

Quasi-Material and Quasi-Things as Elements in The Making of Atmosphere in Architecture

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Abstract

This paper discusses important elements of material that construct atmospheric architecture, namely quasi-material and quasi-things. This paper explores the existence of quasi-materials and quasi-things in affecting the human sense and forming the atmosphere of architecture. It is argued that quasi-material and quasi-things are important as both elements could shift focus in designing architecture from form-based into amorphous, immateriality. This study utilized cases as precedents of atmospheric architecture, which is analyzed for every quasi-material and quasi-thing that plays a role in the construction of the atmosphere. The findings from the precedent analysis revealed that some quasi-materials such as light, wind, and water can be manipulated either by employing simple media or sophisticated instrumentations to produce specific quasi-things. These quasi-things that built the atmosphere inside the architecture would later interact with human senses and emotions, setting up the tone and mood inside the architecture. This research proves that the materiality of architecture could be pursued through immateriality with the appearances of quasi-materials and quasi-things in the making of the atmosphere. This paper demonstrates that the presence of quasi-materials in forming an atmosphere in architecture could support building more sophisticated and coherent rehabilitation facilities by indulging human and atmosphere direct relationship inside an atmosphere.

Keywords: Atmospheric Architecture; Materiality; Quasi-Material; Quasi-Thing; Human Sensory; Immateriality.

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1. Introduction

This paper aims to explore the two important elements in constructing atmospheric conditions in architecture, namely quasi-material, and quasi-things. This topic is raised within the discourse of materiality, specifically related to material characteristics and properties of the material and its connection to spatial experience. The developments in the discourse of materiality include the advancement in material components and design methods, resulting in the new material-based design and utilization of new material substances generated by other disciplines aside from the architecture field. An example is research that focused on finding long-lasting material intended for long-term use. Enhancing the durability of concrete by mixing integrated building systems using polypropylene stealth fiber, and putting extra hand-made

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concrete, will increase the building's wall protection to increase the lifetime and resistance to various climates (Roberts, 2003). However, there is a stagnant, especially related to the idea that mainly only looks to embellish the architectural form for aesthetic purposes. These developments focus more on physical appearances, rather than talking about the characters of the material. Such gestures tend to highlight either traditional values (such as an ornament) or modern production, resulting in a repetition of form or texture (Hedges et al., 2017).

On the other hand, there is a shift in finding a new meaning of architectural form through materiality. Architecture can be formless, amorphous, and even immaterial (Böhme, 2017). It emphasizes the relationship between the user and the "things" that construct the architecture (Hedges et al., 2017). The atmospheric condition constructed by the material and materiality becomes more valuable for experiencing the architecture. Every particular scene of architecture will produce specific atmospheres that trigger several senses and perceptions (Pallasmaa, 2005). It is important to explore the aspect of immateriality inside the atmosphere as it helps to set the atmosphere that triggers senses to connect directly with the user because immateriality could enable several spaces to have their atmosphere spatial qualities to give different experiences (Tuan, 1977).

This idea of immateriality also gave a new meaning to atmosphere construction, as it does not contain hard material, but rather characteristic and formless things (Böhme, 2017). The atmosphere can be constructed by tangible things and intangible things or quasi-things, which exist between tangible things and human senses (Sadar, 2018). This perspective urges the kind of architecture that focuses more on the intangible or immaterial things. Through the Idea of immateriality, we could reach a better architecture design method, because good architecture is something that responds to the senses and gives a unique experience to the user (Zumthor et al., 2006).

2. Theoretical Analysis

2.1 Identifying Quasi-Materials and Quasi-Things

The interesting idea in employing intangible things in architecture is that they could appear transcendently in the space, without being there. The sun, the sunlight, or the resulting shadow (blocked by a particular material), radiation, position, intensity, or other factors can be examples (White et al., 2013). The things give freedom for the user to explore the atmospheric space, such as the absorbed light at the wall resulting from the light that passes the opening of the room (Böhme, 2017). The existence of things inside an atmosphere offers various ideas on attracting and pleasing the eye and provoking the urge to touch using amorphous, intangible things as the main source of atmospheres (Pallasmaa, 2005). Things also help to form a unique scenery inside the atmosphere like the sound of human steps, human noises, sounds, colors, and lights (Zumthor, 2021). Furthermore, the merging and blending of several things will create a different atmosphere (Sadar, 2018).

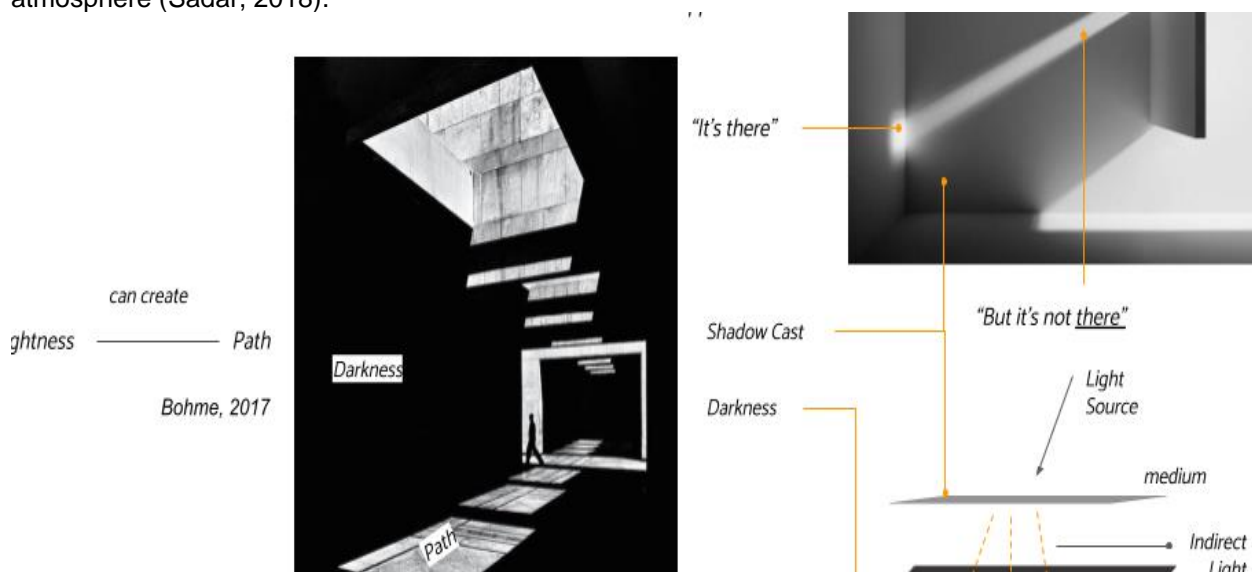


Figure 1. Transcendental Nature of Things, such as Light (Böhme, 2017).

Things shape a particular atmosphere, they radiate a spatial extension into the human sense (Sadar, 2018). Based on Sadar (2018), the term quasi means the resemblance of its original things, like the sound of the

train, the splash of water, and so on. The sound of rain, the breeze of wind, and the smell of grass appear during the rain and can be sensed even though none of them are visible or appear in the space. Sadar (2018) employs the idea of quasi-material and quasi-thing. The idea is that the quasi-material, such as sound, light, smell, etc., interacts with a medium and projects a specific effect known as the quasi-thing. A medium is something that interacts with quasi-materials which is important because it helps to project quasi-things, as an example the hollowed roof of Bruder Klaus Field Chapel by Peter Zumthor, allowed several quasi-materials like, light, dew, and rainwater to interact and create various quasi-things (Trias, 2015). The intertwining of those constructs the atmosphere of a space. Even though quasi-materials may take form as intangible, they can play an important role in the making of atmospheric quality of architectural works. The quasi-things generated from the outdoor natural atmosphere can contribute to the interior atmospheric condition. As an example, rainwater outside that interacts with a medium, e.g. leaves or grasses, causes the sound of tossing, creating a particular atmosphere in the interior. The water that causes the sound effect will become quasi-material and the resulting sound will become the quasi-thing. The presence of quasi-material and quasi-things in the making of atmospheres will affect the human experience.

Quasi-things and quasi-materials affect the way humans perceive the environment. The spatial atmosphere constructed by the quasi-things and quasi-material, stimulates the vision, hearing, smelling, and passivity (feeling and imagination) of the human being (Tuan, 1977). They contribute to creating a particular atmosphere that is directly experienced by the user and triggers old memories and mood settings (Griffero, 2017). As Zumthor designed Bruder Klaus Field Chapel, the interior looks like the atmosphere of the interior of a cave experienced as he grew up surrounded by mountains and farming villages. The memory of his childhood affected his design and thus he attempted to improve the atmosphere in the Chapel. The combination of molten copper floor resembles the looks of cave ground, combined with burned logs that look like a cave wall, and a large opening on the roof that looks like a cave light (Zumthor, 2021). Eventually, the interaction of the quasi-material and the opening as the medium projects such unique quasi-things and creates the atmosphere inside (Harling, 2012). This suggests that quasi-things and quasi-materials potentially become crucial elements in designing architecture.

The main objective of this paper is to explore the role of quasi-materials and quasi-things as important elements in the making of the atmosphere in architecture. This research hypothesized that quasi-materials and quasi-things play important roles in the making of atmosphere in architecture such as an ability to shape atmosphere using amorphic-immaterial features and forge relationships with humans through human senses and emotions. To fulfill this objective, this article is structured into four sections. It starts with discussing the position of quasi-things and quasi-materials in the discourse of materiality and the shifting of designing architecture that emphasizes spatial experience rather than formal composition. It highlights quasi-things and quasi-materials and how both can contribute to expanding design methods. To further examine how quasi-things and quasi-materials are involved in the design, the next step is to analyze how both are employed in each design precedent and how immaterial element becomes an essential strategy in architectural design.



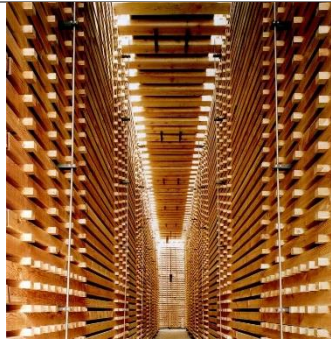

3. Method

3.1 Identifying The Quasi-Materials and The Quasi-Things

To explore the mechanism of how quasi-materials and quasi-things construct a particular atmosphere in architectural phenomena, it is required to analyze the phenomenon based on the atmospheric conditions, the quasi-materials at play, and the quasi-things that occur (Griffero, 2017). This paper employs a qualitative approach by using the case study method. In this case study, architectural works as cases that display a strong atmospheric quality as their design excellences are selected. The qualitative outcome from each case allows an in-depth descriptive explanation (Creswell, 2017), which in this case, of how quasi-material and quasi-things intertwined in the making of atmosphere and insinuates particular sensory experiences or spatial effects. More importantly, these explanations arguably further inform the goals, process of design thinking, and thus the design method of each precedent.

This study employs five precedents of atmospheric architecture, namely the Bruder Klaus Field Chapel by Peter Zumthor, Blur Building by Diller and Scofidio, Swiss Sound Box by Peter Zumthor, Pepsi Pavilion by E.A.T., and Pneuhaus's Atmospheres by Pneuhaus. Each of these precedents is selected based on its atmospheric quality and particular method of generating atmosphere and the appearances or immateriality in their architecture. This research observed only a specific part of the building that employs natural elements as quasi-materials for the making particular atmosphere inside.

Table 1: Atmospheric Precedent Details.

Project Name	Atmospheric Precedents	Method of Generating Atmosphere
Bruder Klaus Field Chapel by Peter Zumthor		Zumthor with his creativity applied his philosophy and transformed it to create phenomenology using atmospheres in his architecture to influence his ideas and his understanding of people (Trias, 2015). His main idea is to compose sound, smell, touch, order, and moods into a single atmosphere, which then melded with the history, memory, and culture of The Bruder Klaus (Pearson, 2016).
Blur Building by Diller and Scofidio	 B. Immersive Environment using (water) Mist (Diller & Scofidio, 2002)	The concept of "The Blur" is to 'blur' the visual and trigger other senses to respond and experience the environment. The main idea is to use the mist to create an immersive environment by utilizing "white noises" projected by dozens of nozzles surrounding the building (Neves & Damazio, 2019).
Swiss Sound Box by Peter Zumthor	 C. Atmosphere of Sound (Schwartz & Ford, 2017)	The plan is to use the stacked wood structure and combine them with orchestras which allow the sound to reverberate through the whole building (Schwartz & Ford, 2017).
Pepsi Pavilion by E.A.T.	 D. Floating Interactive Reflection (Turner, 2014)	Utilizing mirror reflection with the shape of a dome to create three-dimensional, holographic-like images that interact with human motion to give the visitors freedom to create their imaginations (Packer, 2004). The main idea is to encourage the visitors to explore the interactive environment and state their own experiences (Turner, 2014).

Pneuhaus's Atmospheres by Pneuhaus



E. Interactive Light Atmospheres (Pneuhaus, 2023)

Utilizing attributes of sunlight such as sunlight movement, sunlight trajectory, sunlight color, and sunlight exposure to create an interactive environment which triggers human senses. The idea is to capture the design atmosphere using an inflatable structure filled with gas, thus inviting the visitors to interact with the light thrust between the seamed-hexagonal pattern (Ludlum, Eric, 2019).

Two steps were required to formulate the method of creating atmospheric quality employing quasi-materials and quasi-things, which can be the basis of architectural programming. As quasi-things radiate atmosphere (Sadar, 2018, p. 55), the first step was to identify important aspects that construct atmospheric phenomena in each precedent. The important aspects are (1) the quasi-things, (2) the quasi-materials or natural phenomena that become the sources of quasi-things, and (3) the medium involved in the design.

The analysis is conducted based on the literature—in the form of text and visual documentation. Secondly, each type of quasi-material was explored to understand the possibility of making various atmospheric qualities. Each type of quasi-materials intertwined with a particular medium and projected particular quasi-things, to make a specific and desired atmospheric quality. These findings become the basis for formulating the mechanism of making atmospheric quality. The results and their relevance as a basis for designing architecture will later be discussed.

4. Discussion (Constructing The Atmospheric Architecture)

This study attempts to highlight the role of quasi-material and quasi-things in the making of atmospheric architecture. This section analyzes the case study based on three important aspects, namely (1) quasi-material, (2) quasi-things, and (3) the medium used in the creation of the atmosphere of space. Each study case is qualitatively analyzed through a diagram so that quasi-material and quasi-things can be highlighted in the process of making atmospheric architecture.


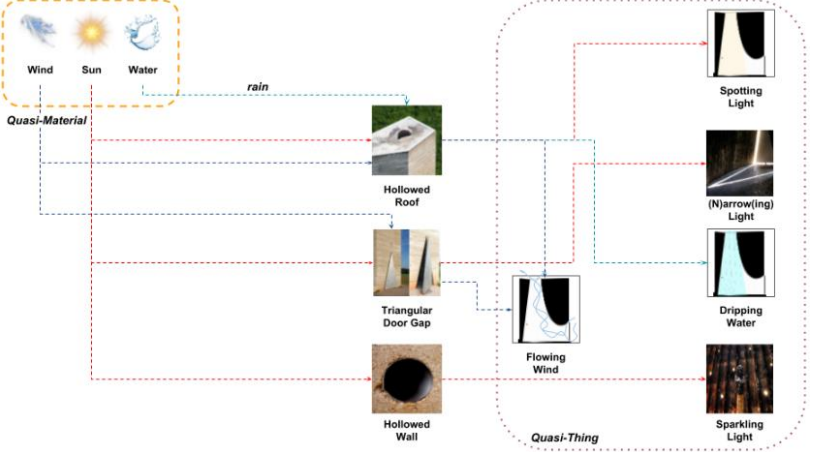

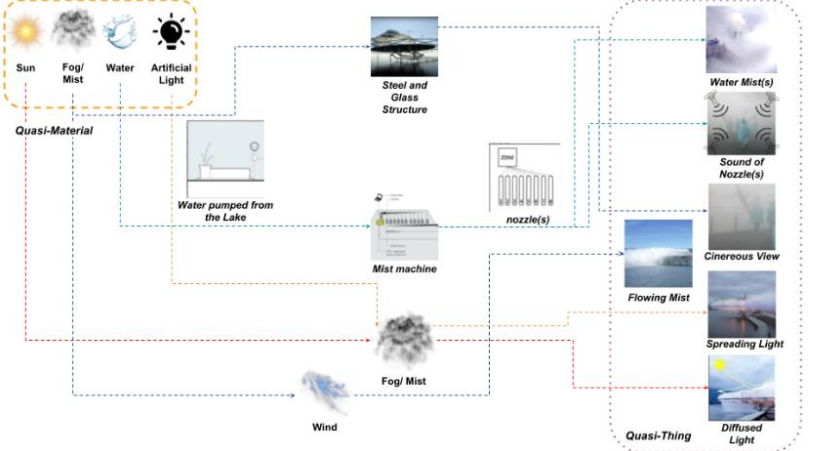
4.1 Identifying The Quasi-Materials and The Quasi-Things

As the first precedent, the Bruder Klaus Field Chapel is designed by Zumthor by generating solemn-mystical space that triggers the solemnness to pray, a place for contemplation, and self-reflection (Crisman, 2009). From the mapping, it can be seen that the Bruder Klaus Field Chapel utilized several quasi-materials to project certain quasi-things. Three quasi-materials based on the natural phenomenon—the sunlight, the wind, and the rain—are used to be projected using media with variations of gaps to achieve the intended quality. The sunlight quasi-material enters the hollowed roof, as a medium, and then as the light spots inside the chapel, the space is enlightened from the darkness. The sunlight also enters the chapel through the triangular gap that acts as a door and projects an arrow-shaped light on the base of the space. Furthermore, the sunlight appears as a sparkling light inside the atmosphere through the small circular glass tubes all over the chapel's vertical surface. The sparkling light changes as the sun moves throughout the day. Here, it can be seen that the variation of projected light inside the chapel—the spotted light, the arrow-shaped light, and the sparkling light—becomes the quasi-things, creating a sunlight-based atmosphere. The second quasi-material that plays a role in the making of the chapel's atmosphere is the wind. As the wind enters the hollowed roof and triangular gap, it causes the effect of flowing wind inside the chapel, creating a potentially breezy experience. The making of this particular condition is unique as the quasi-material is projected through two media. The last quasi-material is the rainwater which only interacts with the hollowed roof and produces dripping water as quasi-things. The three quasi-materials produce eventually five different quasi-things inside the atmosphere which interact with each other and generate the solemn atmosphere of a sacred space and trigger the self-reflection condition (Crisman, 2009).

The Blur Building by Diller & Scofidio employs the water in the surroundings and the mist created through a particular mechanism, the wind, the sunlight, and the artificial lighting to create a blurred experience. Different from the chapel which utilized gaps on the envelope, this architecture employs structure and high-pressure devices with nozzles to vividly demonstrate the design intention—blurring the vision and dimming

out human senses immersively (Neves & Damazio, 2019). The water that surrounds the building is the source of the mist and can be termed as the original quasi-material before it is alternated by the nozzles into the mists that produce floating mist and cinereous view. The presence of a particular quasi-material can be alternated into different forms of quasi-material. The white noise, a dispersing sound produced by the nozzles, also creates the acoustical experience. The changes of natural phenomena—wind direction and sunlight—and additionally artificial lighting interact with the mist, reinforcing the shifting condition of thermal and humidity and creating a spreading and diffused light. This result shows a unique phenomenon where some of the quasi-things could also become medium and quasi-material, which later interact with different media. Furthermore, the interaction of quasi-materials can be employed altogether to produce various quasi-things that provide an immersive atmosphere. In this building, the four quasi-materials produce six quasi-things to blur human senses when entering space.

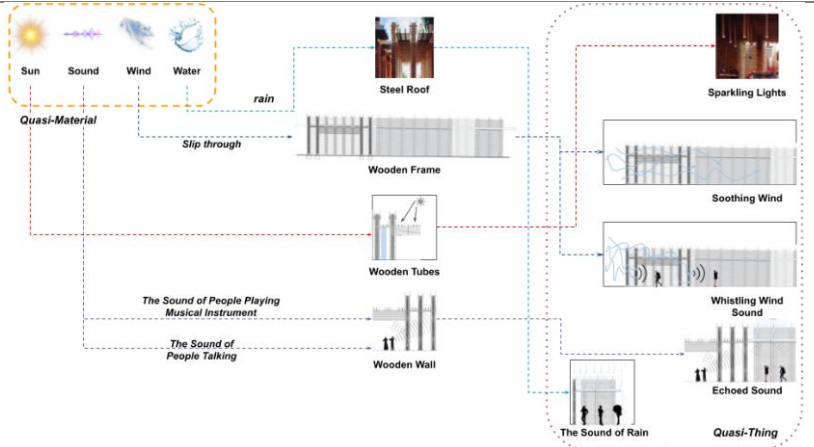
Table 2: The identification of quasi-materials and quasi-things.

No.	Case of Study	Analysis Results
1.	<p>Bruder Klaus Field Chapel by Peter Zumthor</p>  <p>Photographs by Samuel Ludwig and Thomas Meyer (Sveiven, 2011).</p>	
2.	<p>Blur Building by Diller and Scofidio</p>  <p>Photographs by Beat Widmer (Diller & Scofidio, 2002)</p>	

3. Swiss Sound Box by Peter Zumthor



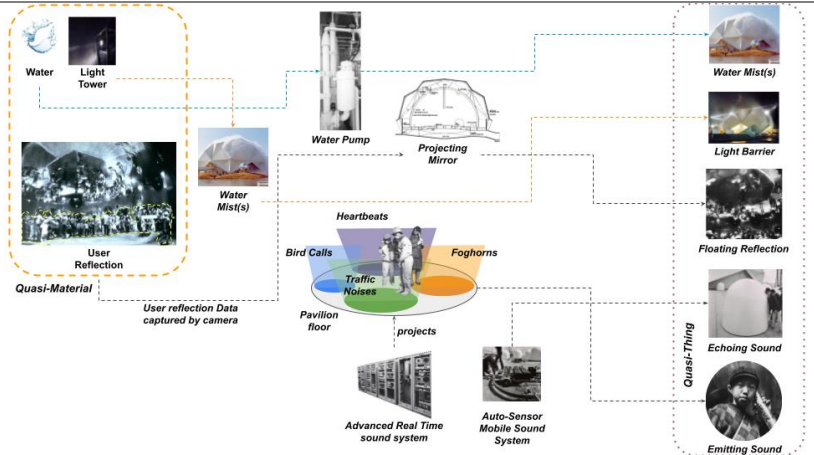
(Schwartz & Ford, 2017)



4. Pepsi Pavilion by E.A.T.



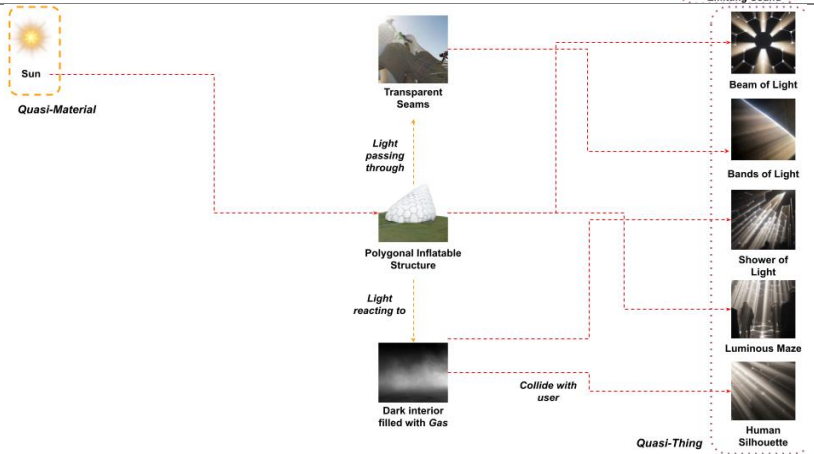
(Packer, 2004)



5. Pneuhaus's Atmospheres by Pneuhaus



(Ludlum, Eric, 2019)



The third precedence, Swiss Sound Box by Zumthor, was built to utilize sound in the atmosphere using highly wood-stacked structures with labyrinth-shaped floor plans. Some of them are covered with metal roofs, providing communal spaces, multiple orchestras, sitting spots, etc. (Schwartz & Ford, 2017). Four quasi-materials can be identified to make the atmosphere of the Sound Box—the sound from the orchestra and people inside, the rainwater, the sunlight, and the wind. The sound from the orchestra and the sound from the people talking act as quasi-materials that interact with the wooden wall, projecting the echoed sound. During the rain, the water as quasi-material interacts with the metal roofs and projects the dripping sound of rain. Meanwhile, the wooden tubes scattered on the ceilings work as media that allow the sunlight to enter the Sound Box and project sparkling lights. The wind also interacts with the wooden frame structure and generates two quasi-things—the soothing wind and the whistling sound. It can be learned also from this case, that two quasi-materials are required to produce a particular quasi-thing, i.e. the echo. This study case shows that five quasi-things are made from four quasi-materials. However, it can also be observed

that not all of the generated quasi-things can be considered relevant to the design intention. The different kinds of sound types produced may be conflicted and not suitable for the building's purpose.

Pepsi Pavilion by E.A.T. as the fourth precedent has a slight similarity with the Blur Building due to the utilization of mist in their atmosphere but not as the main focus. The focus of this building is to create mind-altering realities that use an immersive environment to connect social interactions and virtual reflections (Packer, 2004). Four quasi-materials are involved in making the atmosphere—the water and the mist, the light, and the reflections of the visitors. These quasi-materials create the exterior and interior atmosphere of the Pavilion. Water as quasi-material is processed using the mist maker to project mist that covers the entire structure. This shrouding mist becomes the quasi-material and at the same time a medium for projecting the light. The mist interacts with the light to produce a streaking light and becomes the intended light tower. The shrouding mist and the streaking light play roles in giving the outer atmosphere an immersive and mysterious impression. Meanwhile, the inner atmosphere is built from advanced artificial mirror optics as media which captures the reflection data of the surrounding objects as well as visitors. The reflection of surrounding objects and visitors as the quasi-material is then reflected by the reflecting surfaces and projects a floating reflection as quasi-things (Packer, 2004). There is also an advanced real-time sound system that emits sound from the interaction between the visitor and sensors of the floor. These three quasi-materials and five quasi-things in the making of two different atmospheres give two different experiences from the outside, into the inside.
































































The last case study is the Pneuhaus' Atmosphere, a large inflated construction consisting of layers of polygonal surfaces with a single space filled with fog (Silbert, 2018). By utilizing the sunlight movement using hexagonal patterns as a medium. The sunlight interacts with the transparent seams of the polygons and projects bands of light. The sunlight also interacts with the structure of the polygon to project luminous mazes and beams of light as quasi-things. When the sunlight interacts with the fog gas inside the chamber through the structure of the polygon, a shower of lights is projected. When the shower of lights hits any object as media, it generates a floating silhouette. The role of quasi-things in the Pneuhaus attracts an interaction with the visitors, it insinuates the visitor to try grabbing the light beam. This suggests the transcendental character of the quasi-things by making the visitor think it appears (Kan, 2013).






4.2 Exploring Possible Strategies of Projecting Quasi-Things

After completing the analysis process and describing the results from five atmospheric architectural precedents, it can be seen how each of the quasi-material and quasi-things work in the making of atmospheres. Thus, this section will discuss the strategy employed for each quasi-material to produce various quasi-things, revealing the hidden process for each occurrence.

In Table 3, characteristics of the media play a crucial role in the making of light-based quasi-things. The voids that present as hollowed surfaces, gaps, and holes with certain shapes make a spotting, beaming, shaping effect of light, diffused, etc. These light-based quasi-things can be further treated and intertwined as a new kind of quasi-material. As the entering light interacts with a mist it will be diffused, e.g. the Blur Building. However, if the light interacts with a gaseous medium, it is projected as a streaking light, as occurs in Pepsi Pavilion and Pneuhaus' Atmospheres. These quasi-things give a different experience to the users, for example, a spotting light defines the interior space despite the darkness, a light streak provides hints and a glimpse of connectivity to the outside, and a sparkling light creates a spatial dynamic and thus calming experiences. The vision becomes the first sense that is triggered by the quasi-things and may be followed by the next reaction which is the response to touch (Pallasmaa, 2005).

Table 3: Atmospheric architectural precedence and analysis results.

Quasi-Materials		Possibility of Projecting Quasi-Things																		
The Light																				
	Precedence	 Bruder Klaus Field Chapel			 Blur Building		 Swiss Sound Box		 Pepsi Pavilion		 Pneuhaus's Atmosphere									
	Quasi-Material	 Sunlight			 Sunlight		 Sunlight		 Artificial Light		 Sunlight		 Light Tower		 Sunlight		 Sunlight			
	Media	 Hollowed Roof			 Tri-angel Door Gap		 Hollowed Wall		 Flowing Mist		 Flowing Mist		 Wooden Tubes		 Enshrouding Mist		 Transparent Seams		 Gas	
	Quasi-Thing	 Spotting Light			 Arrowing Light		 Sparkling Lights		 Diffused Light		 Spreading Light		 Sparkling Lights		 Light Barrier		 Beam of Light		 Shower of Light	
	Atmosphere	 Solemn Space			 Leading Space		 Cave's Slit Light		 Sky Walk		 Glowing Clouds		 Cave's Slit Light		 Restricted Enclosure		 Astral Constellation		 Piece of Light in The Forest	
The Wind																				
	Precedence	 Bruder Klaus Field Chapel			 Blur Building		 Swiss Sound Box		 Pepsi Pavilion											
	Quasi-Material	 Wind			 Wind		 Wind		 Wind		 Wind									
	Media	 Roof and Door Gap			 Water Mist		 Wooden Structure		 Wooden Structure		 Water Fog									
	Quasi-Thing	 Flowing Wind			 Flowing Mist		 Soothing Wind		 Whistling Wind Sound		 Flowing Fog									
	Atmosphere	 Cold Dark Cave			 Sky Walk		 Calming Wind		 Enshrouding Fog											

The Water					
Precedence	 Bruder Klaus Field Chapel	 Blur Building	 Swiss Sound Box	 Pepsi Pavilion	
Quasi-Material	 Rain	 Lake Water	 LakeWater	 Rain	 Water (Water Tank)
Media	 Hollowed Roof	 Mist Machine	 Nozzles	 Steel Roof	 Fog Nozzles
Quasi-Thing	 Dripping Water	 Water Mist	 Nozzles Sound	 Sound of Rain	 Water Mist
Atmosphere	 Water Dripping inside The Cave	 Sky Walk	 Caught in The Storm	 Rain in the Cabin	 Enshrouding Fog
The Sound and Miscellaneous					
Precedence	 Swiss Sound Box	 Pepsi Pavilion		 Pepsi Pavilion	
Quasi-Material	 Sound of People Talking	 Advanced Real Time sound system	 Auto-Sensor Mobile Sound System	 User Reflection Data	
Media	 Wooden Structure	 Handset Sound Projector		 Projecting Mirror	
Quasi-Thing	 Echoed Sound	 Emitting Sound	 Echoing Sound	 Floating Reflection	
Atmosphere	 Lost in The Labyrinth	 Exploring Sound	 Random Noise In The Woods	 Hologram Technology	

The second analyzed quasi-material is the wind, which also interacts with different types of medium. If the wind interacts with gaps and holes, it slips through continuously and can give a soothing feeling. If it interacts with a gaseous or mist, it will move the gas or the mist away and create a flowing mist or even clouds. The wind can produce sounds if it slips through several tight gaps at a high speed. From the analysis above, the wind-based quasi-materials can project two different types of wind as quasi-things: (1) the visible, such as fog, mist, and dew; and (2) the invisible, such as the flowing air and humid air. The visible one will trigger the visual sense. Thus, the mind will unconsciously create the visual space which is the barrier-less space that is occupied by the fog or the mist (Tuan, 1977). The invisible wind will take a slower reaction because of its invisibility. Thus, it could only be responded to through the tactile and auditory senses (Pallasmaa, 2005). The continuous flow of the air or wind hitting the skin will slowly affect the human mind, creating a spatial extension and triggering specific memories of several places with similar conditions (Borch, 2014).

Water as a quasi-material offers the possibility of how it interacts with different types of medium. The rain, which would be a natural occurrence, produces two kinds of quasi-things. The first one is the movement of water and the second one is the sound produced by the movement. The rainwater can be dripping water

or falling water as it moves through gaps or holes and causes dripping or murmuring sound as it falls. When the water collides with the steel surface, it creates another sound. Meanwhile, in some cases, e.g. Pepsi Pavilion and Blur Building, the surrounding natural water, like lake water or groundwater, is processed by a machine and then converted into mist, providing a mystical vibe. The water-based quasi-things could provide peace to the human, as it projects visual, tactile, and auditory quality that is cooling and soothing, and eventually comfort (Tuan, 1977).

Lastly, the sound produced as quasi-materials or quasi-things that were originally produced from other quasi-materials can also be used to enhance the atmospheric condition. The sound of people talking or the orchestras playing if interacting with the hollowed wood stack as a medium will be echoed around the surroundings, becoming quasi-things. Meanwhile, sound in Pepsi Pavilion acts as quasi-things, which is produced by media using advanced artificial intelligence. The surrounding movement from the visitors is processed by a media that involves algorithms and sensors to emit the sound in the pavilion, giving a mysterious vibe. The media can also be used for additional quasi-things like hologram reflections based on the reflection data captured and project it back in a specific direction, e.g. to the mirror dome). Cyclically and iteratively, the hologram triggers vision and movement, which would be followed by further projection of sound. The existence of particular or several sounds in the atmosphere will decide the type of scenery of the atmosphere since the sound can trigger a specific memory of an image or a fantasy (Borch, 2014).

4.3 The Making of Atmospheric Quality

From the discussion above, it can be shown that a quasi-material has the potential to produce multiple quasi-things by utilizing various media. A specific method is required to produce a specific condition inside the atmosphere to trigger specific senses. The quasi-things that are produced by the light as quasi-material will trigger a visual experience, the quasi-material that produces sound as quasi-things will trigger an auditorial experience, the smell will trigger an aural experience, and so on.

Furthermore, a quasi-material can be transformed into several kinds of quasi-things, produced as separate processes or sequentially. It is also possible for a quasi-thing to become quasi-material to be further processed or projected. Several unique phenomena were found during the analysis process, such as a particular media that can produce up to two quasi-things, a single quasi-thing that is made from two quasi-materials, a quasi-thing that becomes a medium and also a quasi-material, and quasi-things that are projected without having a medium and quasi-material, but from advanced artificial technology triggered by motion.

The diagrams in Table 2 show that several quasi-materials like sun and wind can have similar behaviors when interacting with similar media. As an example, if the light or the wind interacted with gaps or tubes, it would slip through or pass through the media. It also shows how different types of quasi-materials that projected several quasi-things could give the same experience, such as the rain that interacted with the hollow roofs causing it to drip will give the scenery of the cave interior, just like the existence of mist inside the scenery will add the solemn atmosphere.

Figure 2 illustrates how quasi-things can be reworked to be the new quasi-material and interact with the medium to create new quasi-things. This occurs when the quasi-things that are projected are being interact directly with different mediums, which then automatically project new quasi-things. As an example, the quasi-material sunlight is projected through polygonal seams, creating quasi-things—a shower of lights. This quasi-thing, light showers, then interact with the visitors, which act as a medium, producing human silhouettes, and other quasi-things. The quasi-materials can produce multiple quasi-things. Another example is in the Blur Building, where the lake water becomes the quasi-materials that are projected by the mist machine into water mist, the first quasi-thing. However, these quasi-things interact further with the wind and thus create a humid flowing wind. In this case, the wind as a natural element becomes the medium, similar to the nozzles of the mist machine. In the same project, the water mist is quasi-things continuous to be the medium for the artificial light, causing the light to be diffused around and pierce through the water mist. Similar cases can be found in Pepsi Pavilion when the water fog as quasi-things will be the media which later interacted with the light tower (quasi-materials) to create light streaks.

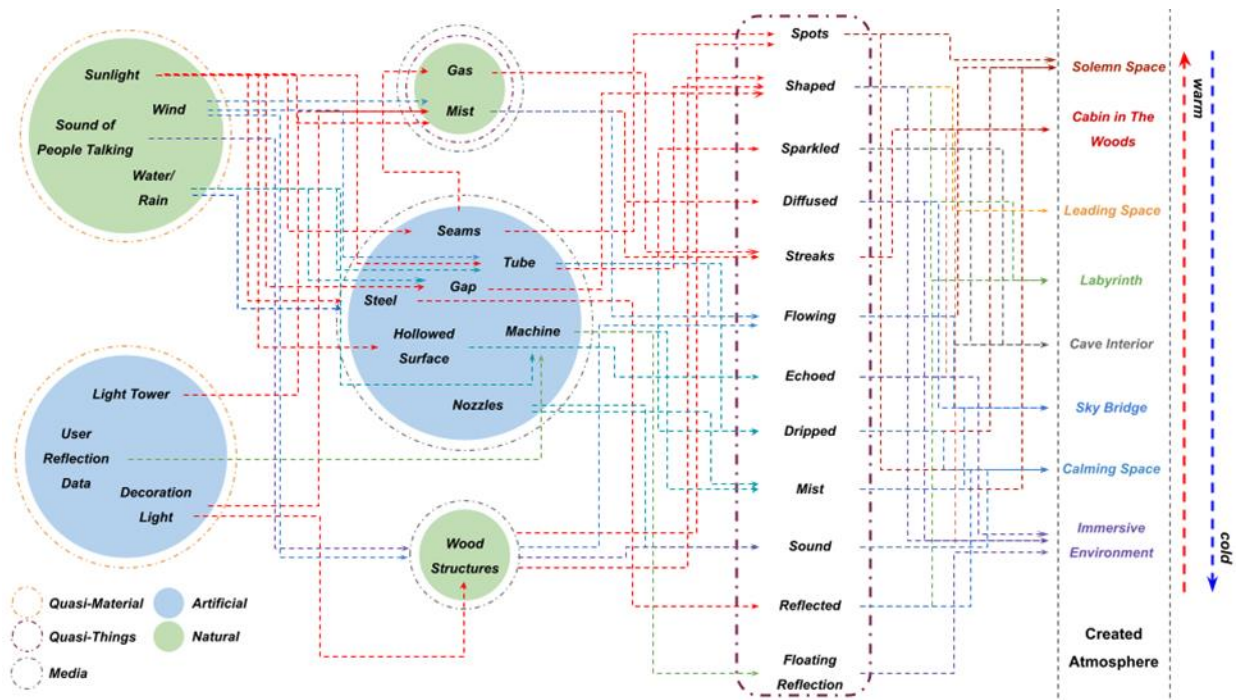


Figure 2. The process of making atmospheric quality by employing natural quasi-material.

Furthermore, Figure 2 suggests that several interactions between quasi-material and quasi-things are required to create a specific atmosphere. For example, creating a solemn atmosphere requires having a dripping sound of water, flowing wind, and mist to calm the mind and to trigger the feeling to meditate or self-reflect (Crisman, 2009). Creating an immersive environment, it needs an atmosphere that triggers the visitor's curiosity to interact with the quasi-things, such as light streaks, reflected images, echoed sounds, shaped lights, and so on.

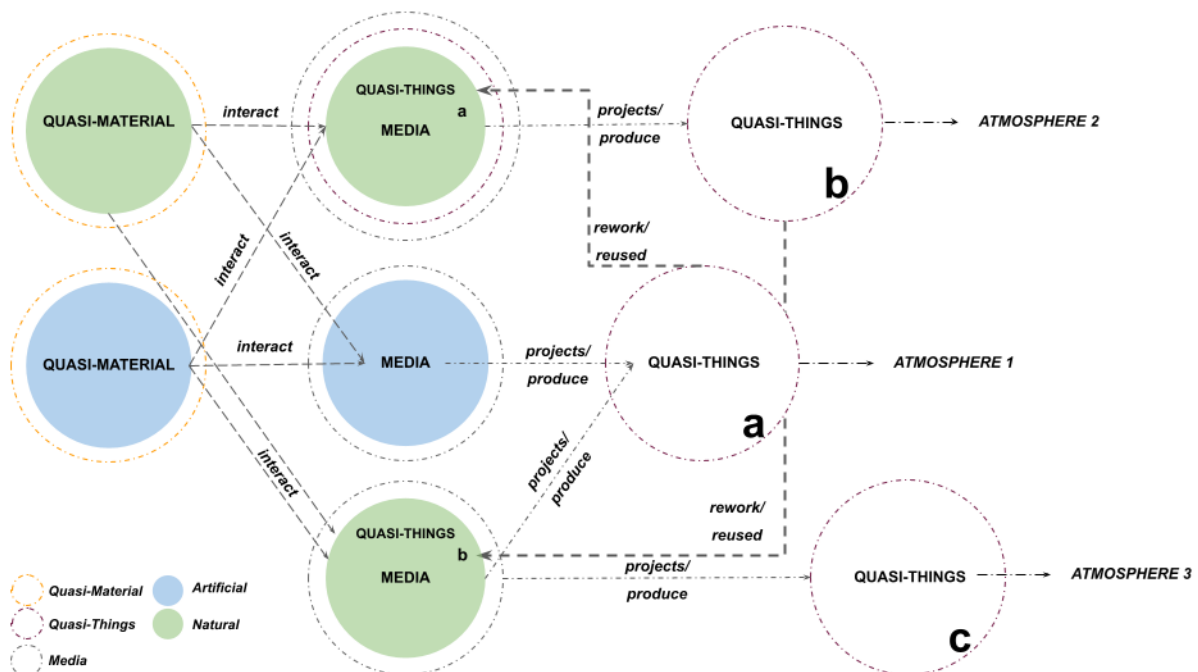


Figure 3. The cross-interaction of quasi-materials, medium, and quasi-things in the making of the atmosphere.

Figure 3 attempts to visualize the intertwining of quasi-materials, medium, and quasi-things in the making of the atmosphere. It highlights the importance of the three aspects and their interrelationship, which offers the possibility of producing unlimited possible atmospheric qualities. The illustration above also positions the medium as a crucial aspect. Two kinds of quasi-materials can interact with the same medium to produce two or more quasi-things, allowing a cyclical or iterative process that projects further atmospheric quality. Below, the above diagram will be simplified flow, to emphasize the process of making the atmosphere and how quasi-thing can be reworked as a quasi-material and projects further new quasi-things.

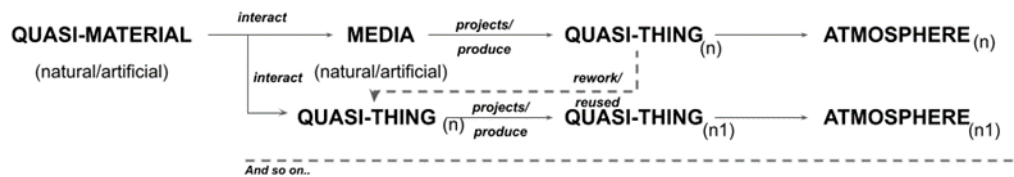


Figure 4. The possibility of reworking quasi-things as a medium.

Figure 4 suggests that a particular atmosphere can be created from the cross-interaction of quasi-materials, media, and quasi-things. The formula shows how a particular quasi-material could result in unlimited interactions between the media and quasi-things. Quasi-things can be a medium or quasi-materials for further projection. If a quasi-thing is reworked and becomes the new media and interacts with the same quasi-material, it will project a new quasi-thing. The particular atmosphere is then can be designed through the intertwining of quasi-materials, the media, and quasi-things. These findings implore a new meaning to the architectural design method, as it employs intangible things to make an atmospheric architecture, rather than having a coincidental atmosphere from objects, forms, and tangible things.

A single spatial experience could contain several atmospheric qualities, which is a cross interaction from quasi-materials, media, and quasi-things. There are unlimited resources on how to create a desired atmosphere in an attempt to trigger the sensory experience of the user and the architecture. This implies that the role of immaterial quasi-materials, media, and quasi-things are becoming more crucial in creating architecture with strong atmospheric qualities rather than only depending on formal architectural elements. Based on the discussion above, the process of making an atmosphere can be a way of designing architecture. This idea can shift the architectural design process by emphasizing creating an atmosphere. In this approach, architectural elements such as enclosures and openings should be arranged to achieve the intended atmospheric quality, rather than the architectural form. By employing this method, the whole architectural structure and construction are only there to support the making of a particular atmosphere, meaning in the future, the architecture are the instrument for constructing the atmosphere.

5. Conclusion

The findings of this study demonstrate that quasi-material and quasi-things play an important role in the making atmosphere. This study contributes to the current understanding of the existence of quasi-materials and quasi-things in affecting the human sense and forming the atmosphere, even though both aspects are intangible or immaterial. The findings of this study also suggest an important knowledge that would expand our perspective in designing architecture that focuses more on the making of atmosphere rather than solely finding form. The form-finding process should shift to arranging the quasi-materials and quasi-things as architectural elements.

The findings from the precedent analysis revealed that some quasi-materials such as light can be manipulated by employing media, either simple techniques or sophisticated instrumentations, to produce specific quasi-things. This research found that quasi-material, media, and quasi-things work as interrelated elements in making a rich and sense-triggering atmosphere through an intertwining of the three aspects. Understanding the intertwining process of those three occurs either as a separate or sequential process and becomes crucial in constructing a particular atmosphere. Through the cross-interrelation between quasi-materials, media, and quasi-things, the possibilities of making the atmospheric condition of the architecture become unlimited.

The study demonstrated that the existence of quasi-materials, media, and quasi-things is important as architectural elements could shift focus in designing material from form-based into amorphous or immaterial. This research also proves that the materiality of architecture could be pursued through immateriality with the appearances of quasi-materials and quasi-things in the making of the atmosphere. In conclusion, the

exploration throughout the atmospheric architecture precedent study revealed that quasi-material and quasi-things could become the main component to construct new atmosphere(s) in architecture which could interact directly with human senses and trigger human emotions and memories. This feature enables architecture to provide a desired atmosphere to create a certain tone and set several moods.

As a contribution, this study expands the idea of immateriality as an architectural element and the making of atmosphere as a basis for designing architecture. The findings from this study could be a stepping stone for the atmospheric-based design method, especially by utilizing quasi-material and quasi-things. Due to the limitation of current research, further study is still needed to explore further the characteristics and mechanism in employing the media which would be the key to projecting the quasi-materials into quasi-things, in the pursuit of immaterial-based architecture.

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Conflicts of interest

The Author(s) declares(s) that there is no conflict of interest.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

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