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VIRTUAL REALITY

Architecture, Culture, and the Body

TATJANA CROSSLEY





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This book investigates how immersive environments, across architecture, art, and media, shape spatial perception, cultural identity, and the construction of reality. It offers a spatial-psychoanalytical reading of virtual reality (VR), examining how architecture and representation engage with the body, sensorial experience, and subjectivity.

Redefining VR as an experiential and spatial condition rather than simply a digital construct, the book traces its lineage from ancient fresco rooms to contemporary digital landscapes. Grounded in theoretical frameworks from psychoanalysis, phenomenology, and media theory, it explores how immersive environments function as extensions of the body and reflect a collective identity. Case studies, from Pompeii to the Metaverse, illustrate how architecture and representation shape our virtual experience. Rather than viewing VR as a new phenomenon, the book positions it as part of a longer trajectory in design and representation, shaped by evolving tools and technologies. It argues that the virtual spaces we create and the artifacts we choose to represent encode insights about identity, memory, and social conditions.

This book is written for theorists, practitioners, academics, and students of architecture, art, and design. It situates architectural practice within the unfolding discourse on virtuality, identity, and the cultural implications of space-making.

Tatjana Crossley is the co-founding partner of ArchiTAG, an architectural and research practice, and an assistant professor at Wentworth Institute of Technology. Her design leadership in both practice and academia fosters a diverse collective of voices and agendas, integrating culture, history, and

place-making into the design process. Her work explores the technological dimensions of design, proposing new ways of perceiving and fabricating our built environments. She interrogates the representational mediums and the cultural and social implications of virtual spaces. Her applied research focuses on the sensorial and psychological dimensions of immersive spaces and VR, and she has lectured internationally on these topics. Prior to establishing ArchiTAG in 2019, Tatjana earned her Ph.D. from the Architectural Association, her MArch II from Harvard Graduate School of Design, and her B.Arch. from Rice University.

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To my daughter, Livia.

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Preface

Throughout history, humans have told stories using language, art, and the built environment to convey experience. This book explores the evolving relationship between design, culture, and the body, examining how our virtual narratives shape identity, memory, and collective meaning. Rather than viewing virtuality as separate from reality, this book argues that it is an inherent condition of lived experience – deeply embedded in the material world.

This project began as my Ph.D. dissertation at the Architectural Association in London and has continued to evolve alongside me through different phases of my life and career. In this past year, it has coincided with a profound shift in my own reality: becoming a mother. The experience of pregnancy, postpartum, and the early months of motherhood forced me to slow down, to observe, and to reflect on the ways we construct meaning. It reinforced for me that knowledge is not static; it is shaped by our lived experiences, by the worlds we inhabit, and by the ones we pass down.

I hope this book offers not only a critical lens on virtuality but also an invitation to consider how the spaces we create shape the way we experience and understand the world.

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To Livia, who has given me a new perspective on the narratives I wish to transcribe and the worlds I aspire to pass down.

To my parents and my family, who have supported me throughout my life and instilled in me a profound respect for education and knowledge. To my father, who eagerly deciphered Merleau-Ponty's texts so that we could engage in meaningful discussions together, and to my mother, who nurtured my deep connection to culture and its role in community and the production of art.

To my brother, Alex – my very first pupil – thank you for letting me role-play as a teacher during our childhood and for being a pillar of my journey.

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To my friends, whose vibrant energy has been a force of nature in my life. To Naina Gupta for being a constant sounding board for my ideas.

I am also indebted to all the teachers who have cultivated my curiosity and to my colleagues at WIT and in Boston for creating such a collaborative and supportive community.

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Introduction

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There is a long-standing tradition of creating architectural spaces that consume their occupants through the forms, the lighting, the materials, the sensorial engagements, and the alternate realities they provide. These spaces constitute the immersive. While working at different scales and modalities, they produce virtual encounters with the narratives of their creators. The effectiveness of these immersive spaces can be attributed to the cultural stories they convey, making them captivating and relevant for the study of the virtual.

Redefining the Virtual, Beyond the Digital

Storytelling and myth have long played a central role in human culture, serving as tools for transmitting knowledge, constructing identities, and interpreting the world. These narratives, embedded in virtual reality (VR) immersive spaces, extend beyond mere decoration or context. They actively shape how we perceive and engage with the environments we occupy. Throughout these chapters, this book will argue that the immersive, a condition present to some extent in every space we inhabit, results from two important factors: the sensory-perceptual shifts caused by the space and its unique cultural makeup. This will be examined through philosophy, the human psyche, and case studies that range from ancient Roman frescos to contemporary VR applications ([Crossley, 2022](#)). While this broadens the notion of the immersive, the focus will remain on deliberately created

immersive environments in art and architecture. These spaces function as VRs that use various mediums and present narratives that can be uniquely experienced. I acknowledge that this expands the traditional definition of VR. Although the term was used in different contexts throughout the 20th century and was popularized in the 1980s by Jaron Lanier who began VPL Research, this book reinterprets VR as constructed spaces proposing spatial properties beyond their physical manifestation. *VR, then, is not the opposite of reality but a type of reality extending from a physical interface, constrained by its respective technology and cultural framework.* As [Marshall McLuhan's media theory suggests \(1964\)](#), the medium itself shapes and transforms human perception as much as the content it conveys. Immersive environments function as media that reframe reality, using these frameworks and influencing not just what is experienced but how it is perceived ([Dolinsky, 2009](#)). The VR extends beyond its role as a representation, actively engaging with the senses and cognition while shaping them. As Ellen Lupton and Andrea Lipps consider in their book and exhibition *The Senses: Design Beyond Vision*, our environment is understood through a symphony of sensory cues that come from touch, temperature, proprioception, sound, smell, taste, and vision. These construct narrative and spatial awareness. It is a multisensory approach that relies on the mediums of perception ([Lupton & Lipps, 2018](#)). McLuhan's famous phrase, 'the medium is the message' (1964), is particularly relevant as VR provides a specific presentation of information that immerses the user, making them a part of the narrative. This encompasses artistic practices encapsulating environments and imaginary conditions for millennia, positioning VR as a methodology of immersion rather than a concept tied to specific technologies. In both ancient and contemporary contexts, these spaces act as extensions of human perception, aligning with McLuhan's theories on media as extensions of man.

While contemporary discourse often associates VR with digital simulations and head-mounted displays, this text broadens the definition to include any constructed immersive experience that reshapes perception. Immersion does not require digital interfaces; it is a function of spatial

manipulation, sensory engagement, and cultural context. Throughout the book, we will look at several examples that all created virtual worlds long before the advent of computer-generated imagery.

This expanded definition also relates to McLuhan's assertion about the medium, emphasizing that technological interfaces—whether frescoes, architecture, art, or digital screens—mediate perception as much as the content they convey. VR is more than an escape from a physical environment; it is, in fact, an inevitable extension of it, reflecting cultural narratives and evolving with media innovations. By redefining VR as an experiential condition rather than a technological product, we can analyze how immersive environments have historically functioned as virtual spaces long before the term was coined.

There is an important role of embodied cognition in VR. Since perception is deeply influenced by the body's interactions with its environment, immersive spaces, whether physical or digital, manipulate sensory input to create a heightened sense of presence ([Aguilera, 2012](#)). This means that perception, thought, and decision-making are not just products of the brain but are shaped by sensorimotor experiences. Susan Leigh Foster discusses this in the context of choreography and dancing. The body is experienced as 'a body-of-ideas' (1992, p. 482). The body's movement, posture, and engagement with space all play crucial roles in shaping cognition. The way humans encode and recall space is deeply connected to movement. This can be described by something as simple as remembering directions from point A to point B, going through the step-by-step motions, but also deals with research in mirror neurons. These studies reveal that observing an action can activate the same brain regions as performing it. This relates to the idea that mediums shape perception but also extends to the idea that VR environments can reconstruct our cognitive processing. Craig D. Murray and Judith Sixsmith describe this in their text 'The Corporeal Body in Virtual Reality' referring to the malleability of the body. While their definition of VR is constrained to the digital, they assert the importance of the sensorial, acknowledging the reliance on the visual (1999). They also describe the debate in VR discourse between the idea of a

mind/body split or Cartesian duality, where the experiential body is replaced with a virtual one, versus the idea of an embodied experience where specific sensations are associated with the virtual environment ([Murray & Sixsmith, 1999](#), pp. 318–319). Like them, this text supports the notion that the virtual is embodied.

Virtuality and Representation

The philosopher, [Grant Tavinor \(2022\)](#), similarly considers VR alongside other artistic representational forms and mediums, defining VR as a medium. Historian and theorist, Oliver Grau, extends this notion, asserting that historic and contemporary representational mediums fall under the umbrella of VR, united by their production and experience of narrative. VR is positioned as a continuum of representational media that does not emerge in isolation but has evolved alongside the history of illusionistic techniques that have produced a sense of atmosphere, trompe l'œil, and multiple perspectives. This insight allows for this broader definition of VR, seeing it as an ongoing evolution of immersive media rather than a sudden technological innovation. Furthermore, [Jean Baudrillard's concept of simulacra \(1994\)](#), where representations begin to replace and even supersede reality, deepens this understanding of VR. Immersive environments, as constructed realities, blur the line between the real and the hyperreal, inviting participants to experience spaces where the distinction between simulation and reality dissolves. In Baudrillard's view, culture is dominated by forms of representation that create their own distinct reality. This blurring of reality and simulation is evident in VR environments, where users experience a heightened sense of presence within a space that is entirely a human construction. Understanding why these environments feel immersive requires us to understand the body image, a term that will be discussed in greater detail in these chapters. We will see through case studies how presence is realized and how many of these achieve the effect where the distinction between 'real' and 'virtual' is blurred. The

representations may depict illusionistic spaces but are realities in themselves ([Tymieniecka, 2011](#)). This occurs because the human brain responds to these virtual stimuli in the same way it does to other experienced stimuli. Applying this to historical case studies highlights how immersive experiences have long shaped human engagement with narrative and perception. To understand the spaces, the mind builds a cognitive map that places the body. It is a cultural and social phenomenon where users bring their identities, behaviors, and social interactions and use the constructed reality as a new arena for identity formation and social life. Thinking about VR in these terms suggests that reality is plural and subjective, that we constantly maneuver virtual conditions and navigate a reality that moves from one constructed environment to another. This text builds on these perspectives to explore how immersive environments across time and cultures contribute to evolving notions of subjectivity and spatial experience. Ultimately, the cultural function of immersive environments extends beyond aesthetics and superficial readings, serving as mechanisms for encoding and transmitting knowledge ([Forty, 2004](#)). These spaces function to reinforce collective memory and identity. While some postmodern philosophers worry that as our technologies improve, the ‘virtual’ will be favored over the ‘real,’ leading to a *Ready Player One* dystopia ([Cline, 2011](#)), I argue that throughout history, *we have always negotiated virtuality and have constructed versions of hyperreality through our mediums of representation.* VR is part of this evolution in communication technologies and their influence on society. Each new medium—from fresco to architecture, from print to telephone and radio, from television to video call and beyond—amplifies some aspect of us. Each extends our perceiving capabilities and, in doing so, transforms how we experience the world. VR can be understood as an umbrella term for all of these and as a culmination of media’s trajectory. It is an attempt to create an all-encompassing extension of human consciousness into a fabricated space, whether that space exists on a canvas, in a novel, in our physical built environments, or our digital ones.

Contemporary media theorists have further examined how VR fits into concepts of immediacy and mediation. Jay David Bolter and Richard Grusin, in their [*Remediation: Understanding New Media* \(1999\)](#), describe how new media refashion older media to create a feeling of unmediated immersion in the content. The ideal situation is to make the interface (the device, frame, hardware, or software) disappear from the user's awareness, so that the virtual world is experienced as directly as possible. With evolving technologies, the framing of the virtual continues to dissolve. The experience is carefully orchestrated to suspend disbelief. The history of immersive environments culminates, for now, in today's digital VR but does not begin there. Instead, it is a grand human narrative of inventing new mediums to convey experience. While the tools have changed from pigment to pixels, the underlying goal remains the same: to immerse our minds in worlds of our own making and reflect on what it means to perceive, to imagine, and to be present in a reality of any kind. The artist and philosopher Koert van Mensvoort furthers this with his *Pyramid of Technology* (2013), where he describes how technology becomes nature. Agriculture, language, and electricity, for example, are just some technologies that have become second nature. We no longer recognize them as technologies since they are so embedded in our way of life. Mensvoort describes the steps technologies must take to become 'vital,' going through stages of 'envisioned,' 'operational,' 'applied,' and 'accepted,' before becoming so ingrained that they are invisible. In examining case studies, we can see how artists and architects have attempted to frame space and immerse people into these constructed narratives. While some may argue that the device did not dissolve, we can reflect upon how these virtual spaces throughout history did become a second nature for their users and how important they were for the proliferation of culture and social structure.

Artistic and architectural representation, using diverse technologies, produce perceptual shifts that enable the evolution of the body image within space ([*Vischer et al., 1994*](#)). Body image, defined as an experiential body, shapes our understanding of relationships to our environment and other

bodies. While related to subjectivity, it is distinct: subjective experience informs the body image, which serves as a dynamic imprint of collected experiences, framing future perceptions. It is central to VR and immersive experiences. VR raises fundamental questions about reality, perception, and existence that resonate with debates in phenomenology, postmodernism, and media theory. The evolution of representation allows us to manufacture experience. From a phenomenological perspective, the virtual allows us to reinterpret ideas about perception. Phenomenologists like Edmund Husserl and Maurice Merleau-Ponty provide valuable insight into the active role of the body in the production of the world. As [Merleau-Ponty \(2002\)](#) argues, the body is not merely an object in space but a lived, perceiving subject actively participating in the world's spatiality. This perspective underscores the embodied nature of VR, where perception is inseparable from the experience of space. The senses are an important part of this, and VR can work with both sensory deprivation and sensory overload; users develop spatial memories that have lasting cognitive effects. This book elaborates on these terms, as they are integral, and examines them through philosophy, psychology, and design, which are all shaped by cultural and social conditions. Immersive environments can be seen as mechanisms of differentiation, where sensory encounters generate new repetitions that alter or reinforce cultural and perceptual frameworks. This difference and repetition, as defined by Gilles Deleuze, provides an understanding of how, in VR spaces, experiences are repeated with variations that lead to new forms of subjectivity and perception. We can parallel this with the work of Merleau-Ponty. Cultural experience is reinforced through the narratives embedded in immersive space. These spaces challenge existing structures by enabling dynamic, non-linear engagements with their narratives ([Deleuze, 1994](#)). The body image constantly evolves through sensory observations to 'stabilize' itself within these contexts. This 'stabilization' precedes controlled movement and spatial reaction.

Body Image and Subjectivity in VR

From a psychoanalytical perspective, the initial body image forms through self-perception (mediated by the gaze and sensory processes) and continues to reflect the entire perceptual history of an individual. The design of space has a profound impact on memory and imagination. Immersive spaces offer renewed sensations, leading to changes in the body image and adding layers to this perceptual history. This book views immersive environments as tools for developing subjectivity, acknowledging how people's lives are shaped by the places and cultures they inhabit ([Bachelard, 2014](#)). Drawing on [Elizabeth Grosz's perspectives \(2001, 1994\)](#), immersive environments can also be understood as spaces where the body becomes a site of transformation and negotiation. Grosz's work foregrounds how cultural, social, and architectural frameworks inscribe meaning onto bodies, influencing their movements, perceptions, and experiences ([Grosz, 1994](#)). They act as an extension of the body ([Blackman, 2012](#)). These insights are critical for unpacking how immersive spaces both reflect and produce the cultural and psychological narratives of their creators and occupants. [Part I](#) defines 'body image' and the role of immersion. [Part II](#) defines VR and applies theoretical concepts to historical and contemporary immersive environments, exploring their cultural and social implications. It reflects on art and architectural narratives that provide new sensorial perspectives and insights into the cultures that produce these spaces. The book's trajectory evolves from the 2D to the 3D to the digital, examining the body image within space from planar to multiaxial perspectives. Case studies offer a new understanding of architecture by examining the relationship between the subject, the immersion, and culture. The book uses these examples to track a lineage of VR, redefining VR as an evolving medium of representation.

VRs have existed throughout human existence, arguably since the advent of representational forms. Innovations in art and technology allow further experimentation with immersive experiences. While technology introduces new tools, each regime of representation serves to produce a version of the immersive, with no single regime inherently superior. Each reflects the technological innovations and cultural values of its creators, collectively

demonstrating variations on humanity's enduring desire for immersion. Humans thrive on narrative, producing mythologies that define their conditions. Ancient representational forms are as valuable to study as contemporary ones, revealing insights into space construction and influence on its subjects. Anthropologically, myths and storytelling have functioned as mechanisms for encoding and perpetuating cultural values, allowing societies to preserve and reinterpret their identities across generations. They create a shared framework for understanding collective experiences. Psychologically, they fulfill a fundamental human need for meaning, enabling individuals to locate themselves within a larger cosmological or cultural context. Ancient models provide knowledge and methodologies applicable to subsequent immersive and virtual regimes. We can consider spaces like the Ancient Egyptian tomb paintings that were designed not merely as decoration but as spiritual manuals for the deceased that provided the essential sequence of steps for their journey into the afterlife. From a Jungian perspective, these myths and symbols become an expression of identity and are a universal element of human experience. While we might look at these paintings and recognize the information provided as part of this myth-making process, for the people using them, these representations extended reality into these virtual depictions. In this case, the afterlife was very real, and these depictions shaped how this afterlife was perceived and experienced ([Coates, 2012](#)). The process of representation makes the mythology reality and gives weight to the experience. There is a profound connection between the beliefs of a culture and the virtual. Throughout these pages, we will look at several spiritual spaces that have relied on VR to support their belief systems. Mosaics and religious iconography, illusionistic paintings, stained glass, and architectural grandeur all contribute to this sense of feeling enveloped by a divine presence. Many of these spaces also employ movement to reinforce memory, deliberately constructing an architectural experience that is guided. We will discover how art and architecture are used to produce VR by overwhelming its occupants with these narratives, bringing them into the fold.

Myths, Memory, and Cultural Transmission

VR frequently employs motifs of the hero's journey, rites of passage, and transformation, which suggests a fundamental human need to engage with these structures. To demonstrate this cultural transfer, the Great Frieze at the Villa dei Misteri in Pompeii serves as an early surviving immersive environment. Dating from around 60–40 BC ([Gazda, 2000](#), p. 1) and preserved under lava and ash with the eruption of Mt. Vesuvius in 79 AD, ([Maiuri, 1960](#), p. 5) this Dionysian fresco¹ in Room 5 of the villa is significant for its narrative immersion ([Macchioro, 1911](#)). Two levels of subjective experience are apparent: the initiate depicted in the fresco and her evolution during the ritual scenes and the actual initiates who inhabited the space and engaged with its depictions. While interpretations of the room's purpose vary, this text focuses on its representation of the Dionysian cult initiation ritual ([Fortunato, 2017](#)).

In looking at the narrative portrayed, we can understand the initiate's evolution as she goes through different steps of initiation into the Dionysian cult. In each illustrated phase of the process, she is depicted to have gained new sensory experience, which results in her growth. This body image evolution is clearly represented and seen in how she presents herself, starting off as a naïve and perhaps shy initiate and resulting in an established and confident priestess. This painting then serves as an illustrative representation of the incorporative processes an individual undergoes as they experience an immersive environment.

While a physical architectural enclosure, the frieze within the space serves as a VR. The life-size figures, depth creation, and 360-degree panorama immerse viewers, guiding them through a narrative initiation sequence. The artist's use of perspective and illusion extends the physical room, and the sequence of acts helps us to understand the ritual of becoming a bride of Dionysus. It produces a temporal and movement-based quality that relies on the interaction of the user to walk through and interpret the images.

The frescos are painted in the 2nd style, as defined by August Mau (in the later part of the 19th century), which is also known as the architectural style—architecture and figures were represented in a more realistic and illusionistic manner. Although it provides an appearance of three dimensions and depth, this was painted in what is known as atmospheric perspective, not to be confused with linear perspective, which was ‘discovered’ during the Renaissance. Atmospheric perspective interprets the qualities that create an appearance of depth rather than mathematically inscribing this. For example, objects in the foreground would be depicted with more clarity, while those in the background would be hazier. Similarly, applications of saturation, color contrast, and brightness are also used to produce this effect.

Understanding the frescos requires familiarity with the layout of the villa and the historical implications of this layout. The Bacchic murals occupy the most opulent room, suggesting use for special occasions and privileged guests. Hillier and Hanson developed a mathematical model that establishes a compelling argument for the significance of Room 5. Using a system of nodes and lines, their method maps out the accessibility of each room in the villa from the front entrance, considering the permeability (number of entry doors) and the pathway required to arrive at a space. The less accessible the room, the more ‘private’ the space—or in the case of the ancient Roman villa, the more privileged the audience that occupies the space. These theories of Space Syntax, developed in the 1970s and 1980s, identify social values and typological patterns encoded in architectural layouts, linking spatial organization to culture and behavioral patterns. Upon examination of the floor plan of the Villa dei Misteri, the possible routes indicate the more ‘private’ spaces and the more ‘public’ ones. According to Hillier and Hanson ([Gazda, 2000](#), pp. 26–27), Room 5’s position toward the back of the villa and its limited entry points² underscore its private and privileged nature.



Figure 0.1 Great Frieze in the Villa dei Misteri, Pompeii, photograph.

Source: © ArchiTAG.

Socially, it was not uncommon for women to join different religious cults related to Gods and Goddesses. Although it was not necessarily encouraged by the Roman government, this was thought to help with marriage, procreation, and protection in the afterlife and was ultimately how women could gain some status—by becoming priestesses—in a society that was patriarchal and granted them no official power in politics. The theory that Room 5 depicts this cult initiation aligns with this historical context ([Gazda, 2000](#), pp. 38–47). The images of the fresco depict the marriage of the initiate to the God Dionysus, and they narrate an emotive and sensorial sequence required for this initiation. Dionysus, while popularly known as the God presiding over wine and revelry, was also known as the God of fertility and harvest. Scholars examining the fresco point out that his depiction and what is represented allude to the latter since wine is not represented anywhere in the depictions. The fresco does not depict a wild and ecstatic Bacchus but instead focuses on agricultural fertility and the vine ([Gazda, 2000](#), pp. 59–69).

The scenes each represent a stage of the ritual from offering, submission, and deliverance. The sequence is read from left to right as you enter from the main doorway. The initiate would have been expected to fully give herself to the cult and to the God while the frescos immerse her into this ritual process. Oliver Grau notes that the full immersion, both physical and psychological, was essential to the Bacchic rites ([Grau, 2003](#), p. 27). There

is a sense of disembodiment, an expansion of consciousness, and collective unity to achieve self-actualization and transcendence. Interestingly, we can identify several parallels with other global spiritual texts about immersion and self-realization.

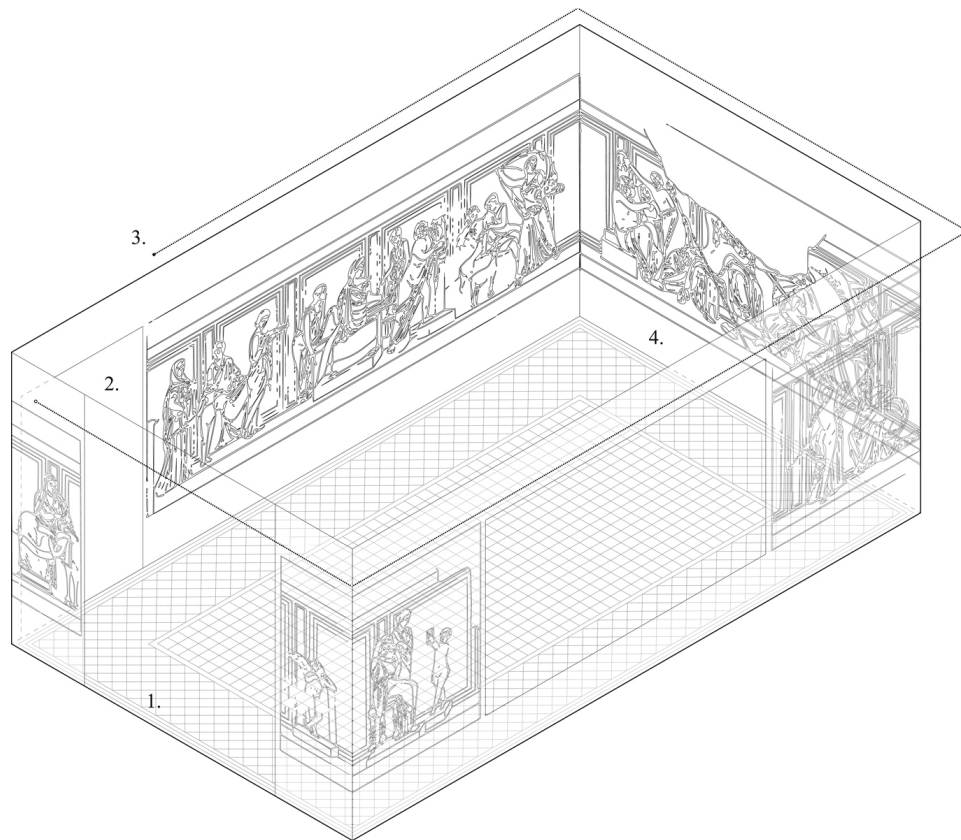


Figure 0.2 Axonometric of the Great Frieze in the Villa dei Misteri, illustration.

Source: © ArchiTAG.

1. Main Entry
2. Entrance Believed to be Added Later
3. Start of Sequence
4. Dionysus

Because this process was so important for the initiation rites, the artist's task was to produce a fresco space that immersed the initiate into the sequence as they prepared to become a bride of Dionysus ([Fortunato, 2017](#)). This is evident in the way that, while rudimentary, depth is created, and the

space of the room seems to expand into the space of the frescos. Moments of the painting appear to extend beyond the walls and into the physical space. The architectural style of the frescos plays with forms of perspective and illusion. There are bands left at the base of the walls that lift the sequence of figures while also playing into the illusion, creating the appearance of a continuation of the floor area extending up and out into the fresco space. The raised figures also mean that the actual inhabitants of the space would not obstruct the fresco, producing imaginary lines of perspective from the room's floor space into the fresco space while focusing on the center of the room and the people within.

Each scene of the sequence depicts different phases of the sacred rites, with the initiate identified seven times throughout the sequence. The painting is also subdivided with distinct breaks in the narrative imagery to emphasize points of development, climax, and conclusion. When reading the images in sequence, it starts with the submissive girl, one ready for instruction. Further along, we are met with an alarmed girl, which signifies confusion of new senses and sensory experience. This is followed by the flagellation, which symbolizes the shock of initiation. Finally, the conclusion of the sequence depicts the seated, calm matron ([Little, 1972](#)). This sequence narrates a process of immersion—the submission required, the confusion of the body image, and then finally the reintegration of the body image that aligns with the environment and the new sensory perceptions. This is what makes the fresco so striking. It illustrates many of the processes that will be covered in the theoretical discussion of the next chapter—how the body image and subjectivity evolve with new sensory experiences and how this cultural specificity produces a particular virtual experience for the subject. The images show the evolution of the initiate from a submissive subject to a confident priestess, changed through the emotional experience of the rites of passage.

Dissecting this narrative further, the story begins at the north wall, first with the reading of the ritual. The initiate veils herself, and a small boy, who is believed to be a representation of Dionysus as a child, reads the rites in front of the priestess. Important to note, throughout the fresco, there are

no depictions of human men (there are only male Gods and Demigods), supporting the theory that this ritual, cult, and space were especially for women. The seated priestess situated behind the boy signifies consciousness ([Fierz-David, 1988](#), p. 36). On their left, the initiate holds a laurel and offers her sacrifice to the God. She walks toward the table where another seated priestess prepares for the ceremony. Her body seems to extend out beyond the picture plane toward the space of the room as she sits on the edge of the seat.

Creating a scene break, the images move toward depictions of Silenus, one of Dionysus's entourage, who is playing the lyre as a satyr plays the panpipes. This scene is meant to symbolize the process of transfiguration moving into the next part of the sequence. The alarmed initiate throws her shawl, and as she does this, she almost steps out of the frame of the fresco, coming toward us with her hand pushing outward into space. The rendering of her shawl produces further depth behind her. The fearful look on her face indicates that she has seen or experienced something terrifying, an interpretation being that she has just returned from the underworld ([Fierz-David, 1988](#), pp. 68–69). The act of throwing the cloak over her head signifies the death of the initiate within the ritual practice, which closely ties with the symbology of the death mask seen following ([Fierz-David, 1988](#), pp. 67–68).

Again, the sequence is broken up with the depictions of Silenus and his satyrs drinking from a bowl. Besides them sits Dionysus and a woman presumed to be his love, Ariadne. Their embrace suggests intimacy and romance as he leans across her lap, and her arm drapes sensually around him. Although they are deities, they remain unnoticed. The figures around them do not look toward them, and no figure looks directly at them. This suggests that they are both there but invisible ([Fierz-David, 1988](#), p. 18). The sequence then returns to the initiate as she unveils the 'mystica vannus' for a fruitful harvest. At this point in the narrative, her hair is covered. Depictions of hair represented the contents of the head and the thoughts. The cap then hides her thoughts ([Fierz-David, 1988](#), p. 89). Following this sacred moment, the initiate endures the flagellation, which is significant for

its symbolism. Ovid described ritual flagellation as an aid to fertility, which may be the reason for this image in the fresco ([Gazda, 2000](#), p. 39). The technique of using the corner of the room creates added depth for the scene. The winged figure's whip seems to reach outside of the wall and back toward the adjacent wall down upon the back of the kneeling initiate whose head is in the lap of a consoling woman. A dancing lady stands to represent the transfiguration and the completion of the initiation rites.



Figure 0.3 The sequence of the Great Frieze in the Villa dei Misteri highlighting the seven times the initiate appears throughout the narrative, diagram.

Source: © ArchiTAG.

1. Initiate Represented 7 Times
2. Moment of Transfiguration
3. Matron of the Cult of Dionysus
4. Reading of the Ritual
5. Preparation for the Ceremony
6. Silenus playing the lyre
7. Silenus and his satyrs
8. Dionysus & Ariadne
9. Offering
10. Bridal Preparations

After this point, the initiate is seen dressing and preparing herself for marriage to the God. Looking at her hair again, unlike before, where it was represented as tied up or covered, she is rearranging it, her thoughts reorganized according to her new point of view that has come out of this experience ([Fierz-David, 1988](#), p. 140). The bride, finally ready, is seated at her mantle; the important role has been passed to her.³

While this story is conjecture based on archaeological evidence and comparison to other Roman frescos of the time, Room 5 provides a

compelling introduction to the immersive space. The fresco illustrates how the design of space, and in this particular case, painted space, influences subjectivity and the occupant's relationship to the space. It reveals the role of culture in the production of space and the absolute link of narrative with the virtual. While it is extremely specific, relating to the subjectivity of a Pompeian woman joining the Dionysian cult before the Common Era, it exemplifies processes that occur in all immersive spaces. It demonstrates how the body image evolves through sensory experience.

Although scholars studying the cult's representations and rituals believe that the fresco depictions are purely representational and that the actual cult rituals would have been executed elsewhere, the villa and this fresco provide insight into the Dionysian ritual and a limited understanding of the initiate's experience. It assists us in understanding the body image within architectural constructions and the narrative woven within this VR.

The following chapters will build upon this, beginning with framing the body and examining the subject, culture, society, and the evolutionary process of the body image as it relates to sensory perceptions, and how this all relates to VR and the immersive environment.

Notes

1. This fresco is also significant from a psychoanalytic perspective related to subjectivity. Nietzsche's 'Birth of Tragedy' describes the traits of Apollo and Dionysus—they represent opposites (day/light versus night/dark, respectively). Apollo symbolizes clarity and definite form, while Dionysus represents the dissolution of boundaries and lack of definitive form. This can be understood in the context of detachment and individual autonomy versus collective. This psychoanalytical reading is important, since we can understand the social significance of the Gods and the role they played in shaping the various Ancient Roman cults and the intentions behind these. In the case of the Dionysian cult, we can understand this transition from initiate to priestess as part of a collective journey shared by the women in the cult. While my own interpretation, there is an idea of sisterhood and empowerment that can be read into this space.



2. It has two paths of entry, though one of these is believed to have been added later. ↵
3. The story of the fresco continues to be a fascinating part of Pompeian and Roman history. This Dionysian cult grew to become a large part of Roman life in Pompeii, but there came a point when the government, intimidated by the mixing of classes (slaves, freemen, citizens, and nobles) banned it from meeting and forced the Cult of Dionysus underground (Fortunato, 2017). Hence, the villa of mysteries. ↵

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Part I

1 Framing the Body

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When we close our eyes and remain as motionless as possible, the body-image tends towards dissolution. The body-image is the result of an effort and cannot be completely maintained when the effort ceases.

([Schilder, 2014](#), p. 287)¹

The next two chapters address the conception of the body image and its indispensability in understanding immersion and the drive to produce the virtual. They delve into theoretical content, drawing upon literature on subjectivity and the immersive, so that these concepts may be applied to the VR space. While academic accounts of the subject are vast and multidisciplinary, this book focuses on specific perspectives from philosophy, psychology, sensorium and neurology, art history, and architectural history. In architectural discourse, theoretical accounts range from the phenomenological to the ontological, providing a variety of approaches to the subject and subjectivity. Given the breadth of this field, it is not possible to address every theory. Instead, I will need to describe the scope of this book to better situate the body image within this architectural discourse.

The writings of the philosophers Jacques Lacan, Jean-Paul Sartre, and Michel Foucault provide a lens through which immersion can be examined. Each addresses the formation of the body image at different stages of social development and within distinct relationships with society. Scalar associations can be inferred, understanding the body as a series of

experiential layers, and understanding it as a component that functions within a larger system of interactions and contexts. Their divergent approaches to subjectivity make their contributions invaluable for a comprehensive understanding of the topic. Lacan's work is most notable for its focus on early childhood development and the social relationships between the infant and the parents, which foster the formation of an initial body image ([Lacan, 1999, 1953](#)). He reinterpreted Freudian psychoanalysis through a lens of structuralist linguistics and philosophy.² Sartre examined the body through three ontological dimensions that emphasize the relational nature of self-understanding through interactions with the other. Central to his analysis is the concept of 'the look' or 'gaze,' which informs our behaviors and attitudes ([Sartre, 1996](#)).³ Foucault shifts our focus from the individual subject, though it is integral to his work, to the social identities that form between bodies. His work examines how society imposes conditioning and discipline,⁴ shaping subjectivity through power structures and cultural frameworks ([Foucault, 1995](#)).⁵ Foucault also provides a discussion of the immersion in art, which is where we will begin to dissect some of these theories in this chapter. Together, these theories reveal the dynamic processes through which body image is formed and evolves over a lifetime. They underscore the importance of perceptual experiences and encounters with society and culture. This understanding becomes essential when examining how the production of virtual realities (VRs) relates to the unique constructs underpinning different societies. These spaces act as mirrors to society ([Agrest, 1991](#)). Humans are storytellers by nature, and our subjectivities depend on the narratives conveyed through mediums of representation. These narratives, in turn, shape the subjectivities of subsequent generations.

What Is Body Image?

So, what exactly is the body image? First, we must understand how it functions. The body image situates us within space, providing a set of

coordinates that allow for controlled movement and spatial awareness. Immersive and VR environments challenge this by inducing a temporary loss of body-image stability.⁶ Immersion compels the body to reevaluate its spatial coordinates, which can result in a heightened awareness of sensory perception. This can happen in subtle or in more extreme ways. Over time, as individuals encounter diverse spatial experiences, their body image develops layers, becoming an archive of past encounters. This archive of experience can be referenced to comprehend new environments, stabilizing the body within them. New spatial encounters can elicit a momentary ‘shock’ that disrupts body awareness. This disruption is followed by restabilization, wherein the body draws upon its archive to integrate new spatial information. While all sensorial modalities contribute to this process, visual perception often dominates immersive experiences and relates to many of the pictorial representations we will encounter throughout the text. For this reason, when we begin to look more deeply at the history of VR, many of the art examples will rely on the visual. However, as we move into more three-dimensional examples found in architecture, we will see how architects have incorporated other sensorial experiences to produce immersive environments that correspond to very specific cultural and social values and aspirations.

This perspective aligns with the work of [Merleau-Ponty \(2002\)](#),⁷ who we will cover in greater detail, and [Don Ihde \(1993\)](#). Both philosophers argue that the body is the locus of perception and that tools extend its capabilities. Ihde specifically asserts that technology is not a passive tool but an active mediator shaping perception and, as a result, characteristics of spatial awareness related to its respective society. By amplifying certain aspects of experience and suppressing others, technology influences how individuals perceive and navigate their environments. Through this lens, we can analyze how VRs dissolve and reconstruct the body image.

While immersive environments can be understood for their ability to expand perception and create new cognitive frameworks, they also raise ethical and philosophical concerns. A major critique put forward of VR is its potential to disconnect users from tangible reality. Scholars like Jean

Baudrillard argue that immersive media can blur the boundaries between real and simulated experience, leading to a hyperreal condition where representations supersede reality. This is a particularly relevant discussion today, as digital VR environments, metaverses, and AI-generated simulations create parallel spaces, at ever-increasing speeds, that mediate how people engage the world. This book argues that it is impossible to separate the virtual from the tangible as they are in constant dialogue with one another. However, it acknowledges the potential for manipulation within immersive environments. Religious architectures historically have used immersive strategies in their design of light, scale, and ornamentations to instill reverence and reinforce institutional power structures. Likewise, contemporary VR spaces today can be used to reinforce ideological or political narratives, tailoring experiences to shape perception and modify world events. We have seen this clearly recently with social media bubbles and political campaigns that have directly targeted groups of people, possibly changing the course of the future. This raises questions about agency within immersion: how much control does a participant truly have over their experience, and how does the constructed nature of these spaces shape cognition? Additionally, the fear of escapism is another topic of discussion when looking at the discourse around VR. Thinking again to *Ready Player One*, critics warn of a future where users become completely detached from their physical bodies and exist in a constant digital simulation ([Cline, 2011](#)). Reiterating, history suggests that humans have always negotiated virtuality and physicality simultaneously and immersion has functioned as a method of expanding perception rather than minimizing ‘the real.’ Identity is innately composed of these virtual encounters. The challenge then in the contemporary context, with the rise in consumerism and the ease and speed that these spaces can now be created, is to ensure that these spaces cultivate a critical awareness over passive consumption.

The Mirror Displacement

Certain artworks have captivated the attention of writers and theorists because they have recognized the powerful and, to some degree, disorienting effects of the work. In Foucault's discussion of subjectivity, he writes extensively about the famous painting *Las Meninas* ([Foucault, 1994](#)), painted in 1656 by Diego Velazquez. This painting is quite unusual for its time, being abstractly a painting of the royal couple, King Philip IV and his wife Mariana, without actually depicting them. Velazquez maintained a good relationship with the King, and the painting would have been intended for their private collection, one that Velazquez was also responsible for curating for the King.

Velazquez sustained a significant status in the court, working toward elevating the role of painting as an art, rather than as a craft or trade. It is said that the King thought so favorably of him that when the painter died, the King ordered the Red Cross of the Order of Santiago, an honor bestowed upon Velazquez after *Las Meninas* was completed, to be painted over the chest of his self-portrait in this composition.

The artwork provides an example of immersion that is not reliant on surrounding the spectator but uses tools of narrative and intrigue to draw the spectator into the work. This was something that Foucault and other writers expressed awe over. It is a far more enigmatic painting than its first reading may seem. Universally regarded as a masterpiece, people flock to the Museo Nacional Del Prado to experience its immersive presence. While today it is rare to get an intimate experience with the painting since you will find tourists and school groups huddled around the base, if you arrive early or have some time to linger, the opportunity may present itself of having a few moments alone with it between groups. The painting behaves as a metaphoric displacement, replacing one space with another—the two-dimensional canvas projecting a three-dimensional environment that is meant to bring spectators into this pictorial reality. Due to its scale and presence on the wall, it serves as a continuum from the space in which the spectator is standing.

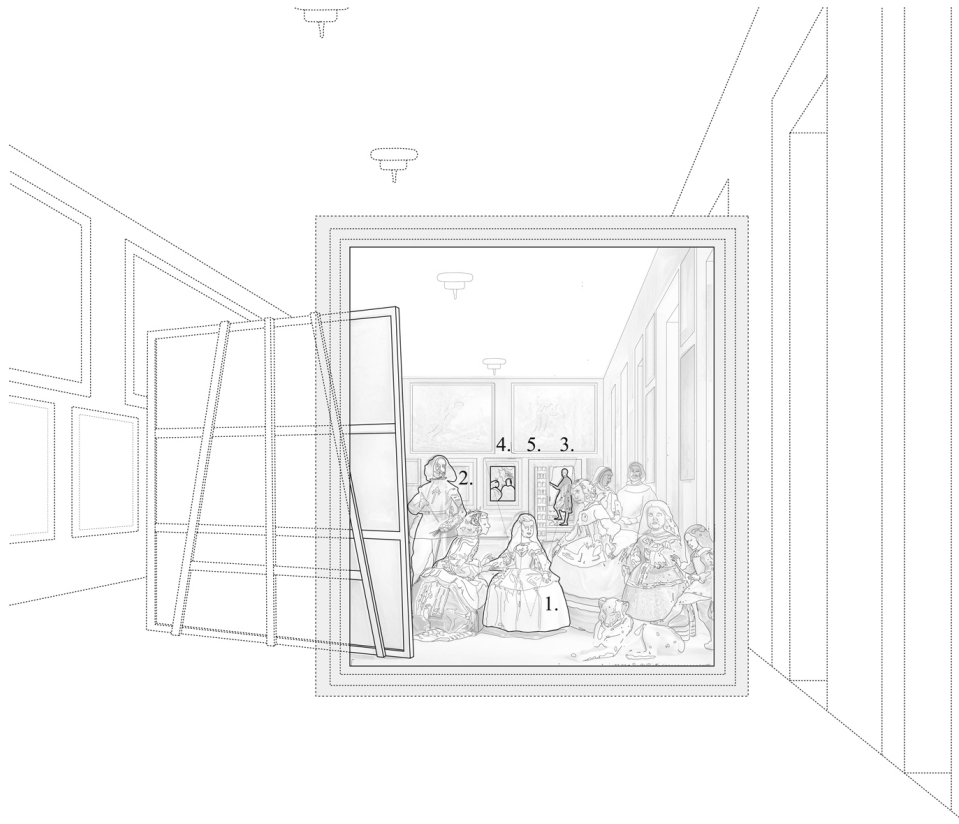


Figure 1.1 Las Meninas painting extending beyond the boundaries of the frame, illustration.

Source: © ArchiTAG.

1. Infanta Margarita
2. Diego Velázquez
3. Jose Nieto
4. Royal Couple's Reflection
5. Focal Triumvirate

The scene depicts the Infanta Margarita in Velázquez's painting studio, surrounded by her maids of honor and entourage. She stands out against the dark background, lit by the sunlight flooding into the room, presumably from a window outside of the pictorial space, at the intersection of two cross diagonals. A canvas dominates the left side of the painting. We see the back of it but cannot see what is being painted. Behind this stands the artist himself, Diego Velázquez, contemplating the scene in front of him before

making his next stroke. The central focus seems to be on the infanta, the mirror in the background, and the figure at the doorway (who is believed to be Jose Nieto), further emphasizing this through the triumvirate. The two rectangles provide a duality, one dark yet glowing with the haze of the reflection of the royal couple and the other bright and oddly crisp. They are the only things in the background that have been given any clarity, as the rest of the back wall remains dark and muted. Different diagonals in the piece direct the viewer's attention around the painting and onto these three central foci. The mirror reflection of the royal couple makes us the spectators at once objectified and irrelevant.

Foucault writes about the effects of the painting, attributing these to the many gazes from painted figures to the outside world that Velazquez includes in the work. These gazes act to implicate the spectator within the scene, bringing them into the narrative of the court people who have assembled around the young princess. In 'The Order of Things,' he points out the uncanny relationships that form between the observer, the painted scene, and the characters within, describing the confrontation created by the gazes that produce a contradiction. On the one hand, we, as spectators, are included within the scene. On the other hand, we are dismissed by it since the narrative produced by the VR suggests that the King and Queen would be standing where we are. Instead, we are replaced by them. Because of this, there is an infinite rebounding of our subjectivity as spectators versus our subjective replacement as King and Queen. We fluctuate between existence and nonexistence in the scene, dissolving the body image. In *Discipline and Punish*, Foucault writes about how desubjectification occurs to have subjectification, in other words, the docile body is created through the apparatus of discipline. He uses this to explain the important role that culture and society and the social constructs they impose have on subjectivity. Our subjectivity is informed by the social frameworks we are immersed in.

This important aspect of the painting is ironically the least discernible at first inspection; the mirror offers an idea of who is standing in our place in the scene and who, narratively speaking, captivates the gaze of the court.

Mirrors offer a VR space, so we can understand the mirror as a VR within the VR of the painted canvas. This was a technique common in painting, used in many Dutch paintings, for example, to show another side of a scene.

What makes Velazquez's mirror particularly distinct is the fact that what is being reflected is not shown in the scene of the painting—the King and Queen are not depicted, save their reflection in the mirror. It is a portrait that renders them visible but indifferent to, even outside of, the gazes that exist within the composition and by the spectators. Their presence is alluded to which makes it all the more powerful.

Upon closer inspection, examining the perspective techniques utilized, we can also notice another abnormality around the mirror. The vanishing point is not at this mirror as we might expect but is along the arm of the figure of Nieto at the door which should mean that we would not see the couple's reflection. Velasquez's perspectival editing further reinforces the role of the mirror ([Benjamin, 2005](#)). It represents the moment of immersion, and Foucault thinks of the mirror as an imaginary center for the painting, making it a painting about Sovereignty ([Awret, 2008](#)).⁸

The painting can be read as a series of frames within the frame. There is the physical frame of the painting that acts as a portal drawing us in. Then, there is the frame of the mirror and the frame of the door next to it at the rear of the painting that produces a triangular focus with the princess. There are the framed paintings on the walls that add mythological reference⁹ to the narrative, elevating the role of painting as an art. In addition, there is the back of the canvas, which acts as a frame, nesting narrative within narrative. The painting produces thoughts about thoughts about thoughts (higher-order thoughts) ([Minissale, 2009](#)).

While traditionally, paintings provided a more voyeuristic relationship between the spectator and the narrative, this one inverts that role. We are at once part of the painting but then obviously outside of it, being drawn in by our placement at the apex of gazes, yet also displaced by the reflection of the royal couple in the mirror at the back of the room. The plane suggested by the physical frame moves into what is now the Del Prado as the spectators are absorbed by Velazquez's artist studio. Strong lines of

perspective extend out into the space of reality that position the viewer at the ‘point of sight.’ This interpretation makes the painting quite a dynamic one that provides an opportunity for a space to manifest. It is discontinuous—creating a jump from one dimensional space into another that does not necessarily have to follow the same spatiotemporal constraints ([De Diego, 2003](#)). The pictorial narrative produces a scenario where the painted figures examine us, spectators, as much as we examine them, and, ultimately, through this depiction, we all become subjects of the sovereigns who only ephemerally exist within the space ([Bongiorni, 2003](#)).

Our displacement renders our subjectivity absorbed by the painting to realize Velazquez’s studio, which completes the immersion. This example illustrates the philosophical and psychological aspects that will be discussed in [Part 1](#). Through the questioning of subjectivity and the dynamism of the gaze, the immersion into the painting causes a new role for the body image, in a state of metamorphosis, as an interface connecting the painted realm with the real. While many of the following concepts explored are quite theoretical, we can begin to apply them to *Las Meninas*, the Great Frieze, and the other examples that will be discussed throughout the text. This will help us understand why these spaces are so immersive and how they were used by society to shape the body image and subjectivity. They demonstrate the profound coupling of our identities with culture and how art and architecture have been used to represent and perpetuate this.

Notes

1. This quote is representative of the role of the sensorial in our construction of self and environment. We need to experience the world around us to understand the extent of our body and our place within space. Without the sensorial, there is no experience. And without experience, there is no meaning. Therefore, to have a body image and to understand space requires the work of the sensorial body. [↩](#)
2. Lacan worked during the World Wars and in postwar France when psychoanalysis was gaining a cultural foothold. His interactions with the art movements of the time, in Surrealist and

Dadaist circles, influenced his interests in dreams and the irrational. He followed the work of Hegel whose master-slave metaphor greatly influenced the ‘mirror stage’ theory. He also engaged with the structural linguistics of Ferdinand de Saussure and the anthropology of Claude Lévi-Strauss, linking the unconscious with the structure of language and unconscious desires as a network of symbols. His seminars, that were held in Paris yearly starting in 1953, became a popular site for many of the intellectual ideas that would later shape French theory ([Sharpe, 2025](#)). ↵

3. Similar to Lacan, Sartre was a French existentialist working during the World Wars and the postwar period. He was influenced by the work in phenomenology by Husserl and Heidegger. He recognized it as a method to describe experience directly. His text *Being and Nothingness*, referenced in this book, was written during the Nazi occupation of France and reflects his beliefs that humans first exist and then later define themselves through actions ([Reynolds & Renaudie, 2022](#)). ↵
4. In an interview with the journal *Hérodote* (found in the compilation *Power/Knowledge: Selected Interviews & Other Writings 1972–1977*) Foucault states: ‘The individual, with his identity and characteristics, is the product of a relation of power exercised over bodies, multiplicities, movements, desires, forces’ ([Foucault & Gordon, 1980](#), p. 74). ↵
5. Again, the perspective that Foucault brings comes from a similar context as Lacan, Sartre, and Merleau-Ponty—postwar France, in the generation after them. He attended lectures by Merleau-Ponty and was influenced by the writing of Heidegger and Nietzsche. Foucault is associated with the structuralist and poststructuralist movements and was interested in phenomenology and structural linguistics. He was also impacted by his mentor, Georges Canguilhem, whose approach caused Foucault to move focus away from a universal subject. He was interested in revealing the underlying rules that structured thought in different eras. Key to his work is the idea of subjectivation—the process by which human subjects are produced by power and discourse ([Gutting & Oksala, 2022](#)). This will be elaborated upon in the following chapter. ↵
6. A simple way to describe this sensation can be through the experience of waking from a dream and momentarily not comprehending where you are. Or sitting in a stationary train or vehicle next to one that was moving and feeling as though you are in the moving vehicle. The perceptual experience causes a disorientation as the body image assesses its location in space. ↵
7. With Sartre, he helped introduce phenomenology to France. Merleau-Ponty also founded, with Sartre and Simone de Beauvoir, the journal *Les Temps Modernes* in 1945. His approach

incorporated Gestalt psychology, psychoanalysis, and Marxism into his phenomenology, with attention to ideas of perception and embodiment ([Toadvine, 2023](#)).

These philosophers, Lacan, Sartre, Merleau-Ponty, and Foucault, were all dealing with the trauma of war and the challenges of rebuilding society. Because of this, they were focused on human experience, freedom, and social change. Despite their differing projects, these philosophers shared a common intellectual and historical context, responding to many of the same movements and intellectuals. They each engage with the concept of the ‘subject’ or self, which was a central issue in 20th-century French philosophy. While creating distinct intellectual paths—the phenomenology of the body, the reinterpretation of Freudian psychoanalysis, existentialist humanism, and the archaeology/genealogy of power, respectively—their ideas often intersect and resonate, providing a foundation from which to understand subjectivity and the body. [↗](#)

8. Freud recounts a joke in *Wit and Its Relation to the Unconscious* that goes: ‘Louis XV wished to test the wit of one of his courtiers whose talent in that direction he had heard about. He seized his first opportunity to command the cavalier to concoct a joke at his (the king’s) expense. He wanted to be the ‘subject’ of the witticism. The courtier answered him with the clever bonmot, ‘Le roi n’est pas sujet.’ ‘Subject’ also means ‘vassal’ (Taken from K. Fischer)’ ([Freud, 1916](#), p. 43) [↗](#)
9. These paintings depict two mythological competitions: Marsyas challenging the God Apollo to a flute playing contest, and Athena challenging Arachne to a weaving contest. They are meant to allude to the skill required in painting, to elevate painting as art. [↗](#)

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2 Body Image

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In the following pages, we will examine key philosophical and psychological texts to define and understand the concept of body image. This foundation will support the next chapter, ‘The Immersion,’ where we explore how the body image operates within the immersive environment. The relevance of this study to architecture is twofold: first, our ability to perceive and comprehend space is deeply tied to the evolution of body image throughout our lives; second, as a species, we have historically constructed narratives and built environments that reflect those narratives. As Liam Young writes in *Planet City*, ‘All Cities are fictions. Their literal edges are nebulous and their physical definition is endlessly being rewritten but their boundaries come into focus as shared narratives’ ([Young, 2021](#), p. 34). This connection between subjects, stories, and our built environments will unfold over the following chapters, starting with this introduction to the theoretical framework required to analyze the art and architecture narratives.

Theoretical Foundations of Body Image

Body image is shaped by input from various sources and is constantly evolving in response to the world. It is an imaginary anatomy that has an autonomous existence, independent of any physical structure. The image manifests in the consciousness. The idea of ‘being’ is universal ([Heidegger, 1978](#)). Relating this to Rene Descartes, ‘cogito, ego sum,’ ‘I think, therefore

I am' (1644), we can think of the body image as 'I perceive, therefore I am.' These inputs add layers of information. Scientific studies show that neural networks in the brain continuously adapt and reorganize through experience ([Combs & Krippner, 2008](#)). This layering process, which begins at birth, forms the foundation for interacting with society and the environment. Lacan identifies the emergence of subjectivity a few months into infancy ([Lacan, 1999](#)), but even before self-recognition, infants sense and process their environment, laying this groundwork for subjectivity and body image.¹ The process involved in body image formation and its evolution relies upon a developed understanding of the self in space. That is why, when discussing the body image, it is also important to discuss both the subject and object, the perceiving body and the gaze. Texts by Lacan, Sartre, Merleau-Ponty, and Schilder provide valuable insights into these dynamics. The following theories represent a sample of psychoanalytic and philosophical theories. It is important to acknowledge that much of the theoretical foundation explored in this chapter is rooted in Western, 20th-century intellectual traditions, particularly in European phenomenology, psychoanalysis, and post-structuralism. However, thinkers such as Lacan, Sartre, Merleau-Ponty, and Foucault have profoundly shaped contemporary understandings of body image, perception, and spatial awareness. These perspectives emerge from specific Eurocentric perspectives, often reflecting the sociocultural concerns of their time—such as existentialism's focus on the individual subject or structuralism's emphasis on language and power. While these theories offer valuable insights, they do not necessarily account for non-Western ontologies of the body, Indigenous epistemologies, or feminist and decolonial critiques of embodiment.

It is insufficient to speak about the experience of the subject without speaking about the object. An object, something to be perceived, is required to have subjectivity. It is impossible to define these terms independently; they are relational, and one cannot exist without the other. Ultimately, there is a continuous interchange between one and the other where all subjects are also objects for other subjects ([Sartre, 2016](#)).

While all perceptual experience is involved in this relationship, Sartre and Lacan both single out the gaze, which inherently produces a subject and an object. The oscillating transition from subject to object signifies a person's relationship to other bodies in space. The 'object' as an object, does nothing more than be objectified, but the object is a subject in their own right, interacting with the subject as an object. Žižek furthers this idea, arguing that our desires are informed by the other's desires of us, as an object of their gaze. In this sense, we can understand that our subjectivity is defined as much by our 'objectness' for the other as it is by our 'subjectness' ([Žižek, 2013](#)). This is why these terms are inseparable. The implications of these theories extend into the digital age, where various social media platforms provide new virtual spaces that transform the way the body image is constructed and perceived. Curated online personalities reinforce cultural standards and contribute to a new form of the gaze—one mediated through screens. This phenomenon echoes Lacan's 'mirror stage,' where the virtual self becomes an unattainable ideal. The sociodigital landscape complicates Sartre's notion of the gaze, as individuals are now subjected to a fragmented, multiplatform gaze.

In analyses of the gaze and its role in shaping subjectivity, the frameworks provided by Lacan, Sartre, and Žižek, following Western philosophical traditions, emphasize individualism and particular power hierarchies. Considering non-Western traditions reveals the conceptualization of embodiment, perception, and relationality in fundamentally different ways. For example, Indigenous theories tend to view selfhood as relational rather than atomized, understanding the body in relation to community, land, and ancestral continuity rather than as an isolated subject observed through the gaze of an Other ([Simpson, 2014](#)). Similarly, African and Asian philosophies approach the mind-body relationship through frameworks that emphasize collectivity, spiritual embodiment, and balance, rather than the dualistic subject-object model found in Western thought ([Oyěwùmí, 1997](#)).

In the scientific paper by [Chiao et al. \(2008\)](#), they confirm that cultural values influence psychological and neurobiological processes. These

cultural beliefs influence visual perception, self-representation, and self-awareness. In their research, they study cultural differences seen between Eastern cultures (more collectivist) and Western cultures (more individualistic). They discovered that cultural differences affect visual perception. Someone who comes from a more individualist culture is better at ignoring contextual information around a focal object, whereas someone coming from a more collectivist culture will be better at incorporating contextual information around a focal object. This distinction also applies to the representation of the self when studying neural activity. The neural representation of an Eastern person when asked about the self and the mother was the same, whereas with a Western person, the neural representation of the self and the mother was distinct.

The Embodied Self

The reciprocal exchange between object and subject shapes identity and the body image, which are integral to proprioception—our understanding of our position in space.² While sensorial inputs inform body image, this process is also shaped by previous experience, societal norms, and cultural conditioning ([Albahari, 2009](#)). The body is an active part of generating the world.³ The brain, drawing on past experiences, constructs perceptions of the world by ‘guessing’ at sensory inputs.⁴

This relates to Paul Schilder’s⁵ statement, ‘the body-image is the result of an effort’ ([Schilder, 2014](#), p. 287); an effort by the body to produce and comprehend a particular set of perceptions to distinguish between the self and what is outside of the self. The mind organizes and integrates this data ([Chutroo, 2007](#)). Because of the centrality of ‘the gaze’ in these theories, I will first focus on the sense of vision, but we will see throughout many of the case studies encountered in the latter part of the book that VR also relies on several other ephemeral and sensorial qualities.

Within the realm of vision, two structures of looking can be identified: the scopic and the immersive. These structures work in tandem. The scopic

involves the gaze of self *over the other*, objectifying the other and asserting the self as subject. The immersive, on the contrary, involves identification of self *with the other*, recognizing aspects familiar to the self.⁶ There is always a degree of the scopic within the immersive since it is a process of identification through the objectification of the other-self. Since the scopic is more straightforward and more widely covered in studies on optics, psychology, and visual perception, this text will only briefly touch upon it. It relies on the apprehension of objects. These structures of looking can be applied to Lacan's 'mirror stage theory' and Sartre's ontological dimensions of the body.

Lacan describes in the 'mirror stage theory'⁷ how an infant at about six months of age understands their subjectivity through their recognition of themselves as an 'other' in a mirror reflection. This is a significant developmental milestone ([Lacan, 1999](#), pp. 75–81). Lacan relied on the observational data collected by Henri Wallon who, in 1931, gave a paper presentation on the development of self-awareness.

In this presentation, Wallon said that the child gradually becomes aware of their physical bodies by distinguishing themselves from their environment. This process relies on sensory development and involves recognizing an inside-outside distinction ([Evans, 1996](#), pp. 117–119). The mirror in both Wallon's and Lacan's work creates doubles. The infant sees themselves (the reflection) as an object, relying on the scopic structure of looking, and also identifies themselves in this reflection, relying on the immersive structure.⁸ Through the objectification of the self, the infant gains subjectivity.⁹ The playful child, looking at their reflection, is captivated by their own image, and Lacan sees this as a turning point in the child's development ([Nobus, 1997](#)).¹⁰

The perception of the other's body comes chronologically before the perception of the self's body ([Sartre, 1996](#)). The child uses this body image to identify with others and to role-play. The child can begin to understand similarities between themselves and others to mimic movements that allow for motor skills and controlled movements to develop from this point onward ([Schilder, 2014](#)). They can begin to understand their body as a tool, to

develop their capabilities: to grab objects, to crawl. The body image and motor skills develop in parallel and constantly evolve based on experience and interaction with space and ‘the other.’

Sartre’s [*Being and Nothingness* \(1996\)](#) categorizes three ontological dimensions of the body.¹¹ The ‘body for self’ is how the individual understands themselves as a subject with the capability of objectifying another. This can be considered the subjective body. The ‘body for others’ is the recognition of self as an object for another subject, or what can be considered the objective body. The third dimension, the ‘body for self as seen by the other’ is where the body is both seeing and seen simultaneously. This hybrid condition exists between the object and subject states where the body is seen through the perspective of the other. Through this dimension, the subject can understand a layer of their own subjectivity blurring the distinction between self and other.

In all three dimensions, ‘the look’ or ‘the gaze’¹² plays a crucial role. In the case of the ‘body for others,’ the look affects human behavior. Our actions are influenced by the knowledge that the other might be watching, an idea that Foucault elaborates upon in [*Discipline & Punish* \(1995\)](#). Sartre describes the voyeuristic aspect as part of human nature—we exist for the other’s gaze. And reiterating what has been discussed previously, that subjectivity ‘appears on the ground of the destruction of the object which manifests it’ ([Sartre, 1996](#), p. 276). In other words, the object that gazes is no longer an object but a subject that objectifies. He goes on to explain that the subject who objectifies becomes reduced to their gaze. This look materializes so that the object that holds it no longer exists ([Sartre, 1996](#), p. 258). However, once the eyes or body of the subject become an object of another’s gaze, the once subject is now an object.¹³ The relationship between subject and object is not static or constant but dynamic, continuously going back and forth, just as in the *Las Meninas* painting. ‘We cannot speak of the body image as a stable entity; the term is a schematic way of talking about the behavioral bonds that are constituted within the body-world’ ([Murray & Sixsmith, 1999](#), p. 323). One’s being is determined

by the varying degrees of object-ness for the other, the amount of subjectivity that is taken by ‘the look.’

The first two dimensions of the body—‘the body for self’ and the ‘body for others’—delineate more strict boundaries between the body image of the object and that of the subject. While these are dynamic, fluctuating relationships, these dimensions themselves remain static. When one is an object, they are a body for the other, and when one is a subject, they are a body for self. These two states are important for the self to maintain its difference from the world. The understanding of subject-ness comes through the recognition of the other as an object. However, with the objectification of the other also comes the objectification of the self. These two states of the body work hand in hand because ‘Being-seen-by-the-Other’ is the truth of ‘seeing-the-Other.’” ([Sartre, 1996](#), p. 257)

Social Construct and Cultural Influence

The body image evolves through the added layers of sensory perception, memory,¹⁴ and social input. Sartre illustrates the importance of the other’s perspective with the example of shyness: the body cannot feel shy or embarrassed in isolation—it only becomes so in the presence (or the belief of presence) of the other’s gaze.¹⁵

This highlights the social nature of body image, as behavioral responses like shyness arise from social cues and constructs that act as inputs from the other ([Berger, 1972](#); [Hewitt & Rule, 1968](#)).¹⁶

Feminist phenomenology challenges the gender-neutral assumptions underlying these frameworks. Simone de Beauvoir’s [The Second Sex \(1989\)](#) argues that women are historically positioned as ‘the other,’ with their bodies reduced to objects within patriarchal structures. Unlike Sartre’s generalized notion of the subject, feminist scholars such as Iris Marion Young, Judith Butler, and Elizabeth Grosz argue that gendered embodiment fundamentally alters one’s experience of body image ([Grosz, 1994, 2001](#)). [Young \(1990\)](#) critiques how gender socialization affects movement and

bodily awareness, citing how women are often conditioned to move with restriction and self-surveillance, shaping their proprioceptive sense of self. [Judith Butler's theory of performativity \(2011\)](#) further asserts that gender is not an inherent quality but a series of performed acts, continually reinforced through social norms. This perspective suggests that the body image is deeply entangled with social conditioning, power dynamics, and gendered and racialized experiences. Butler elaborates upon this in [Senses of the Subject \(2015\)](#), where they discuss the nature of subjectivity and agency, engaging with philosophical traditions that have shaped contemporary understandings of the self while critically examining embodiment and the social dimensions of subject formation. Butler revisits the work of figures like Merleau-Ponty, questioning how subjectivity is conditioned by historical and social frameworks. They argue that agency is tied to emotional and social experiences and that subjectivity is always formed in relation to others, dependent on structures of power. This is what Foucault presents in his texts, but he does not account for the full diversity of embodied experiences ([Foucault, 1982](#)).

Without the gaze of the other, this layer of body image would not exist, bringing us back to Lacan's 'mirror stage theory.' When the infant begins to discover their body image, they start to understand their body parts as tools—for instance, hands as tools for grasping or legs for walking. Crucially, this process can extend beyond the physical body to include other objects the body uses, which then become a part of the body image. This will be addressed in greater detail later in the chapter with the contributions of Merleau-Ponty.

The body image is malleable, constantly shifting in response to perceptions of self, environment, the gaze of others, and societal conditioning ([Blackman, 2012](#)). Foucault addresses this social dimension in *Discipline and Punish*, specifically in the chapter 'Docile Bodies' (1995, 1988). He argues that the body image is not only shaped by sensory experiences and the ontological dimensions of the body but is also profoundly influenced by social training regulated through cultural norms. Bodies are trained over generations to behave in a particular way. Societal

gaze imposes restrictions on how the body relates to others. It becomes an apparatus of power ([Agamben, 2009](#)). This training continuously reconfigures the body image.

As immersive technology continues to develop, digital environments are becoming an extension of the body, challenging conventional notions of embodiment. The avatar becomes a part of the individual's corporeal identity, revealing the malleability of body image and its ability to incorporate and adapt.

Susan Foster, in her essay 'Dancing Bodies' from *Incorporations* (1992), provides a tangible example of how training transforms the body image. A dancer's physical body changes through training, but so too does their body image and proprioception ([Murray & Sixsmith, 1999](#), p. 324).¹⁷ Repetitive practice reorganizes the brain, creating habitual movements and patterns. Merleau-Ponty describes this process as 'the general synthesis of one's own body,' whereby trained habits enable the body to operate seamlessly within its environment ([Merleau-Ponty, 2002](#), p. 152).

Foucault extends this idea to emphasize that body training goes beyond the individual to encompass social constructs that have developed over several centuries. Cultures establish collective practices that shape how we perceive and engage with the world. Perception, therefore, is structured by social experience and cultural history. These constructs become so deeply embedded in our body image that they seem 'natural.' Said another way using Marx's quote from *Economic and Philosophic Manuscripts*, 'the forming of the five senses is a labour of the entire history of the world down to the present' ([Howes, 2004](#), p. 55). Historical and social constructs shape our sensory preferences and habits, and since body image is built on sensory experience, it too is a product of these constructs.

A simple illustration of this concept is the use of a spoon for eating. Infants learn to use a spoon through trial and error and by mimicking their parents. The mimetic process, made possible by mirror neurons, enables self-identification in the other ([Maclaren, 2008](#)). Such mundane tasks often feel second nature, as though we were born knowing how to use a spoon. However, the use and significance of utensils like the spoon vary across

cultures. In the Western world, a spoon might be associated with specific foods like soup or cereal, while in Iran and parts of the Middle East, the spoon is a staple utensil for meals involving rice and stews. In many Eastern cultures, other utensils such as chopsticks are favored. Another example to show these nuanced preferences is the distinction between sitting on tatami mats in Japan, which requires specific body flexibility and a different postural awareness compared to sitting on a chair. This cultural variability, even in something as simple as a dining utensil or a place to sit, illustrates how body image, after its initial discovery in the mirror stage, continually adapts to its environment, reshaping itself to fit the social constraints and practices of a given society.

Beyond individual conditioning, body image is deeply entangled with cultural and intersectional factors ([Bhabha, 2012](#)). The idealized body is not universal but shaped by historical and geopolitical contexts. These adaptations contribute to the formation of *habitus*, a shared social orientation shaped by distinctions such as race, class, gender, space, time, and culture. As Lefebvre defines it, *habitus* is ‘a quality which is a basic attribute of a person’ ([Lefebvre, 1991](#), p. 259), determined by mutual imitation within a group. Whether in language, race, sex, religion, morals, politics, diet, living arrangements, socioeconomic status, or recreational interests, *habitus* reflects ‘inherited cultural tradition’ ([Pallasmaa, 2012](#), p. 20). Like the body image, *habitus* is not static; it is continuously reshaped by societal norms and experiences. As Juhani Pallasmaa observes, *habitus* embeds social learning and imitation into the fabric of identity.

This process of social learning and imitation acknowledges the influence of the community on the body image. It is a mimetic response that results from mirror neurons and mirroring neural mechanisms that allow for self-identification in the other ([Gallese, 2009](#)). This is reiterated by Sartre’s second and third ontological dimensions of the body and Foucault’s ‘docile bodies.’ These theories emphasize the profound interplay between individuals and society in shaping how we perceive ourselves and others, underscoring the dynamic and evolving nature of body image.¹⁸

Through the body image, we negotiate space and our experience of it. While social constructs provide a framework for perceiving the world, the body image shapes how we understand our relationship with our built environment through these constructs. Our perceptions emerge from bodily interactions with space and other bodies. Ultimately, we experience space and form because we have a body through which to understand them ([Wölfflin, 1994](#)).¹⁹

Sartre's gaze assumes the universality of it. However, important to address, bell hooks, critiques this perspective, arguing that the gaze has been a site of domination, surveillance, and dehumanization where enslaved people were denied the right to claim subjectivity through the gaze. She argues it is a site of racialized power relations that shape self-perception at both psychological and cultural levels ([hooks, 1992](#)). Because of this, body image is historically conditioned and shaped by practices of exclusion ([hooks, 2014](#)). While this sentiment is similarly expressed by Foucault's concept of 'docile bodies,' hooks extends this by examining how racialized and sexed bodies experience heightened surveillance and control and have experienced a deeper level of subjugation than Foucault acknowledges. Not all bodies are disciplined equally ([hooks, 2000](#)). hooks work suggests that body image is not a neutral, individual phenomenon but a politically charged site. She reveals the racial and gendered hierarchies embedded within theories put forward by Lacan, Sartre, Merleau-Ponty, and Foucault, acknowledging further how race, gender, class, and history shape the way that we understand ourselves and others.

Understanding body image through an architectural lens provides insight into how built environments influence perception and spatial awareness. Architects and designers shape body image by constructing spaces that privilege certain bodies and experiences ([Agregt, 1991](#)). Pallasmaa argues that designing for the senses—rather than for aesthetics—creates environments that are more attuned to human embodiment, reinforcing this reciprocal relationship between body and space ([Pallasmaa, 2005](#)). While this accounts for the role of the built environment in shaping bodily perception, other spatial traditions engage with embodiment through

symbolism, ritual, and multisensory design. Design activates proprioception and memory through multisensory experiences. The body is not merely the subject of design but its co-creator, responding to textures, sounds, and spatial arrangements to produce immersive, emotional, and cognitive transformations ([Lupton & Lipps, 2018](#)).²⁰ Architecture is an active participant in shaping identity and memory and is closely linked with cultural practice ([Brislin, 2012](#)). For example, Japanese architecture employs spatial fluidity to encourage dynamic bodily interaction, while African village layouts often integrate circular formations, emphasizing communal engagement. This contrasts with Western notions of private, enclosed space ([Elleh, 1997](#)).

Given the integral role of the gaze in these theories, it is important to examine the visual aspect in more detail. Psychologist James J. Gibson made notable contributions to our understanding of visual perception, particularly regarding how we perceive our environment through surface understanding and the optic array—a series of angles with a common apex that corresponds to a unique object. While some of his theories are contradictory ([Bickhard & Richie, 1983](#)), he offers insights into how the body perceives space. [Gibson \(2014\)](#) argued that we detect an object's form through its shadowing, influenced by changes in layout (caused by forces), texture and color (caused by composition), and the existence of surfaces (caused by substance state). He further theorized that our perception of three-dimensionality was informed by an understanding of the ground plane.

Optical information is determined by the field of view, which varies across species based on eye placement (e.g., frontal versus lateral vision). In human frontal vision, there is an overlap of information gathered from each eye, and although we always see our nose in our field of view, our brain filters it out to focus on the surrounding environment. This demonstrates the inherent link between body image and environment—egoreception (information of the self) and exteroception (information of the environment) occur together, meaning subjective and objective information are co-perceived. Gibson developed a theory of information pickup,²¹ stating:

The traditional theories of perception take it for granted that what we see now, present experience, is the sensory basis of our perception of the environment and that what we have seen up to now, past experience is added to it. We can only understand the present in terms of the past.

([Gibson, 2014](#), p. 243)

In this sense, body image can be understood as an accumulation of past experiences. As the body perceives changes in the environment, it continuously adapts by integrating new experiences. Merleau-Ponty's *The Phenomenology of Perception* deepens our understanding of this process. Without perception, we could not form a body image because there would be no way to comprehend the body's relationship to space and others. The mind interprets the environment using hypotheses based on past experiences and sensory confirmation. Merleau-Ponty explains: 'Perception becomes an "interpretation" of the signs that our senses provide in accordance with the bodily stimuli, a "hypothesis" that the mind evolves to "explain its impressions to itself"' ([Merleau-Ponty, 2002](#), p. 33). Since perception is shaped by individual experiences, each person forms a unique spatial understanding based on how their mind processes sensory input.

However, the perceiving body extends beyond its physical boundaries. Sensory input is not limited to the immediate nervous system—each sense can be augmented or extended through tools or prosthetics. Merleau-Ponty illustrates this with the example of the blind man using a walking stick. The stick becomes an extension of his sensory apparatus, allowing him to 'see' his surroundings through touch ([Merleau-Ponty, 2002](#)).

The Extension of the Body

This idea of elasticity and extension has been further explored in neuroscience and design, experimenting with synesthetic methods of producing new perceptions using the brain's plasticity ([Smith, 2009](#);

[Tratnik, 2015](#)). Paul Bach-y-Rita developed the *BrainPort* device, which, like the walking stick, enables blind individuals to ‘see’ by converting visual input from a head-mounted camera into electrical signals transmitted through a tongue pad. The device relies on the stimulation of receptors on the tongue instead of ocular ones. The brain processes this information in the visual cortex, effectively bypassing conventional retinal and neural circuits ([Schwartzman, 2011](#), pp. 98–99). This technology exemplifies how devices can become integrated into the perceiving body, extending and augmenting sensory experience.

Drew Leder refers to this phenomenon as ‘phenomenological osmosis’ ([Leder, 1990](#), p. 34), where the instruments become a part of the body gestalt ([Murray & Sixsmith, 1999](#), p. 325). Everything attached to or used by the body—clothing, tools, and devices—affects how we interact with space and others ([Crossley, 2015, 2017](#)). Merleau-Ponty provides another example: a woman wearing a hat with a long feather must adjust her movements based on this new spatial constraint. Merleau-Ponty even goes as far as to say that the car we drive becomes an extension of our body image for the time we are driving it ([Merleau-Ponty, 2002](#)).

Furthering this, Indigenous cultures offer a relational understanding of embodiment that interweaves the body with land, community, and ancestral continuity ([Simpson, 2014](#)). They go beyond Merleau-Ponty’s view that the body image is an outcome of sensory perception to acknowledge how culture and history are embedded in this process and how it is also shaped by a collective and ancestral memory. This is reminiscent of theories put forward by Foucault when considering the wider social implications. These theories critique the idea of Cartesian dualism, arguing that perception is an active, bodily engagement with the world and that subjectivity comes out of social mechanisms of discipline and control.

Ultimately, these extensions influence how we perceive and project our self-image. Recognizing one’s body and forming a body image relies on the interplay between self-perception, perceptions of others, external perspectives, and spatial imagination that provides an understanding of the self in a space ([Louden & Kant, 2006](#)). Sartre differentiates between

perceiving and imagining—two processes that cannot occur simultaneously and are both important aspects of ‘the look.’ Perception objectifies the environment, while imagination constructs it using prior body image experiences ([Vischer et al., 1994](#)). These evolve together and are required for a full comprehension of what is being perceived. They constitute a dynamic relationship where all ‘imaginings’ are a product of past perceptions, and all perceptions are informed by past imaginings. Bringing us back to Merleau-Ponty—perception is ultimately an interpretation made by the mind—sensory signals are received by the body, and then the mind approximates these, interprets, and imagines the environment. This aligns with Sartre’s ‘law of relativity of sensations’ ([Sartre, 1996](#), p. 312), which suggests that our sensory experiences are always relative to prior ones, shaped by memory and past knowledge.

Perception is the foundation of body image, just as body image is essential for perception. Space is understood through the body’s projection onto and within it ([Forty, 2004](#), p. 261). They are mutually dependent ([Moholy-Nagy, 1947](#), p. 163). There is no perception of space without a body and no body without space ([Schopenhauer, 2000](#), p. 87).²²

From a holistic perspective, perception is not merely a result of raw sensory input but an interpretation shaped by the intellect. This means perception is inherently subjective.²³ Although Paul Schilder’s book *The Image and Appearance of the Human Body* (1930s) predates contemporary discourse, it remains relevant in its psychoanalytic approach, bridging neurological and psychological understandings of body image. Through case studies, Schilder empirically demonstrates the evolution of body image through sensory experience ([Schilder, 2014](#)). His research also connects to the 19th-century Kantian/Wölfflin issue, which argues that we can experience space because we have a body from which to experience it—an idea later refined through the neurological concept of proprioception.

Proprioception encompasses the sensory information relayed from muscles, tendons, and vestibular organs to the brain, governing balance and spatial awareness. While this process is largely unconscious, it is essential to body image formation. Schilder recognized the importance of

sensory stimulation in psychological development, showing how biological systems evolve through interaction with the external world, leading to an accumulation of sensory knowledge that determines neurological and personality traits ([Schilder, 2014, 1947](#)). However, perception is not always accurate.²⁴ This brings us back to designed space and the role of illusion.²⁵ Merleau-Ponty's 'experience error' is illustrated by using Muller-Lyer's optical illusion ([Gombrich, 2002](#)). In this experiment, two equal-length lines appear different due to the orientation of the surrounding lines ([Merleau-Ponty, 2002](#), p. 6). Context shifts our perception, just as objects viewed at different distances or lighting conditions can appear misleading. A white object cast in shadow may seem darker than a black object in bright light, demonstrating how perception is relative. We perceive more than we see ([Sartre, 2004](#)).

Artists and architects have long exploited these principles to create immersive experiences that challenge and manipulate perception. They construct virtual spaces using their respective mediums and technologies to challenge the body's perceptual processes. Whether through art, architecture, or digital media, these immersions reveal how the body image is fluid, responsive, and deeply intertwined with environmental conditions ([Tratnik, 2015](#)). In the next chapter, we will explore these implications further, examining how immersion and VR reshape body image.

The theoretical frameworks explored in this chapter provide critical insights into the evolving nature of body image, emphasizing its dynamic relationship with perception, culture, and spatial interaction. These perspectives have shaped contemporary discourses on embodiment, yet they largely reflect a particular cultural assumption about subjectivity, perception, and spatiality. From Lacan's mirror stage and Sartre's ontological dimensions of the body to Foucault's docile bodies, this discussion highlights the ways in which body image is continuously shaped by external forces. Merleau-Ponty's phenomenological approach and Gibson's ocular theories consider the dynamic interplay between the body and environment. Concluding with the main takeaway: the body image is not static; rather, it is an adaptive construct that evolves through experience,

interaction, and perception, shaping the way we navigate both physical and digital virtual spaces.

Notes

1. It has been interesting to witness this in my own child's development as she has become more sensorially aware. At 5 months, she is alert, taking in her environment and reacting to sounds and spectacles, responding to her environment, people's speech and facial expressions. While it is not clear if she recognizes her own subjectivity yet (she smiles at us in the mirror), this sensorial exploration indicates the beginning of this understanding of self-body. At 10 months she is developing greater motor control suggesting a recognition of self-body: crawling, picking up objects, pointing and using the body to navigate and explore space. [↗](#)
2. Proprioception relates to somatopsyché as it falls under the broader concept of bodily self-awareness. While Charles Scott Sherrington first introduced somatopsyché in 1906 to describe the connection between bodily states and mental experience, he also defined three sensory modalities:

Exteroception—sensing the external environment (eg. sight, sound, touch, taste, smell)

Interoception—sensing the internal bodily state (eg. Heart rate, digestion, breathing)

Proprioception—sensing the body's position and movement in space

([Sherrington, 1906](#))

We can understand proprioception through the example of walking in the dark. We are still able to maneuver through space based on an understanding of the body within it. We can recognize how contracted or stretched out each muscle is to comprehend the body's position. Proprioception is a cognitive understanding that deals with the position and equilibrium of the body. It is related to (but not the same as) kinesthesia which deals with the actual movements the body makes. Both proprioception and kinesthesia deal with the inference of the body's movement and placement in space. [↗](#)

3. The text by [Zhao et al. \(2025\)](#) examines the relationship between perception and the brain affirming complex neurological systems that construct our environment through sensory and bodily experience. [↗](#)

4. 'All sensations, including the body-image, are phenomena constructed by the representative mechanisms of perception and involve a series of distributed, hierarchical, interactive, parallel neurocomputational and virtual reality mechanisms' ([Smythies, 2009](#), p. 78). Anil Seth describes consciousness as having two properties: the experience of the world and the experience of the self where the brain interprets what is being perceived. He calls this a controlled hallucination. Reality, then, comes from our collective agreed hallucinations ([Seth, 2017](#)). ↵
5. Paul Schilder was an influential psychiatrist from Austria. He is most known for his research on the concept of the body image. It was developed from three key concepts: Sir Henry Head's postural model of the body, Freud's idea of the body ego, and Carl Wernicke's somatopsyché. ↵
6. [Laura Mulvey \(1989\)](#) refers to these as the scopophilic and narcissistic. She examines these terms in the context of the objectification of the female character in film. ↵
7. This was Lacan's first contribution to psychoanalytic theory. He spoke about it for the first time in 1936, but the paper was not published until 1949. In this, he describes how the six-month-old child differs from a chimpanzee of the same age looking at their reflections respectively. The human child becomes excited and fascinated by the reflection and assumes this image as its own whereas the chimp eventually realizes the image is an illusion and loses interest in it. The infant's changing attitude towards its reflection was crucial to Lacan as the baby goes through the 'weaning complex' phase and develops a sense of 'me.' ↵
8. Lacan had 3 orders: imaginary, symbolic and real. The imaginary deals with the dual relation of the ego and the image in the mirror stage—the process of identification, alienation, narcissism, and aggressivity. The symbolic deals with the relational and the distinction between the subject and ego (split subject). It relies on the object. The real is opposed to the image ([Evans, 1996](#)). ↵
9. This can be considered one of the paradoxes of subjectivity. Kant and Husserl speak of this paradox and the idea of two selves, or two subjects: what Kant calls the 'empirical' and 'transcendental'. Husserl's famous quote on this reads: 'The paradox of human subjectivity: being a subject for the world and at the same time being an object in the world.' He continues, 'The subjective part of the world swallows up, so to speak, the whole world and thus itself too. What an absurdity!' ([Husserl, 1970](#), pp. 178–180)

To gain knowledge of the world, we must construct representations of it from sensations. However, since experience is subjective, this knowledge is of the mind, not about the objects and the world themselves, and therefore stands as a representation. The sensations experienced should not be confused with the object itself. Like Wöfflin, Kant's view of the self-conscious is

that it is aware of itself through experience and that self-awareness makes experience possible. The empirical subject is related to the world, not its representations. We objectify ourselves, as we do objects in the world, in order to achieve this subject. We are objects in the world and are conscious of this. The transcendental subject on the other hand is conscious of itself as thinking and exists in regards to what it is thinking about. It is therefore related to the representations of the world. There is no representation of the self because the self is a thinking conscious. Kant expresses in his writings that 'trying to grasp it is like trying to ... see your eyes seeing' ([Carr, 1999](#), p. 117). This is the 'pure' subject-object relationship. These two subjects describe the being as both a phenomenon and an intelligible object—Kant described the transcendental and empirical subjects in these terms), a subject objectifying the world, 'subject for the world,' and an object for self, 'object in the world,' which can be related to the grammatical distinctions of 'I' and 'me' in describing these two different subjects. Husserl builds upon the concepts of the empirical and transcendental. Through reflection the self becomes an object to itself, in other words, consciousness becomes aware of consciousness. This is referred to in Carr's text as 'the self of which I am conscious' and the 'consciousness of self' ([Carr, 1999](#), pp. 85–86), the empirical and transcendental, respectively.

While the empirical or natural subject is related to other objects and is within the world, the transcendental subject exists in relationship to the meaning it gives to other objects. They are the same self but exist through different modes of reflection, natural reflection and transcendental reflection—linked to complex theoretical methods of phenomenology. Because of this, for Husserl, the transcendental subject, based on theoretical 'fictions,' seems artificial. To conclude, the transcendental subject does not have an object body or a body image since this requires an objectification of self (as we have with the empirical). Sartre states that this subject, the transcendental, causes anxiety and disorientation, which can be related to this body-image-less condition.

Carr poetically describes this:

the suspension of the natural attitude first comes to us as an affective break in its hold on us. In the natural attitude we unquestioningly take the world to exist and take ourselves to be part of it. Anxiety transforms the world into a phenomenon whose ontological status is suspended, and whose meaning-constituted character comes to the fore; as such its meaning is revealed as depending on me, or rather on my meaning-bestowing consciousness, not as a thing in the world (for the world is no longer taken for granted),

but purely as subject for the world. This vertiginous form of self-awareness, which is not reflection in any ordinary sense at all, is nevertheless the self-awareness of intentional consciousness itself, not as the attribute of a worldly object (i.e., the empirical ego) but as a meaning- and self-constituting process.

([Carr, 1999](#), pp. 127–128) [↗](#)

10. The mirror stage relates to human narcissism. The story of Narcissus seeing his reflection is directly related to the infant seeing their reflection and the creation of the ego which leads to self-destruction. The child sees this image as an ideal, a whole, as compared with their uncoordinated real body and thus sees themselves as fragmented. This causes a form of aggression towards the image, related to lack and the desire to be ‘whole.’ To cope with this, there is an identification process with the image which results in the creation of the ego. This process alienates the subject from the self, causing a split in the subject between the ego and the alter-ego, which has no resolution ([Evans, 1996](#)).

Relating this to other psychoanalytical theories, Jung (influenced by Schopenhauer via Nietzsche) describes the first half of life as the development of the ego and the second half as the integration of the unconscious with the conscious. He used Dante’s *Divine Comedy* to come up with the Process of Individuation. The first half is about becoming familiar with one’s own dark side to be followed by enantiodromia, a principle that everything eventually leads to its opposite ([Jung, 1995](#)). In the case of Dante, he takes us through hell and up to Mt. Purgatory to the Garden of Eden, the white rose being a symbol of the totality of the psyche ([Alighieri, 2003](#)).

[↗](#)

11. While Sartre associates the unconscious with nothingness, Lacan disagrees with this. ‘Being’ is of the symbolic order since it is related to the other. The subject is constituted through both a lack of being and a desire for being. [↗](#)
12. Lacan also references Sartre’s ‘look’ but separates the gaze from the act of looking. For Sartre, these are the same. [↗](#)
13. Norman Bryson, in ‘The Gaze in the Expanded Field,’ uses Nishitani’s critique of Sartre’s centralized subject and the aphorism ‘fire does not burn itself’ to show how the subject tends towards dissolution since it is restricted by the insularity of the subject and object poles. The definition of fire is that it burns but it cannot burn itself. In other words, it cannot exist in isolation ([Bryson, 1988](#), p. 99). [↗](#)

14. What is remembered from an experience is retrospectively built. This is a similar process to Freud's 'Secondary Revision of Dreams' which acts as a curation or reconstruction of a dream to create a narrative that may not have made sense in the original. ↵
15. In Foucault's *Birth of the Clinic* (1976), he describes the gaze from the perspective of the medical gaze where the human body defines a space for disease. This text demonstrates how subjectivity has been historically shaped through the institutions of health. ↵
16. Although the communicability with the other is essential. Sartre explains that one would not typically be shy under the gaze of a dog. ↵
17. This has also been proven through scientific studies of the brain. Brains are reorganized through repetitive practice. Cultures define ways of practice that create a collective representation which informs how we see the world around us. So therefore, perception is structured by social experience and culture (Turner & Whitehead, 2008) ↵
18. Schilder refers to this in his writings on social groups where mutual imitation determines the qualities of the group (similar mannerisms or characteristics). ↵
19. A space is understood with respect to the relationship of it to the body. This has to do with the empathy theory or what Freud calls 'hysterical identification' which is when we identify strongly with something outside of ourself. Wöfflin was not able to develop his thesis since there was not yet a conception of body image. That appeared later with Schopenhauer (2000) and led to further phenomenological discussions of proprioception—the understanding of one's position and movements in space. The psychology of the spectator was studied more beginning in the 19th century in Germany with Wilhelm Wundt, known as the 'father of experimental psychology.' The innovation of Wöfflin's thesis is that it tries to make subjectivity a more concrete reality. The later philosophical and psychological studies attempt to make the subject more scientific. ↵
20. Ellen Lupton and Andrea Lipps also consider sensorial experience from the perspective of accessibility and inclusivity. Multisensory environments accommodate a diversity of bodies and perceptual styles, challenging ocular centrism in design and virtual systems. The integration of haptics, sonic landscapes, and tactile materials in contemporary design and new digital virtual realities reflect an ongoing shift toward sensory richness. The experience created by this extends bodily awareness into the virtual construction, allowing users to feel with their bodies rather than simply seeing with the eyes. ↵
21. Gibson rejected the following theories and developed his own theory of information pickup:

The depth perception theory posits that depth is registered differently in 3D (generally binocular) than in 2D (generally monocular). With registration of depth in the three dimensional, the eyes register shadows, convergence due to having two images (one from each eye), and disparity in these two retinal images. Gibson rejected depth perception theories, claiming that there is no such thing as depth perception. He related it to a two-dimensional way of seeing and instead put forward his theory that the visual world is registered because of its background and the relationship of surfaces to one another.

Retinal still image theory has to do with the image that is left on the retina. Different scientists researching vision have theorized why certain after images are formed and retain themselves or fade. Since Gibson didn't believe perception occurred in an image-based manner, he rejected theories that classified perception as a 2D image on the eye.

The stimulation of perception theories are a part of the identification of five stages involved in perception—stimulation, organization, interpretation, memory, and recall. The visual sense is stimulated by an environment. Since Gibson believed that perceiving is a psychosomatic act that isn't of the mind or body independently but rather of the living observer, this theory reduces perception to something that is passive rather than active. [↵](#)

22. Heidegger first discussed this sentiment when he referred to the spatiality of the subject in *Being and Time*. [↵](#)
23. This is also the premise of Kant's doctrine of 'transcendental idealism'—our individual perceptions shape the real that we perceive. [↵](#)
24. In Schilder's case studies, he discusses many instances of psychosis. Relevant to this discussion is his description of a patient with Phantom Limb Syndrome, a condition where, although the limb is gone, the body image from before persists, resulting in the sensations of the limb still being there, and usually the pain related to its loss. Due to denial and shock, the consciousness does not comprehend the lack of the limb and the patient cannot properly perceive or experience their disability. The body image must reorganize itself for the patient to recover ([Finkel, 1992](#)). On this condition, Lacan writes, 'It is as if one caught a glimpse here of the existential relation of man with his body-image in this relationship with such a narcissistic object as the lack of a limb' ([Lacan, 1953](#), p. 13). On the contrary, in cases of amputees using prosthetic limbs, echoing Merleau-Ponty's sentiments, the device becomes a part of the body image.

Neuroscientific research increasingly highlights the adaptability of body image through neuroplasticity—the brain’s ability to reorganize itself based on new experiences. Advances in virtual reality exposure therapy show promise in recalibrating the distorted body image. [↗](#)

25. [Foucault \(2008\)](#) describes how imagination is projected onto reality, producing an illusion. [↗](#)

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3 Immersion

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So far, we have set up a framework for understanding how the body processes perceptual information through sensory experience. While much of the previous chapter focused on visual perception, I emphasize that these perceptual processes are not limited to the visual. Sarah Williams Goldhagen's research in [*Welcome to Your World* \(2017\)](#) reinforces the idea that perception encompasses a full sensorial experience that is embodied and shaped by architecture. She argues that our interactions with the built environment are processed through a combination of sensory inputs—vision, touch, and movement—which structure our cognitive and emotional responses to space. Materials, spatial proportions, and light influence neural activity, altering a person's mood and focus. Even when we simply look, our tactile neurons fire, constructing an idea of how space feels. This becomes more apparent in the architectural examples discussed later in the book. In this chapter, we will examine immersion, a critical component of VR.

Defining Immersion

All space—natural or manufactured—can be considered immersive¹ because we always interact with space through our senses. Designed immersive environments create specific perceptual conditions that establish an 'inside' and an 'outside.'² These are directly related since the outside, representing each respective culture and society, consequently shapes the inside,

reflecting what that society seeks to be immersed in. Architecturally, the built environment has always operated within this framework: culture, society, politics, technology, and ecology all shape the design of space, producing unique immersive conditions ([Forty, 2004](#)). As we explored in the discussion on body image, sensory perception and past experience influence how these spaces are understood and interpreted.

The concept of immersion is not just a spatial phenomenon but a fundamental aspect of human identity formation. The essays in *Superhumanity: Design of the Self* ([Axel et al., 2018](#)) argue that design is not only a tool for constructing environments but an active force in shaping subjectivity. The self, not fixed, is constantly redefined through cultural, technological, and architectural interventions. Immersive spaces mediate perception and influence cognitive and emotional experiences. The immersion is an extension of how the self is designed and redesigned over time. The built environment is not neutral. It is a framework that conditions.

While the eyes scan and create an optical representation of space, the skin acts as ‘a sentient bodyscape’ ([Murray & Sixsmith, 1999](#), p. 322). The senses gather information, which the mind translates into a spatial representation that orients the body. Constructed immersive environments harness the body’s ability to sense and produce spaces, employing technology and mediums that reflect and perpetuate cultural and social dynamics. Drawing on Merleau-Ponty, we can argue that architecture itself functions as an extension of the body, acting as a device through which culture and society manifest and influence subjectivity.³

The Role of Illusion

A key element in many immersive environments is illusion. Illusions exploit our knowledge of sensory processes to ‘trick’ the senses, creating a perception that deviates from reality. It is a fundamental tool in shaping reality. The human fascination with illusion has a long history—Pliny recounts the famous deception of the revered painter Zeuxis. The story goes

that for one of the ancient contests, Zeuxis painted some grapes that were so realistic that birds flew down to feast upon them. Everyone thought that Zeuxis would win the competition until one of Zeuxis's rivals Parrhasius also entered it, coming late with what appeared to be a canvas with a drape over it. Zeuxis called to Parrhasius to remove the drape so that everyone could see the painting and judge it, to which Parrhasius replied, the drape is the painting. Zeuxis, astonished, admitted to his defeat since, while his painting had tricked the birds, Parrhasius's tricked Zeuxis himself ([Pliny, 1938](#)).

Within the category of illusion, *trompe l'œil*, which translates to 'tricking the eye,' has been widely used from fun fairs and circuses to Renaissance painting. The Ames Room provides a compelling example of illusionistic space: although appearing to be a standard rectangular room, it is actually distorted—one back corner is closer to the viewer, the floor slopes upward and the ceiling slopes downward toward that back corner. This subtle manipulation alters scale perception, making one person in the pinched corner appear significantly larger than another person standing in the opposite corner. Because we expect to see a conventional room, our prior knowledge and perception construct this false understanding, allowing the illusion to take hold. The room's manipulation convinces us that objects are larger and smaller than they really are.

Cognitive neuroscience further illustrates why illusions are so effective. The brain constructs its reality based on past experiences and expectations ([Gibson, 2014](#)), meaning that subtle manipulations of scale, light, and texture can dramatically shift perception. This is relevant in the discussion of VR, where the brain's predictive processes allow for the immersion. Case studies describing virtual realities (VRs) range in mediums from physical to digital.

If we extend the definition of augmented reality beyond digital overlays, we might consider the role of architecture in perceptual augmentation. A subtle change can dramatically alter the perception of an object in space. A white object in shadow may appear darker than a black object in light. A brightly lit room makes objects and bodies seem lighter, while the lighting

hue—warm or cool—further affects perception. Since our previous notions of color, shape, size, and texture are shaped by memory, shifts in lighting act as overlays, modifying our interpretation. Light has been an important design component in architecture, shaping spatial experience and transforming the way surfaces, materials, and forms are perceived. Cathedrals, for example, employed stained glass or the Luminous Cloud effect⁴ to create an ethereal effect, filtering daylight to produce a specific spiritual atmosphere. Gothic cathedrals were designed to reflect sounds in a way that diminishes our ability to perceive echolocation. This causes a disorientation in understanding one's relationship to other bodies within the space. They were historically designed to inspire awe and devotion through these atmospheric effects. Contemporary examples, like the works of James Turrell, use light to dissolve the boundaries between material and immaterial space, creating perceptual ambiguity. Architectural manipulations work through subtraction, amplification, and modulation—adjusting intensity, color temperature, and shadow to shift perception. Rather than relying solely on contemporary technologies, architecture has long controlled sensory conditions to shape perception in specific ways.

1. Pinched Corners

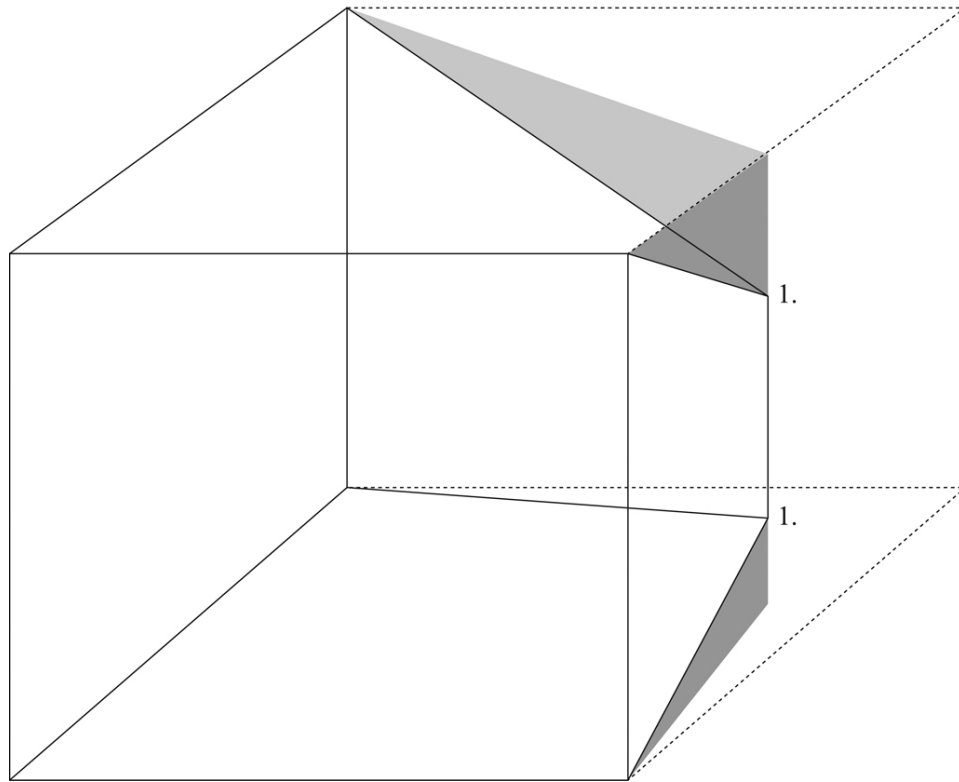


Figure 3.1 Ames Room, diagram.

Source: © ArchiTAG.

1. Pinched Corners

These techniques rely on illusionistic methods to distort perception. Throughout art history, painters have used perspective to create the illusion of three-dimensionality on a two-dimensional surface. In examples like the Villa dei Misteri, ancient Greek and Roman mural rooms attempted to produce immersion through painted illusion. By the late 1700s, the techniques expanded in scale with panorama rotundas, where optical illusions were combined with physical elements to amplify the immersive experience. These were a form of entertainment that capitalized upon rules of optics. We will return to these examples in [Part II](#).

Multisensory Engagement

While much of the discussion on immersive environments centers on visual perception, immersion relies on the integration of multiple senses. Sound, touch, and proprioception play critical roles in how virtual environments, whether architectural or artistic, are perceived. Spiritual spaces have often been designed to produce multisensory experiences, using attributes like light and scale, acoustics, and material textures to shape the specific spiritual experience. Many examples produced a reverberant soundscape that blurred the boundaries between earthly and divine space. Altering the way sound was perceived reinforced the sense of transcendence. In contemporary digital case studies, haptic technology and spatial audio recreate these multisensory conditions. Sound design is particularly effective in producing immersion, as demonstrated in binaural recordings and 3D audio environments that create the illusion of movement and depth (producing particular proprioceptive effects). Research in neuroscience suggests that auditory cues significantly influence spatial awareness. Similarly, haptic interfaces extend the perceptual body image, allowing users to ‘feel’ virtual objects through force feedback and temperature simulations. These technologies parallel historical methods of engaging the senses through materiality and resonance, demonstrating how immersion is an embodied interaction.

As VR environments continue to evolve, their effectiveness will increasingly depend on their ability to engage multiple senses simultaneously. Just as ancient ritual spaces used incense, chanting, and movement, for example, alongside a visual spectacle to deepen engagement, future immersive environments must consider the full spectrum of human perception. Designing the mediums to cater to the experience is crucial rather than simply creating the spaces around the available technologies. The most powerful immersive spaces are those that recognize that cognition is deeply tied to the visual and to touch, sound, and spatial awareness.

Contemporary neuroarchitecture reflects this imperative. In the Foster + Partners article by Vittoria Falchini and Rosi Pachilova, [*Brain, Body, Building: Neuroarchitecture and Design*](#) (2023), the authors investigate how spatial parameters influence stress, comfort, and recovery—demonstrating how design can actively shape neural and emotional states. They draw on the field of neuro-aesthetics, which links sensory input with memory, cognition, and pleasure to demonstrate how immersive environments can be crafted to heal, reinforcing the idea that architects and designers not only shape environments but engage the human nervous system. Perception and cognition are bodily and, therefore, inherently spatial and immersive.

Virtual Reality and Immersion

If we consider constructed immersive environments as encompassing all designed spaces—illusionistic or not—then VRs fall within this category. The evolution of immersive techniques demonstrates a recurring human fascination with extending reality to dissolve a viewer's spatial constraints, allowing them to mentally or physically inhabit a construct. VR aims to amplify, transport, or impart forms of knowledge. It is a canvas for the transmission of information. Architecture has always served this function; buildings are designed to convey power, social structures, and political ideologies. They encode virtual frameworks that govern society in ways specific to their cultural context. Although VR is often understood as its digital definition, its conceptual foundation predates modern technologies. It has used the available technologies and mediums of representation to create this transference of knowledge. VR exemplifies the fluidity of identity and perception as the self is not a stable entity but a designed construct, shaped by the technologies and environments we inhabit. The body image adapts to new spatial frameworks, altering cognitive and perceptual boundaries. Cathedrals were designed to evoke emotions of faith, grandeur, and, arguably, fear. Religious architecture used attributes of lighting, sound, smell, and spectacle to overwhelm visitors and heighten

their emotional response within the space. Additionally, visual iconography—whether pictorial, textual, or geometric—served as narrative tools to educate and inculcate a congregation. They used this visual imagery so that the stories would be more visceral ([Baxandall, 1988](#)).

Immersion induces a perceptual shift from ‘the outside’ environment to ‘the inside’ experience. It often involves a form of disorientation that suspends the subject’s external reference points such that they are unable to hang onto a subjective point of view until their body image adapts to the new environment, fully integrating them into the space.

Symbolically, immersion has been associated with transformation across cultures—emerging new—from Christian baptisms to Hindu ritual ablutions in the Ganges. These acts emphasize sensory awareness and spiritual renewal, reinforcing the notion that immersion—whether physical, emotional, or cognitive—is a conduit for altered states of being. The act of immersing oneself in water serves to ‘cleanse.’ Unlike routine bathing, these rituals emphasize heightened sensory awareness and deliberate engagement with the experience of being submerged in water. It requires the body to be attuned to the experience of the water. The act of immersion fosters a connection between the senses and the spirit, facilitating a form of transcendence. The water is the medium to focus the senses.

Similar principles apply to meditation practices, which aim to suspend sensory input and alter one’s awareness of the body image. The *Hatha Yoga Pradipika* (15th c.) and the ancient texts of the *Vedas* and *Upaniṣads* (1200–400 BCE)⁵ outline methods of discovering the true self through the quieting of the mind achieved by greater proprioceptive awareness. These texts can be paralleled to the later phenomenological works,⁶ specifically in how they link experience to bodily practice and focus on pure awareness and the dissolution of the ego ([Miller, 1984](#)). They each explore subjectivity, embodiment, and consciousness.⁷ These Indian philosophical texts prefigure key existential and phenomenological ideas, offering a non-Western approach to subjectivity that challenges Cartesian frameworks.

This emphasis on altered states of awareness and the suspension of bodily perception also applies to explorations in sensory deprivation, which

similarly seek to disrupt habitual sensory processing, leading to shifts in consciousness and self-perception. Sensory deprivation, in examples like John C. Lilly's experiments ([Fisher, 1973](#), p. 22) or what have evolved to become contemporary floatation pods, is equally effective at producing an immersion into a specific type of perceptual experience that suspends the body image.

Through these examples, we can recognize that immersions are fundamentally tied to sensory experience, reorganizing the body image in relation to the space. Throughout history, architectural and art spaces have utilized various mediums to produce immersive effects, often prioritizing vision but also incorporating sound, touch, and smell. While vision has been a dominant means of immersion ([Foster, 1988](#)), it is also more prone to the 'experience error' than the other senses—our visual perceptions are less consistent between individuals, making it less 'reliable.' However, all perceptual experience remains subjective, shaped by individual differences in how the body and mind receive and interpret information. There will always be degrees of nuance.

Contemporary philosophers like [David Chalmers \(2022\)](#) and neuroscientists like [Anil Seth \(2017\)](#) argue that, in a way, our entire experience of the world is virtual. Our subjective minds create the world around us, immersing us in a representation of reality that is of our own making. This view echoes Schopenhauer's claim that perception is not a passive reception of sensory data but an 'intellectual interpretation' ([Schopenhauer, 2000](#)). Sensory experience is always a representation of reality based on subjective perceptions and previous experience. We cannot actually experience 'the real' directly, only its mediated representation. Collective reality, shaped by social frameworks, becomes truth. It is for this reason that this shared perception is a construct rather than an objective truth.⁸

Our constructed VR environments offer a means to explore past experiences, historical knowledge, and alternative spatial frameworks. These environments need not replicate physical reality but can propose new

ways of situating the body in space using a variety of representational techniques.

Virtual Sensation

In late 2016, the Serpentine Gallery opened an exhibit that displayed Zaha Hadid's early drawings and paintings. The exhibit included a VR Oculus experience created by the Zaha Hadid Virtual Reality Group in collaboration with Google Arts and Culture. This immersive experience allowed users to enter the worlds of four of Zaha's drawings, translating the two-dimensional pieces into perceptually three-dimensional spaces. The renderings preserved her signature style, not trying to replicate 'reality.' They instead consisted of her original color blocks and lines projected into three-dimensional space. This experience left a strong impression on me at the time; it was 'other-worldly' and remarkable how quickly the body image was able to adjust to the radically different world, allowing the user to feel sensations associated with movement within the space. The Leicester Square drawing immersion was particularly effective in its demonstration of VR's capacity to alter perception.

Upon donning the VR headset, users found themselves in a virtual gallery space where, by focusing their gaze, they could select one of the four paintings on the wall to enter. The Leicester Square experience began with an aerial view of Hadid's abstract cityscape, the user hovering above to view the major arteries that determine the footprint of the architectural intervention. They pan over the space while the colored crystalline forms of the design appear and elongate. The user then gently falls through the ground plane, revealing and admiring the proposed underground design. Even though the user remains stationary, the sensation of movement mimicked that of the 'real'—eliciting physical responses. Finally, the user moves away from the design to see it within the context of the city represented simply with planar lines projected onto a curved 'global' surface.

The experience is exhilarating, allowing the user to feel their heartbeat race while viewing what Zaha Hadid considered the heart of the city. The body image, immersed in the world, adjusts to the new reality that allows for the mimicry of sensations through the manipulation of perception. It brings us back to the philosophical question also posed by Chalmers and Seth: what do we perceive as ‘real’ versus ‘virtual’?

VRs fall under the category of immersive environments. The term VR raises fundamental questions about the distinction between the real and the virtual. For this reason, I recognize these terms not as opposites but as interwoven—the virtual nested within the real. Since sensory perceptions arise from nerve synapses and neurotransmitters that can be stimulated through alternative means, the boundary between ‘real’ and ‘virtual’ becomes increasingly ambiguous. This distinction is ultimately irrelevant since both real and virtual experiences shape the body image and contribute to experiential memory.

Understanding this principle has led to groundbreaking applications in neuroscience and rehabilitation. People subconsciously interact with their surroundings.⁹ In cases of body paralysis, the brain is unable to send neural messages to the paralyzed parts of the body because these pathways are damaged, resulting in a body image that does not include them. Using advanced technologies with VR and robotics, doctors have worked with patients to reinstate the body image. This has produced some success.

In 2014, the opening at the FIFA World Cup in Brazil featured Juliano Pinto, a paraplegic patient who kicked off the game using a brain-controlled robotic exoskeleton. Researchers developed this system as part of the Walk Again Project (WAP), an innovative research nonprofit that also incorporated the use of immersive VR training environments to help the recovery of other paraplegic patients.

Over the course of twelve months, WAP successfully helped eight paraplegic patients reestablish motor control using a system that capitalizes on the redevelopment of the body image. In initial tests, the researchers made a discovery that is in keeping with Schilder’s observations. When asked to imagine walking, the patients did not have the associated brain

signals. The first step in the rehabilitation was to develop these brain signals using VR environments. In VR, patients trained with an avatar that established a brain-body connection, illustrating [Schilder's \(2014\)](#) work on how crucial the body image is in the development of neurological networks and movement.

Following this, a robotic exoskeleton was incorporated that responded to the brain signals and assisted in redeveloping motor control. All eight patients experienced improvements in voluntary muscle contraction, motor recovery, and proprioception. Half of them were reclassified from being fully paralyzed to partially paralyzed. The combined use of the VR environment, visual and tactile stimulation, and the brain-machine interface (BMI) robotic exoskeleton allowed for a degree of neuro-rehabilitation ([Donati et al., 2016](#)). We can compare this to Lacan's 'mirror stage theory' and how the infant develops their body image, gradually gaining motor control.

This chapter has examined the psychological and perceptual effects of immersive environments, establishing a foundation for understanding how they shape our body image and subjective experience. By exploring illusion, virtuality, and sensory perception, we can recognize how architecture and designed spaces influence cognition, emotion, and embodiment. This discussion of immersion reveals that all experiences are mediated through design—that there is no natural predesigned self, only a continuous process of body image evolution through interaction with architecture, technology, and culture. As virtual and augmented realities continue to evolve, architecture must critically engage with these shifts, ensuring that immersive spaces enhance embodied perception, balancing technological mediation with sensory engagement that redefines how and why we inhabit and experience space. The distinction between 'real' and 'virtual' proves increasingly tenuous, as both contribute to our experiential memory and perception of reality. In this sense, the distinction becomes irrelevant. Instead, what matters is how these immersive frameworks mediate knowledge, power, and identity in contemporary society. This blurring of boundaries has profound implications not only for architecture

but also for neuroscience, rehabilitation, and the evolving relationship between technology and the human body. Immersion, then, is not just about entering a designed space but understanding how the self is, in itself, designed. Moving forward, we will continue to investigate how culture and society construct subjectivity through VRs, questioning these frameworks in the contemporary world.

Notes

1. Adrian Forty argues that architectural meaning is shaped through language. The way we describe immersive environments influences how they are conceptualized and understood. Terms like ‘virtual,’ ‘augmented,’ and ‘simulated,’ imply degrees of separation from reality, yet they also define the scope of what an immersive space can be. Historically, architectural terminology has often reflected dominant cultural and ideological narratives, reinforcing certain spatial hierarchies while obscuring others. Similarly, immersion is framed by the language used to describe it—whether as an extension of material reality, a departure from it, or a cognitive manipulation. Understanding immersion, then, requires not only examining its spatial and perceptual dimensions but also recognizing the linguistic frameworks that condition its meaning. [↩](#)
2. [Deleuze’s concept of the Fold \(1988\)](#) provides a useful framework for understanding the relationship between inside and outside in immersive environments. Rather than a simple dichotomy, the Fold suggests that the inside and outside are continuous, co-constituting each other in a process of becoming. In this sense, immersive environments do not merely enclose but actively fold the external world into an internalized spatial experience. What is ‘inside’ is not separate from ‘outside’ but reacting to its forces—whether cultural, political, or technological. In architecture, this manifests as the way structures encode broader socio-political realities while simultaneously shaping embodied experiences within them. Immersion, then, is not just a question of being enclosed within a space but of how the external world is enfolded into perception. [↩](#)
3. [Goldhagen \(2017\)](#) expands on this concept by demonstrating how well-designed spaces can enhance human well-being, whereas poorly considered environments can induce stress and cognitive fatigue. She critiques modernist architecture for neglecting how people actually

experience space, often prioritizing function and efficiency over the psychological and physiological needs of users. Instead, she proposed design that addresses empathy in space and one that acknowledges the way humans subconsciously navigate and perceive their surroundings. Goldhagen argues that architecture directly impacts human emotions, identity formation, and a sense of belonging. Environments with more organic forms, natural light, and warmer materials evoke feelings of comfort and connection. In contrast, sterile, repetitive spaces can create a sense of alienation and mental fatigue. This aligns with the main point of this chapter that immersive environment mediate perception which is responsible for the body image. ↵

4. This involves the interaction of light with particulate matter, such as fog, mist, or dust, to produce a diffused, glowing environment. It is used to evoke a sense of transcendence. ↵
5. These are foundational texts of Indian philosophy and spirituality, and each contributes uniquely to the understanding of subjectivity, consciousness, and the self. The *Hatha Yoga Pradipika* ([Muktibodhananda, 1985](#)) outlines a system of physical postures, breath control, and meditative practices aimed at achieving spiritual liberation. The text builds on earlier Tantric and Yogic traditions emphasizing practical methods for awakening kundalini (latent energy/life force) and experiencing the true nature of the self. The text presents subjectivity as embodied consciousness, where the mind and body are vehicles for spiritual awakening. Subjectivity is not fixed but can be transformed through yogic practices, which refine perception and dissolve an ego-based identity. This text aligns with later writings on phenomenology and subjectivity. The *Vedas* are the oldest scriptures of Hinduism and are largely liturgical but contain mythological narratives and symbolic allegories. They relate subjective experience with the cosmos, divine order, and rituals, and they conceptualize the self (atman). The *Upanishads* build upon the *Vedas*, shifting from a more ritual-focused set of texts to an exploration of reality and further studies of the self, the universal consciousness (brahman), and liberation (moksha). They redefine subjectivity as pure awareness/consciousness and propose that the true self and subjectivity is not separate from ultimate reality ([Ranganathan, 2025](#)). ↵
6. Parallels can be made with the works of Husserl, Merleau-Ponty, Schopenhauer, Hegel, Heidegger, and Sartre. ↵
7. The *Hatha Yoga Pradipika* treats the body as the medium for subjective transformation, emphasizing how specific body practices refine consciousness. Kundalini (life force) awakening and sensory withdrawal reshape perception, paralleling Merleau-Ponty's argument that perception is inseparable from the body. Rather than being an object of consciousness, the

body is the means through which reality is experienced. Like the *Hatha Yoga Pradipika*, his theories suggest that bodily practices reshape subjective experience, reinforcing the idea that sensory awareness is integral to selfhood. Schopenhauer argues that the world is a representation shaped by the will, with all subjective experience driven by an underlying will. He also describes the world as an illusion created by the mind, a notion similar to *the Vedas*, which describe the universe governed by cosmic order and illusion, shaping subjective experience. Both the *Vedas* and Schopenhauer propose that liberation is possible from transcending attachment to worldly desire. Finally, the *Upaniṣads* explore the self beyond the ego. In *Being and Nothingness*, Sartre presents consciousness as distinct from material being. It has no fixed nature but is defined by its negation of being. Consciousness is ‘for-itself.’ [↵](#)

8. This raises the question: if all experience is mediated how can we quantify which experiences are ‘authentic’ or simulated? Critics of digital virtual realities argue that these spaces risk detaching individuals from material realities, creating a hyper-mediated existence where spatial memory and embodied cognition become secondary to simulated experience. [↵](#)
9. There are studies demonstrating that individuals in well-designed environments show improved cognitive function, lower stress levels, and greater social connectivity. In contrast, environments that lack sensory engagement—such as office buildings without windows or monotonous urban environments—contribute to emotional disengagement ([Goldhagen, 2017](#)). [↵](#)

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Part II

4 From the Cave to the Digital Landscape

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The pursuit of immersion is deeply embedded in human nature, in our evolutionary, cultural, and architectural history. [Oliver Grau \(2003\)](#) argues that the drive to create VR goes back to cave paintings. Even though prehistoric drawings used simple forms of representation, they were used to convey stories, keep records, and document experiences. They allowed information to be passed down across generations, ensuring that the knowledge endured. They encoded memory, belief, and shared cultural identity. While cave paintings such as those found at Lascaux, France, did not require people to construct the enclosure, the drawings within the space suggest a ceremonial organization. [Richard Ingersoll \(2019\)](#) writes that these can be considered the first religious architectures. The organization of these sites suggests an awareness of spatial storytelling, where images and structures worked together to create an enveloping experience for their viewers. It is even believed that these early artists used the existing light and shadow to enhance the experience with the drawings.¹ Just as prehistoric artists sought to simulate movement and depth with their pictographic representations, later civilizations would refine these principles and develop other ways to explore the perception of space. Bringing to mind a different cave, Plato's allegory offers a timeless metaphor for how our perceptions of reality are formed. In the allegory, prisoners confined to a dark cave mistake the shadows cast on the wall for the entirety of reality since the shadows are all they have ever known.

Plato's allegory laid the groundwork for philosophical inquiry into perception and illusion ([Heidegger, 2013](#)). Renaissance thinkers applied these ideas in their explorations of linear perspective, creating artworks that attempted to blur the line between real space and representation, equating geometric linear perspective with Godliness. Jean Baudrillard's simulacra argues that we now live in a world dominated by hyperreal images—copies of a reality that no longer exists. We are surrounded by sensory stimulation of our own making that reinforces a particular way of living and interacting. In this context, do contemporary virtual experiences function as new 'shadows on the cave wall,' presenting illusions so convincing that they reshape our perceptions?

Myth, Ritual, and Representation

The Allegory of the Cave underscores that our sensory experiences—and the representations we create from them—are inherently limited, shaping a specific understanding of the world based on these frameworks.² Storytelling contributes to this. It possesses an immersive quality, engaging the imagination to fill in the sensory details. The effectiveness of a story relies on the listener's ability to construct a sensorial world, drawing from their prior experiences to visualize, smell, touch, or even taste the events being described. This process is fundamental to human cognition—a way of making sense of the world. It is also where the joy of reading a brilliant novel is derived: in the immersive act of using the imagination and inhabiting the narrative.

Prehistoric cultures delineated their environments and built their structures according to values they attributed to the production of space. While decisions were made based on climate, materials, fortification, and emerging agricultural practices, there was also a spiritual component that determined the orientation and formal strategies of these sites. The positioning of structures, the use of light and shadow, and the integration of natural elements were deliberate choices that augmented the impact of these

early spaces. Some built monuments aligned with the sun's path movements, while others incorporated landscapes and waterways. Symbols and inscriptions similarly acted to convey messages, providing multiple layers of informational immersion. These design decisions illustrate a greater picture of each society and the virtual conditions they surrounded themselves with.

The design of a site like Çatalhöyük, served both a practical and immersive function. It is a Neolithic archeological site first occupied around 7000 BCE, located in southern Turkey. The design of the site is a dense honeycomb of cellular spaces without streets between buildings. While the site includes a few spaces believed to be temples, spiritual practices were embedded in daily life, each home had its own shrine, and the dead were buried beneath, making them a form of sanctuary. Additionally, like the cave paintings, the walls of these domestic spaces had religious images. On the one hand, the clustering of buildings provided security to inhabitants, as people could only access homes via the openings on the roofs with a wooden ladder. The entry apertures found on the roofs also provided an exit for smoke from cooking or ritual practices. The perimeter of the site was made inaccessible, with blank walls and no doors or windows. On the other hand, this arrangement meant that the interior spaces were dimly lit, and descending into the cavernous space added to the religious quality. The home served a memorial purpose that bound the occupants to the site ([Ingersoll, 2019](#)). Based on the layout of the city, the lack of a monumental center, the incorporation of religious practice in all buildings, and the equally sized spaces that remove an obvious hierarchy of space, we can begin to understand how this settlement may have represented a deeply spiritual and egalitarian society. Ingersoll explains, 'architecture became an act of communication when groups of prehistoric dwellers joined together to pile up stones for a collective purpose' ([Ingersoll, 2019](#), p. 24). In this viewpoint, even the 'primitive hut' ([Laugier, 1977](#)) has cultural value beyond its function as shelter. There are so many examples of structures that now leave a trace and an idea about what these previous cultures valued. In many cases, we can only speculate how the spaces were really

used, but the ruins provide insight into the complex relationship between subjects and architecture throughout history.³ These architectural strategies evolved into elaborate urban designs, ritual sites, sacred monuments, and governing structures, reinforcing the notion that built environments could serve as vessels for collective memory and immersive storytelling.

The transition from premodern immersive spaces to contemporary digital VR is not a rupture but a continuation of longstanding techniques in the production of perception. In this next section of the book, several case studies demonstrate fundamental similarities with today's virtual environments. The key message is that they create a controlled perceptual framework that alters user experience. We can begin to draw parallels with VR experiences like the Google Tilt Brush and painterly representations found in various fresco rooms where users can 'step into' paintings and engage with an illusion. Similarly, spatial sound technology found in head-mounted display devices produces acoustic experiences that mimic the role of physical architectural spaces that have used resonance and reverberation to distort or amplify a sense of the body's coordinates. Cultural narratives have consistently sought to extend perception beyond the constraints of the immediate environment.

Telling the Story

Before the written word, oral storytelling flourished. Respected bards wove vivid narratives, conjuring spaces, characters, and events through spoken words alone. These stories, passed from narrator to narrator and committed to memory, explained natural phenomena through mythological gods, celebrated heroes, famous competitions, and honored artists. Among those immortalized in such stories was Zeuxis, whose legendary competition with Parrhasius allows us to understand the *tromp l'œil*. As one of antiquity's most revered painters, Pliny described him as having 'stolen the art from others and had taken it all to himself' (Pliny, 1938, p. 38). In other words, he had become a better artist than his teachers. His reputation for excellence

was matched by his arrogance, known to refuse to sell his paintings, claiming they were too valuable to be assigned a price. Nevertheless, his talents as a painter and sculptor were preserved through storytelling in accounts like ‘Zeuxis Selecting Models’ ([Pliny, 1938](#); [Mansfield, 2007](#)).

In this story, Zeuxis was commissioned to paint a rendition of Helen of Troy for the Temple of Lacinian Juno in Agrigentum. Determined to capture Helen’s famed beauty, he sought out a model to represent her. After seeing all the women in the town, he could find no one who perfectly embodied this ideal and instead selected five models, borrowing the finest features from each to create a composite image of perfection. On the one hand, this hybrid female figure exemplifies the classical strategy of mimesis—copying and manipulating nature to construct a believable or realistic image. On the other hand, this story demonstrates how constructs, in this case, conceptions of beauty, shape the construction of the virtual condition. Zeuxis created a nature that simultaneously existed and did not exist. With mimetic techniques, he attempted to depict reality, or the existing preconceived notion of it, in the most visually ‘accurate’ way, even if that meant that the painting was not accurate. The woman does not exist but is a fabrication composed of five separate women. His painting functions as a form of VR, shaped by a cultural understanding of beauty and representation. This notion of constructing an idealized reality persists in contemporary culture. Especially in this age of emerging artificial intelligence

(AI), software and algorithms assemble composite images that conform to societal expectations. Just as Zeuxis combined multiple perspectives to achieve an imagined standard of beauty, modern digital tools manipulate images using compilations of data points to present new standards of aesthetics and architectural practice. There are clearly ethical issues that arise with this and the data biases embedded in the information curated. Zeuxis determined his ‘data set’ by considering every woman in the town; we will need to determine appropriate methods to develop our datasets and how they are used. This story demonstrates a contradiction that relates to virtuality. Zeuxis’ approach mirrors the ways in which society and human

perception construct reality: through selective attention, memory, and interpretation. This has always been the case and is amplified through contemporary technologies.

The story of Zeuxis selecting models also highlights the enduring tension between realism and illusion in the history of Western art. The ability to paint with realism conferred status on artists in antiquity and beyond, making figures like Zeuxis legendary. Over the next few chapters, we will explore how different artistic traditions have used realism and abstraction to create virtual realities (VRs), employing a range of mediums and techniques. We will consider the spectacle produced by theatre and set design, and we will look at architectural spaces that have produced calculated atmospheric effects to convey specific messages. At the heart of these practices is the desire to convey experience through sensory perception.

While evaluating representational traditions around the world, a unifying feature beyond styles and mediums is how stories are used to immerse an audience into the virtual world created. The painted examples discussed so far have relied on their position on a wall. However, other cultures and representational practices used more intimate techniques to immerse their viewer. Chinese handscroll paintings require a more physical relationship to the medium. Unrolling a handscroll is a deliberate and ceremonial act: the viewer must move through the narrative slowly and purposefully, examining sections that can be no longer than arm's length before rolling forward to reveal the next scene. This active engagement produces a deeply personal connection to the representation. Since these scrolls stylistically contain scenic depictions with the narrative woven within, it is up to the viewer to identify and perceive the storyline. This lends the reading to take on the subjectivities of the users as they each uniquely move through the representational space. The viewer cannot be passive. The scholar Dawn Delbanco (2008) describes this experience as one of intimacy—handscrolls are typically viewed alone and from close range, demanding this direct and physical interaction. The pace and rhythm of the story are determined by the viewer. Given the similarities we can draw between this and reading

text, it follows that many scrolls contain inscriptions and colophons provided by previous viewers that leave a trace of who has been here before (Delbanco, 2008). It creates a layered history of participation that shapes the work's meaning and interpretations over time.

In recent years, new technologies have reinterpreted these immersive traditions. The digital rendition of the panorama 'Along the River During the Qingming Festival' at the China Pavilion for the 2010 Shanghai Expo transformed the historic handscroll into an animated, large-scale experience. While the original intimacy of the handscroll was lost, the new format introduced a collective mode of viewing, emphasizing movement, dynamism, and shared engagement. Rather than suggesting one method as superior, such adaptations reveal the diversity of immersive experiences and mediums used. Each mode reveals new layers of meaning and comprehension. These new renditions create accessibility to stories, providing the experience to more people.



Figure 4.1 Chinese Handscroll, illustration.

Source: © ArchiTAG.

1. Physical Act of Unrolling the Handscroll
2. Viewed from Close Range and Individually Experienced

Similarly, archaeological sites have been reconstructed and placed in VR as an educational tool, sharing knowledge discovered by archaeologists with a wider public. ‘The Curious Case of Çatalhöyük’ ([Tarkan, 2018](#)) was a traveling exhibit that allowed people to step into the site and learn about Neolithic culture and the process of excavation. The artist, Refik Anadol, contributed to this exhibit, taking the data from the project’s archive, using machine learning to sort it, and immersing people in this information ([Anadol, 2017–2018](#)).

This transition from physical to digital immersion marks a pivotal shift in how narratives are consumed and experienced. While physical mediums require a physical presence, contemporary technologies allow for interaction beyond the constraints of geography. Today’s VR, augmented reality, and interactive digital media now provide users with customizable, participatory experiences that, in many cases, engage multiple senses. Stories and cultures can be shared like never before, opening possibilities for greater empathy and collective learning. This digital evolution represents both a continuation of historical immersive strategies and a redefinition of the ways in which humans construct and inhabit virtual spaces. They also redefine ways of communication, bringing disparate communities together. This is not to say that these new technologies exist without constraint. In fact, with them, new questions surface about ethics, consumption, equity, and disinformation. VR has the potential to shape beliefs, memories, and identity, making them powerful tools that can be used both responsibly and irresponsibly. Much like how historic religious spaces used immersive techniques to guide spiritual devotion, today’s digital environments have the power to influence political opinions, reinforce ideologies, and create alternate and parallel realities. We have seen the consequences of this already with social media bubbles creating

greater polarization. However, each medium provides new perspectives and modes of experience worth dissecting further.

These various methods of representation and the mediums they employ all bring value to the discourse around VR and the perceiving body. They help us understand the subjects of immersion Across artistic traditions, the drive to tell stories is the feature that unites them. The second part of this book delves deeper into these remarkable spaces and their narratives, analyzing the mediums, methods, and technologies that construct our understanding of VR. By examining how different cultures have pursued immersion through representation, we gain insight into the ways art and architecture shape subjective experience and our perception of reality. As we move further into the digital age, the boundaries between the physical and virtual continue to blur. With the rise of the metaverse, AI-generated content, and increasingly sophisticated mixed reality experiences, we must ask how these new mediums will redefine the way we construct and share narratives. The history of immersive representation suggests that while technologies change, the human impulse to create alternative realities remains constant. From pigments to pixels, cave drawings to digital environments, the desire to step into the virtual is a defining characteristic of humanity—one that will continue to evolve in ways we can only begin to imagine.

Notes

1. Yuval Noah Harari argues that Homo sapiens became a dominant species due to the ability to create and believe in shared myths. This complex communication allowed for organization between humans that led to the development of cultural and social frameworks and the design of the urban condition. This ability to create fiction in the form of religion, nation, and economics, for example, enabled this large-scale human cooperation. What started off as small tribes evolved into organized societies ([Harari, 2015](#)). He suggests that today, we must reconsider our narratives and the fictions that shape society to address global challenges, the rise of the surveillance state, and inequalities. He also calls attention to the crisis of truth with

the rise of fake news. People are creating virtual bubbles with curated and manipulated information that has led to polarization and a society where objective truth is a question of politics and media. He continues to speculate futures for humankind that considers the evolution of the species with technology ([Harari, 2017](#)). In *Lessons for the 21st Century*, Harari addresses contemporary debates about immigration and ‘otherness’ that are fueled by culture rather than any real economic issue. He argues that identities are fluid and are a product of shared myths rather than biological determinism ([Harari, 2018](#)). ↵

2. This is also in keeping with Deleuze’s concept of the fold, which suggests that these ‘folded’ ‘inside’ spaces are an extension of an outside. Reality is shaped by the perceptual and psychological constructs in place. Plato’s cave dwellers see a representation of the outside that becomes their reality. ↵
3. Structures such as Stonehenge, from around 2500 BCE demonstrate complex understandings of astronomy and geometry. Bluestones were carried from miles away, showing how devoted these people were, collecting these special stones from southwest Wales to construct the site 250km away. While speculation, scholars believe that the stones were placed to mark seasons and serve as a timekeeper for the necessary rituals ([Abbott et al., 2012](#)). For the summer solstice, the sun rises over the Heel Stone, and for the winter solstice, it sets over it. Archeologists studying prehistoric humans recognize that, contrary to earlier beliefs that people went linearly from being nomadic to sedentary, these communities went through cycles of being nomads. This allowed them to cultivate agriculture and set up trade during seasons when this would be fruitful ([Lane, 2011](#)). It also provided extra security and collective support during months that were more dangerous due to the weather. The monuments and markers they put up were an important part of determining the cycles ([Graeber & Wengrow, 2021](#)). The rituals they would have practiced would have been a part of the myth construction, similar to other ancient civilizations, of giving meaning to the world and its phenomena, praying for good harvest and health for their tribes.

Looking elsewhere, canal systems and urban planning in Mesopotamian sites delineated space and produced hierarchical social structures. Ziggurats and Pyramids sought to bring people closer to their Gods. Temple structures created a layering organization, bringing privileged people closer to altar spaces. The growth of cities and social hierarchies led to legal systems and codes of conduct. Virtual systems: laws, religions, and ideologies are materialized within the architectures, and these architectures then reinforce their respective systems. Interestingly, cultures in the Americas, Asia, Europe, the Fertile Crescent, and Africa built these

tall and monumental structures and landforms in isolation of one another, demonstrating a human nature to invent the mythology that supported their constructions. [↗](#)

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5 Tricking the Eye

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The history of humanity chronicles not only the use and development of tools and devices for survival but also a long lineage of devices to augment perception by engaging our senses and enhancing experiences. Among these, a wide range of optical devices have served both practical and pleasurable purposes. There is a unique pleasure derived from the manipulation of vision—a pleasure that is evident in the multitude of optical illusions invented purely for entertainment. This is especially evident in the 18th and 19th centuries when optical devices used for peepshows at fun fairs and circuses became increasingly popular ([Crary, 1992](#)). These devices have an inherently voyeuristic quality, often involving the act of peeking through an aperture to view hidden images. Understanding ways of seeing led to these illusionistic devices ([Mannoni et al., 2004](#)). To fully appreciate this fascination with spectacle and optical illusion, it is important to first understand the underlying theories on optics.

The Science of Optical Illusion and Perception

Generally, optical devices capitalize on what [J.J. Gibson \(2014\)](#)¹ termed ‘aperture vision,’ or the experience of looking through a peephole. This parallels his other vision categories, ‘ambient vision’—the act of looking around—and ‘ambulatory vision’—the act of looking while moving. In his book *The Ecological Approach to Visual Perception*,² while there are some discrepancies,³ his work provides a valuable perspective on optical

perception and how knowledge of it can be used to construct the illusion and immersion necessary to understand the success of VR spaces. However, it is important to note that Gibson did not think it was possible to represent reality as it exists and is perceived since his theories refute our understanding of objects through depth perception and the flattening of the three-dimensional into a two-dimensional retinal image. Instead, he believed that perception and information pickup occur directly and are then interpreted by the brain to create the sensation of three-dimensional space.⁴

Gibson rejected earlier theories—such as Euclid’s concept of the ‘visual cone’ and Ptolemy’s ‘visual pyramid’—which were the accepted explanations for vision.⁵ These posited that an optic array projected from the eyes conically and as these visual rays intersected with objects the properties of the objects could be determined. Euclid mathematically described this in his text *Optics*. Later scholars like Leon Battista Alberti in the 15th century, who developed a methodology of linear perspective (‘rediscovered’ by Brunelleschi), and Roger Bacon in the 13th century, who wrote *Opus Majus* approaching optics using geometric laws, built upon these ideas. In contrast, Gibson argued that all unobstructed surfaces are projected to a fixed point, with movement allowing for hidden surfaces to become visible. The registration of surface and ground plane allows for depth perception. Instead of the assumption that the silhouette of an object is detected before its depth, he hypothesized that depth perception arises from the shadowing and registration of surfaces that reveal the object’s form.

This perspective suggests that pictorial representations done in linear perspective could mimic natural perspective since images often use shading. However, the problem arises with ‘central perspective,’ which assumes we see with a single eye (usually not the case) and that a planar cross-section can adequately represent the complex, curved optical image our eyes actually perceive. This abstraction from reality is why Gibson opposed equating a two-dimensional pictorial representation with natural perspective/perception of reality. He further argued that perceiving is a

psychosomatic process—a continuous stream of information pickup by the living observer, rather than a series of static images.

What some of these earlier theories did not consider that Gibson noted was that the perception of the self is always present within our experience of the environment. This underscores the inherently subjective nature of perception and supports Gibson's argument on the shortcomings of pictorial representations.⁶ Gibson referred to this duality as perception's poles with egoreception (information about the self) and exteroception (information about the environment) in coexistence. We simultaneously perceive the external world while co-perceiving our own presence within it ([Gibson, 2014](#)). Reiterating the concept from earlier, he uses a simple explanation: our nose is always in our field of view, though our brain filters it out so that we focus on the environment—a clear demonstration of how our perceptions of space are inseparable from our perceptions of self.

In many optical devices and illusionary spaces, the connection between self and environment can become tenuous. Either the device forces a monocular experience, reducing the ability to co-perceive body and space, or, in the case of many contemporary virtual realities (VRs), the absence of an avatar can lead to disorientation and even nausea. Nevertheless, despite the shortcomings of some VR representations, these spaces encapsulate subjective understandings of space that reveal broader cultural and social shifts. The devices themselves are as revealing as the environments they present. Knowledge of optics has been harnessed to create a wide array of devices that immerse viewers, ranging in scale, breadth, dimensionality, and complexity, all aiming to manipulate perception so that users can 'enter' a new environment. The most successful immersions integrate a perception of self within the perception of the space.

The Camera Obscura and Early Vision Devices

The camera obscura is described by Diana Agrest as 'a room for representation or the representation of a room. A place for representation or

the representation of a place; this is the camera obscura ... creates a whole world of illusion.’([Agrest, 1991](#), p. 157) This device, a simple pinhole camera, dates back to around Euclid’s time ([Grau, 2003](#)). The earliest descriptions are found in writings by the philosophers Aristotle in Greece and Mozi in China. The camera obscura consists of a box or a (windowless) room with a small aperture on one side from which the image of the outside projects upside down onto the opposite wall. The smaller the opening, the more precise and focused the image will appear. It is the foundation for modern photography, scientific observation, and artistic techniques. These devices helped in understanding optics, perspective, and depth perception. The camera obscura led to innovations in artistic techniques like chiaroscuro and linear perspective. In photography, 19th-century scientists replaced the temporary projection with a chemically fixed image, creating the first photographs. It demonstrated that vision occurs when light enters the eye rather than the inverse, correcting misconceptions from ancient Greece. This simple yet powerful device has been used for both entertainment and scientific purposes, such as in Paolo dal Pozzo Toscanelli’s gnomon in the Cathedral of Santa Maria del Fiore. The Gnomon device allowed astronomers to study solar eclipses and other celestial happenings. It was used to calculate the Earth’s distance from the sun and the astronomical year. Installed in the 15th century, Toscanelli’s gnomon is one of the largest astronomical instruments of its kind. This device consists of a bronze plate with a small hole, placed in the dome of the cathedral. When sunlight passes through the hole, it projects a spotlight onto the floor. The movement of this spotlight can be tracked and allows astronomers to understand the Sun’s position throughout the year. The alignment of the sunlight with a marked spot on the floor was crucial to determining the equinoxes, solstices, and refining calculations of the Earth’s tilt. Camera Obscuras range in scale and provide a new perceptual immersive experience of the projected outside. Since the projection is inverted, the ‘thinking mind’ logically recognizes that the image is an inversion; however, the ‘sensing mind’ experiences the image as new and different.

The scientist George M. Stratton also experimented with inverted images by developing inversion glasses that flipped his visual field. Through a series of perceptual experiments, Stratton tested them on himself to discover the relationship between perception and the brain. The device uses mirrors to flip the image the wearer sees—left becomes right and up becomes down. Stratton documented how, initially, the inversion caused significant disorientation and nausea. Over several days, however, his brain adapted, reorienting the body image until the inverted vision became the new normal. The new ‘virtual’ environment produced by the inversion becomes reality such that when the glasses are removed, reality appears inverted.

Stratton provided a day-by-day account of his experience using the inversion glasses. He noted that on the first day, everything appeared upside down, making movement extremely difficult due to the reversed visual field. By the second day, movement began to ease slightly, though he still could not accurately perceive his surroundings. When he closed his eyes, his mind recreated his familiar environment as he remembered it. On days three and four, his motor movements continued to lag behind his altered vision, but by day four, the initial nausea had completely subsided (this nausea would return for a day upon removal of the glasses after his adjustment). On day five, he observed that his body image had begun to reorient, allowing him to move more easily and better understand his position in space. On day six, tests of tactile perception revealed that touch was no longer arbitrarily experienced. By day seven, the inverted context did not feel foreign; he stopped mentally re-inverting the image when his eyes were closed. Finally, on day eight, Stratton described a breakthrough,

when I directed my attention to the new visual presentation of the body which was to be touched, and expected touch there, the touch was felt in the new situation, and there was no change in the correlations. Immediately afterwards, a kind of after-image of the touch occurred at the other visual side ... I seemed to observe the world from a body which had been turned round.

This important observation shows how the body image is continually constructed through iterative sensory input and environmental interaction. Stratton describes the experience of the inversion as a merger of both his old orientation and the new. His previous perceptions shaped how he was able to experience the new. This experiment also demonstrates the temporality of the immersion and the strong correlation between the visual experience and proprioception. The instability experienced during a shift in environment—such as the nausea common in many VR systems—illustrates how the body image adapts to, and is reshaped by, new optical experiences.

The success of many optical devices lies in their use of two key features of vision: the retinal afterimage and the persistence of vision.⁷ From the mid-1820s onward, experiments in optical science led to the invention of several popular optical toys. One of the simplest of these, the thaumatrope became a common household object in the 19th century—a circular paper with different complementary images on each side attached to strings—merged the two images into one continuous perception when spun ([Crary, 1992](#)). This reveals that perception is not immediate or instantaneous; rather, the eyes integrate successive images to form a coherent overall impression. We might think of this as a layering of experience that consolidates new perceptual information. Since Gibson did not believe we see the world in static images, he would have argued that this process illustrates the constant process of information pickup. In the case of the thaumatrope, we can understand how perception produces the merged image and relate this to how the body recognizes and assesses objects in our environment. It is a continuous process of information overlay.⁸

During the same period, many other optical devices emerged—including the stereoscope, phenakistoscope, zoetrope, and kaleidoscope—which explored various modes of perception within a designed, handheld space. This stereoscopic vision translated into painting styles and artistic movements such as cubism and impressionism, which sought to capture a more visceral, sensorial quality of space.

Pictorial Immersion

A critical philosophical point emerges: representations do not need to mimic or reproduce reality to effectively immerse a viewer. Instead, spectators participate actively in a mode of representation, constructing their own perception of space. This subjectivity means that some representations resonate more deeply than others, depending on which modes an individual is willing to participate in and engage with.

In an example like Seurat's *Parade de Cirque*, the artist employed particular ratios and dynamogenic properties—measures of response to stimuli—to create an accordion-like effect where layered planes both flatten and expand to draw the eye in. Although the colors might appear muted at first glance, closer inspection reveals vibrant hues of pink, green, and blue that suggest depth in a non-conventional manner. Seurat's work is not a snapshot of a single moment but a durational composite, a time-lapse that captures the dynamic nature of visual perception.

For Seurat the apprehension of an image occurs over time. ... It invokes the body not as a unified receiver of orderly representations but as a composite apparatus on which external stimuli are able provisionally to produce luminous and chromatic effects.

([Crary, 2001](#), p. 153)

These experimental approaches to representation deconstruct perception, challenging us to consider how we sensorially construct space. Merleau-Ponty argued that vision is always embodied—that the body sees and is seen simultaneously, shaping the artist's engagement with the world ([Merleau-Ponty et al., 1993](#)). Artists throughout history have used the available technologies and mediums to explore the production of depth and temporality in VR. McLuhan, in *Understanding Media: The Extensions of Man*, argues how these mediums and technologies change human patterns and become an extension of the body. The representation becomes a language that translates experience ([Gombrich, 2002](#)). He writes, 'cubism,

by giving the inside and outside, the top, bottom, back, and front and the rest, in two dimensions, drops the illusion of perspective in favor of instant sensory awareness of the whole' ([McLuhan, 1994](#), p. 13). Each mode of representation and the construction of virtual environments reflects knowledge from the respective cultural and social moment. They become an apparatus that shape a particular discipline ([Agamben, 2009](#)). By understanding this we can see each VR as representative of much more than a singular environment but of a societal framework that provides us information about the people, their values, and practices.

While linear perspective had not yet been 'discovered' to serve ancient Rome, efforts were made in panoramic fresco rooms to convey a sense of the real. They were common and more than decoration ([Plat & Squire, 2017](#)). Scholars studying ancient Roman frescos have theorized that these pictorial representations mapped relationships between different rooms in their villas, establishing alternative connections between represented and physical space. They functioned as narrative devices and memory aids, enabling viewers to connect painted scenes with specific keywords or phrases ([Bergmann & Victoria, 1994](#)). As viewers moved through the space, a complete narrative emerged, with different paths yielding multiple interpretations. The Great Frieze at the Villa Dei Misteri is one example, the Villa Livia at Primaporta offers another.



Figure 5.1 Villa Livia panorama room in the National Roman Museum, photograph.

Source: © ArchiTAG.

Panorama rooms such as this one were designed to transport their viewers into a garden setting. These spaces are often referred to as ‘garden rooms’ ([Grau, 2003](#)). Typically, these rooms depicted detailed images of flowers, trees, and natural landscapes, creating a sense of calm, that in the case of Villa Livia⁹ contrasted with the hectic, hot urban life of Rome. Prima porta, located north of Rome, was the original site for this garden room. It was originally situated in a subterranean space to keep it cool,¹⁰ likely a summer triclinium for dining. Artists used shading, saturation, and blurring to create an enhanced sense of depth. They also used techniques such as elevating the fresco from the ground plane and changing the viewer’s eye alignment with the landscape. The Villa Livia Fresco is painted in the second style¹¹ of Ancient Roman fresco painting ([Dietrich, 2019](#)). Similarly to the Villa dei Misteri, lifting the painting up on the wall is meant to allow for the fresco to remain visible even when furniture is placed in the room and for the base of the wall to be read as an extension of the floor so that the depth carries up and out into the painted space.¹² The artist also used color shading and an emphasis on surfaces to create a foreground and a background. The colors used are cool and airy to evoke

the sensation of being outside in a shaded garden. In this example, there is careful attention to natural details: the depiction of light falling on trees, the suggestion of wind and movement in the foliage, and the dynamic portrayal of birds in flight or landing. Atmospheric perspective¹³ is employed to create the illusion of depth in a naturalistic way—objects in the foreground are rendered with crisp outlines, while those in the background become increasingly hazy through reduced vividness and contrast, and increased brightness. Within the painted space, the artist created a fence with entrances into the garden space that wraps around the entire room, enclosing the space the viewer occupies. Outside this ‘patio’ enclosure lies a grassed garden with a few trees and plants. This layer is bordered by a wall that features recesses on each side, giving an impression of outward expansion. Coloration is used to show light and shadow on these recessed wall parts. The final layer is a wild tree-scape with faint mountains in the far distance. This artistic representation includes accurate depictions of fruit trees, birds, and flowers, which together are realistically impossible. There are pomegranate trees, apple trees, quince trees, palms, pines, oaks, irises, chamomile flowers, rose, myrtle, and oleander shrubs, partridges, doves, and goldfinches, all portrayed in their prime and fruiting moments and intricately painted in vivid colors. They are all shown in bloom simultaneously in this eternal spring, suggesting a utopic paradise since these species blossom in different seasons. Birds nest, perch, and fly among the foliage, enhancing the sense of a lively garden space.¹⁴ Scholars interpret this as a reference to the Augustan Golden Age—one defined as an era of peace, plenty, and renewal. Many elements carry symbolic weight related to Augustus and Livia ([Mudd, 2022](#)). Laurel trees allude to Apollo as a symbol of triumph. Oak trees, associated with Jupiter, allude to Augustus’s role as a savior of the state. Fruits connote fertility and plenty. Myrtle plants suggest marital harmony. The variety of flora and fauna in the idyllic scene symbolizes the harmony of nature. It also encodes the message of order since we do not see a wild scene of nature depicted but a managed, well-tended garden space. Ultimately, it represents ideologies of peace and order. While the reality of the empire has darker aspects to its history, the

illusion presented in the painting creates a symbolic fiction for escape ([Sevilla-Sadeh, 2019](#)).

Garden rooms like this in ancient Rome demonstrate the desire to integrate the natural world into domestic spaces. The quality of details shows an interest in natural history and horticulture, and the illusion produces a visual escape. The Villa Livia panorama garden room effectively employed atmospheric perspective to create a VR space that transported its viewers to a utopic garden. Similarly, the pointillism used by Seurat, developed centuries later, can be considered another iteration of atmospheric perspective. Throughout history, artists have explored different expressions of spatial experience, yet linear perspective has received particular emphasis since its ‘rediscovery’ by Brunelleschi during the Renaissance. In Western contexts today, linear perspective is taken for granted as a representational methodology. It is so ingrained in our understanding of visualizing and depicting the world even though we do not see the world in linear perspective.

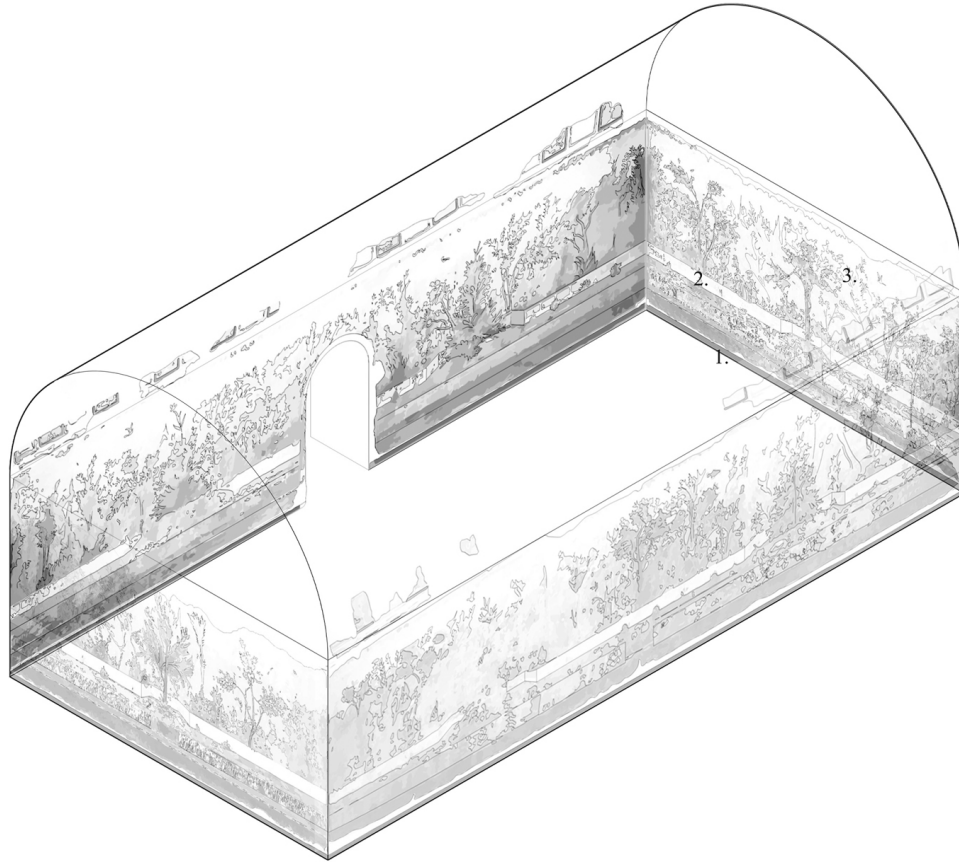


Figure 5.2 Axonometric of the Villa Livia panorama room, illustration.

Source: © ArchiTAG.

1. Lawn Layer
2. Garden Layer
3. Distant Mountains

The Discovery of Linear Perspective

The precise technique of geometric linear perspective was ‘discovered’ in the 15th century when Brunelleschi produced a demonstration that mathematically rationalized the depiction of space, thereby elevating art to a form of science ([Damisch, 1994](#)). Prior to this, particularly during the medieval era, paintings tended to flatten objects by showing multiple sides simultaneously. This approach, while complex in its own right, can be paralleled to paintings done by children. This merger of several image

perspectives was brought back to artistic representation by modern cubist artists to show the multidimensionality of our environment and the temporal quality of experience. It demonstrates a specific way to understand and represent sensing the world.

Perceptual development and understanding of spatial relationships develop at about age eight, according to the Swiss psychologist Jean Piaget ([Edgerton, 1975](#), p. 22). ‘The human mind possesses an innate capacity to structure’ ([Edgerton, 1975](#), p. 157). Piaget calls this the theory of structuralism, a concept used previously by Gestalt psychologists, anthropologists, linguists, mathematicians, biologists, and philosophers. It was originally articulated by Cassirer under the terminology ‘symbolic forms’ and was used by Jacques Lacan. According to this theory, everything is understood in terms of its relation to the surrounding world; there is a structure that overlays itself on all perceptions. Cassirer stated that

the conception of an aesthetic form in the sensible world is possible only because we ourselves created the fundamental elements of form. All understanding of spatial forms, for example, is ultimately bound up with this activity of their inner production and with the law governing this production.

([Damisch, 1994](#), p. 10)

In [*Perspective as Symbolic Form* \(1997\)](#), art historian Erwin Panofsky compares various representational techniques of perspective. He reinforces the viewpoint that linear perspective is one way of representing among many visual methods. Panofsky is also less dogmatic than Gombrich in viewing perspective as a discovery that provided the Western world with a technological advantage. Linear perspective emerged as a widely used method in Renaissance paintings. Although many Renaissance artists embraced this mode of representation, the earlier Baroque style was more expressive of movement, form dissolves in favor of light ([Damisch, 2002](#)). The surface of the paint was more visible, and the style of portraying depth was more recessionary, using dramatic and even theatrical ways rather than

purely optical ways to draw the eye of the viewer into the space. Because of this expressive quality, Leonardo Da Vinci did not rely on linear perspective, instead relying on color to create a sense of depth—an approach akin to atmospheric perspective. Linear perspective relies on the use of converging orthogonals to represent the spatial orientation. In the centuries following the ‘birth’ of linear perspective, Western artists strove to achieve the perception of depth in their paintings. As many of these commissioned works were associated with religious narratives, linear perspective was equated to Godliness. Artists came up with rules and mechanisms to apply this structural technique, and the ability to render this type of perspective became a point of pride and a marker of status ([Panofsky, 1997](#); [Baxandall, 1988](#)).

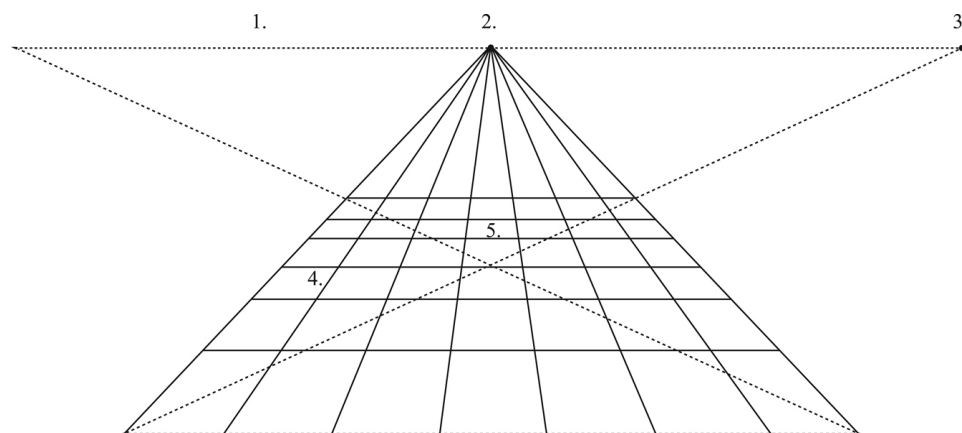


Figure 5.3 Linear Perspective Method, diagram.

Source: © ArchiTAG.

1. Horizon Line
2. Vanishing Point
3. Distance Point
4. Orthogonals
5. Transversals

Brunelleschi’s discovery in 1425 involved an experiment using an apparatus composed of a mirror and a painting with a small sight hole.¹⁵ In his setup, the canvas was held facing the mirror, and the sight hole allowed

him to look through the painting to see its reflection. By removing the mirror, he could compare the reflected image with the actual scene depicted in the painting, checking whether he had achieved the correct perspective. This experiment led to his discovery of the vanishing point. He tested his device with two paintings: one of the Florentine Baptistery in frontal perspective and the other of the Palazzo della Signoria in oblique view. His apparatus was relatively small, with the canvas measuring only about 41 centimeters square. Although it may have been possible to test perspective without the use of the mirror, Brunelleschi determined that relying solely on the painted image would result in a perception of a flat, two-dimensional surface. He believed that the reflection in the mirror gave the image a three-dimensional quality ([Edgerton, 1975](#)).

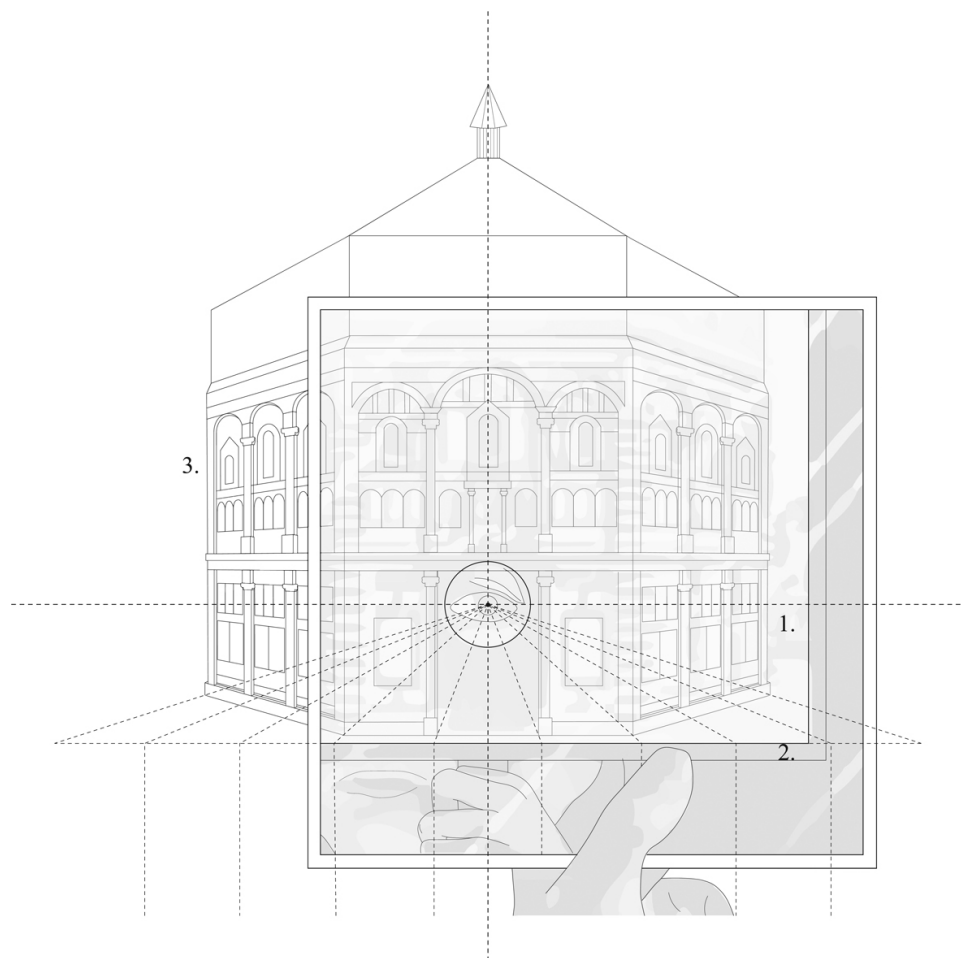


Figure 5.4 Brunelleschi's discovery, illustration.

Source: © ArchiTAG.

1. Painting Reflection
2. Mirror
3. Baptistery

The small peephole in the canvas functioned much like a lens, drawing a parallel to later peephole devices from the 1800s. Through this apparatus, the viewer becomes both a voyeur and the object of the gaze, as the viewer's eye looks back at themselves in the reflection.

Brunelleschi's second mirror-painting device was intended to more closely resemble 'normal vision.' His intention was not to create an illusion but rather for the image to be perceived as an extension of the real ([Damisch, 1994](#)). Edgerton writes about this:

The shrewd master may have realized something which has received attention from perceptual psychologists in recent times: that perspective illusion is strong only when the observer's awareness of the painted picture surface is dispelled. When the viewer loses his "subsidiary awareness," as the phenomenon is now called, he tends to believe the picture surface does not exist and that the illusionary space depicted is three-dimensional. The image in a mirror seems so real precisely because we tend to disregard that the mirror is actually only a two-dimensional face.

([Edgerton, 1975](#), p. 152)

Prior to this discovery, artists used a tool that involved fixing their position to create a single vantage point—a technique used since the 4th century. The visual space was based on a system of linear coordinates. Since the Renaissance, however, the use of linear perspective has been credited for producing greater 'realism' in painting.¹⁶

Alberti ([Alberti & Sinisgalli, 2013](#)) recorded the principles of perspective roughly a decade after they were first introduced. He referred to the 'centric point'—what we now call the vanishing point—and emphasized its crucial role in creating a convincing depiction of space in linear perspective. In

Alberti's time, vision was regarded as the most intellectual sense, making the desire to represent space through linear perspective even more compelling.

Alberti believed that the world operated according to the laws of mathematics, treating painting not merely as a craft but as a scientific discipline, considering perspective an element of optics, not art. In his book, he translated technical, scientific terminology into language more accessible to painters, thereby bridging a gap between art and science ([Edgerton, 1975](#)).

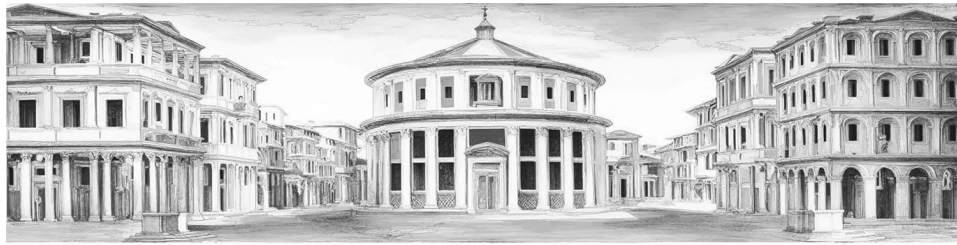
In addition to his theoretical contributions, Alberti developed a veiling method to simplify the drawing of proportions. This method, similar to strategies used by artists previously to fix their position, involved a net of reticulated strings that could be held up in front of a scene to be painted, breaking it down into manageable rectangles. The painter would then translate these sections to rectangles of the same proportions on the canvas. Albrecht Dürer's famous etching shows this tool in action. The gridded screen in front of the scene corresponded to the grid on the drawing surface, while a fixed viewing point ensured a consistent perspective. This method of drawing is still taught today to teach proportion and perspective, proving that there is still a drive to impose a certain mathematical order onto optic perception and to represent space in a 'realistic' way. This raises the question: do we see the world in linear perspective because we have been trained to do so? A cross-cultural and historical study of representation suggests that this is the case and that the method of representation has sociocultural implications.

Renaissance artists like Brunelleschi and Alberti believed that geometric linear perspective could bring people closer to God. It was used 'to enhance the allegorical, moral, and mystical message in scripture and the lives of the saints' ([Edgerton, 1975](#), p. 24). While Alberti's treatise on architecture did not include visual representations of the principles he described, this belief is evident in the Ideal City Panels—utopic cityscapes painted around 1480. According to Damisch, they provide a theatrical view that sets up a separation of space. However, these panels, which include the Urbino,

Baltimore, and Berlin panels (named for the cities where they each now reside), employ rigorous one-point linear perspective to draw the eye into an idealized urban environment. In the Berlin panel, the pergola effectively emphasizes both foreground and background space, while receding orthogonals guide the viewer's attention into the depth of the painting. Deliberate offsets, such as the boat slightly displaced from the vanishing point, further contribute to the uncanny quality of these constructed spaces. Apart from the few figures in the Baltimore panel, presumed to have been added later, the absence of people makes them even stranger. In many ways, these panels epitomize VR: they depict completely fabricated architectural sites, they embody society's ideals and aspirations, and they provide a trace of how society wished to be remembered, constituting a form of collective memory. They provide insight into the cultural values—emphasizing symmetry, order, and balance—and we can see how this plays out in daily life. Symmetry plays an important role in all three panels. Both the Urbino and Baltimore ones use bilateral symmetry, rotational symmetry, and reflexive symmetry, while the Berlin panel uses bilateral and translational symmetry. The buildings follow Alberti's laws, with the centric ray converging at the vanishing point (what was demonstrated by Brunelleschi's experiment).

These three paintings use the newly discovered linear perspective to draw the eye in, along a clearly defined sight line. In the Urbino panel, a central circular building—likely a Baptistery—is surrounded by a public space, and what we can assume are important civic buildings, suggested by the selected column order and the ornamental details. The right door of the Baptistery is open, and we can see a small point to the center-right of the closed door, coinciding with the convergence of the diagonals. This was likely a small hole used in a similar way to Brunelleschi's experiment—as a means to verify the perspective. The artist has chosen to emphasize perspective through the depiction of marble tiles in the public space. Flanking the central space are two pediments without statues and colonnaded buildings. The repetition of windows and columns, along with

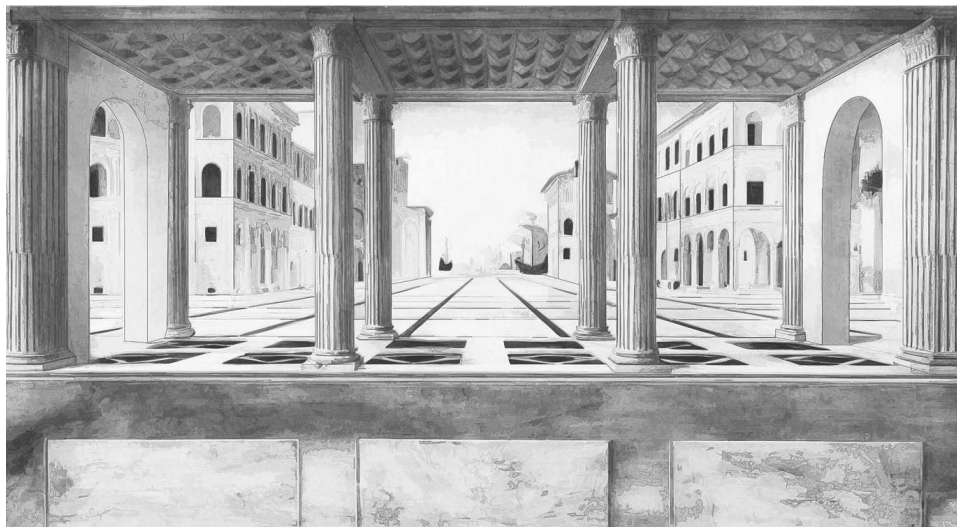
the streets that recede into the distance, emphasizes the symmetry, perspective, and theatricality.



Urbino Panel



Baltimore Panel



Berlin Panel

Figure 5.5 Ideal City Panels, illustration.

Source: © ArchiTAG.

Similarly, the Baltimore panel uses these techniques, depicting three central buildings: a colosseum-like structure, a triumphal arch, and an octagonal building that would have appeared very modern for the time. In this panel, the public space is recessed, and within it, four statue-topped columns and a fountain punctuate the scene. The composition evokes the monumental structures of ancient Rome, which were built to celebrate triumphal victories. Here, too, the vanishing point directs the viewer's gaze to the distant doorway behind the triumphal arch.

Finally, in the Berlin panel, the viewer is positioned under a covered space supported by columns, looking out to the sea. Again, the diagonals are emphasized by the marble tiling lines, which guide the eye to the sea and the boats at the horizon. Notably, the diagonals in this panel converge at a vanishing point that does not correspond to a specific dot in the distance, suggesting the belief that rational, geometric order applies to the urban rather than the natural. There is an important relationship between the urban environment and the port as an access point to the world.¹⁷

These three panels describe the ideal urban conditions during the Renaissance. Examining them, we can understand the value placed on public civic space and the monumental. With a renewed fascination for and study of ancient Rome and Greece, Renaissance cities reintroduced rational urban planning by clearing spaces for civic use and rethinking urban layouts. The abstract values are materialized and represented through the panels, providing a VR that manifests from the immaterial.

The Birth of Mass Immersion

While panoramas and immersive paintings were used throughout history, nothing matched the scale of the panorama rotundas ([Oettermann, 1997](#)). Robert Barker patented his panorama rotunda in the late 1700s. His first building was constructed in Leicester Square and opened on May 14, 1793. Barker is most famous for his 1815 rotunda depicting the Battle of Waterloo. This type of entertainment gained popularity toward the end of

the 1700s, leading to numerous panorama constructions across Europe, many of which even toured different cities. The nationalist propaganda value of these panoramas was recognized, resulting in about 30% of the scenes representing battles. Through these images, much like the documentation of history, a particular narrative was shaped determining what history would be remembered ([Grau, 2003](#)).

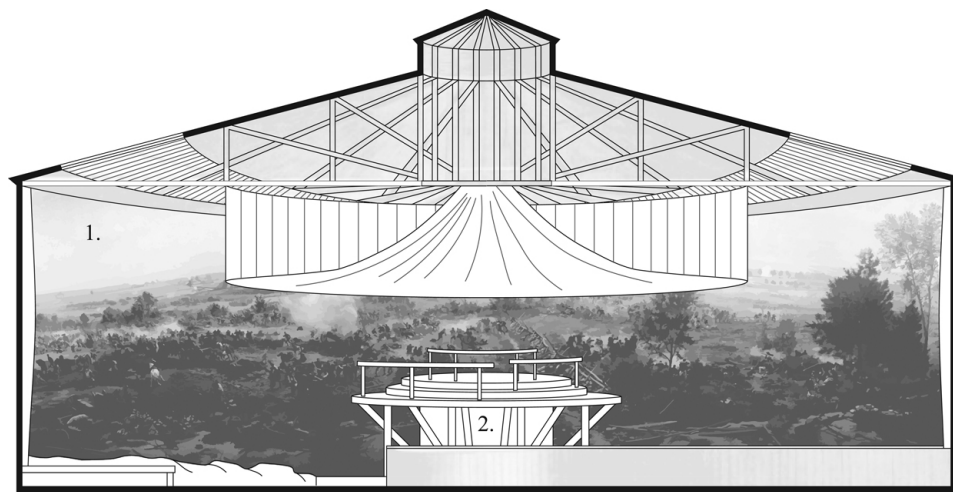


Figure 5.6 Panorama Rotunda, illustration.

Source: © ArchiTAG.

1. 360° Panorama Painting of the Battle of Sedan
2. Revolving Viewing Platform

When panorama rotundas became widely used, they sparked both controversy and admiration. Critics—or ‘apocalyptists’—accused them of being too illusionistic, creating a ‘second reality’ that some found dangerously deceptive, while others—‘utopists’—were inspired and awed by the experience ([Grau, 2003](#), p. 64). For some people, the illusion was so realistic that it actually made them feel ill, known as ‘panorama sickness.’ We can parallel this nausea with the similar motion sickness experienced with other contemporary immersive devices.

The Battle of Sedan, fought during the Franco-Prussian War in 1870,¹⁸ was represented in one of the most famous panorama rotundas, opened in 1883. Anton von Werner oversaw the painting and construction of this

interpretation of the historic battle, from a Prussian patriotic perspective. The French soldiers were deliberately painted without faces to show them as an anonymous enemy, while the Prussian faces were rendered with detailed expressions. The Prussians are depicted as orderly and brave, while the French seem disoriented and in disarray. This selective representation reinforced a narrative of Prussian superiority.

The panorama consisted of 1725 square meters of canvas and was completed in one and a half years. The painters went so far as to travel to the battlegrounds, accompanied by one of the men who fought, to sketch it out and accurately capture the event as it would have unfolded. They used technical apparatuses to transfer these sketches onto the final canvases, ensuring correct perspective despite the distortions caused by the proximity and curvature. Later panoramas adopted projection techniques to trace image outlines more precisely. Specifically, they used tools such as the panoramagraph, a device that assembled single drawings into a whole with the correct perspective, the camera lucida, which used a prism to project the image onto the canvas so the lines could be traced, and the diagraph, another tool for transferring outlines at a desired scale ([Grau, 2003](#)).

The architect for the Sedan Panorama introduced several innovative design features. An outer circular viewing platform revolved to simulate movement, and a subdued artificial lighting system allowed the panorama to be viewed at night. The Kaiser praised the work, and it is conservatively estimated that this panorama attracted ten million visitors. It served as a place of pilgrimage for Prussian patriotism. The Battle of Sedan Panorama worked so effectively because the visitor's experience was carefully choreographed: entering through a dark passageway that led to the viewing platform. From the closed restricted space of the dark hallway, the viewer walked out into the open atrium and onto the platform surrounded by the battle scene. It was so effective that many people left the space believing that they had actually been at the scene of the battle. The *Neue Preussische Zeitung* newspaper reported that

[t]he visitor is gripped immediately, he is taken completely by surprise and instinctively holds back. One is afraid of being trampled by the horses' hooves and feels the urge to concentrate on going backwards. Swirling dust and smoke seem to fill the air. Trumpets blare, drums beat, drums roll.

([Grau, 2007](#), p. 7)

Unfortunately, this panorama rotunda was demolished in 1904 and the paintings have been lost since WWII.

A key feature of the panorama rotunda is its reliance on the viewer's distance from the two-dimensional scene, a factor that skews depth perception. Hermann von Helmholtz discussed this in his lecture *On the Relation of Optics to Painting*, noting that since we normally see with binocular vision, a painted surface appears flat since both eyes see the same image rather than the slightly different views that produce depth. However, he acknowledged that if the image is further away, this distinction becomes less since the farther objects are, the more similarly the right and left eyes see them ([Helmholtz, 1821–1894](#), p. 607). By using large canvases that are placed twelve meters from the observer, the eyes are unable to distinguish between what is three-dimensional and what is two-dimensional. Humans lose the ability to perceive objects spatially at this distance, and the panorama rotundas exploited this. In addition to the two-dimensional painted canvas, they included three-dimensional objects called 'faux terrain'—like cannons, stacks of hay, or wagons—placed to integrate the three-dimensional user with the two-dimensional virtual painted space.

The structures that housed the panoramas were innovative and complex. Some were designed so that the viewing platform would slowly but imperceptibly rotate. Auditory elements, like orchestras playing military marches or canon fire, further deepened the immersive experience. While their popularity existed within a relatively brief moment in history, the panorama rotundas created vivid VRs that are known for having disoriented their audience and making them believe they were actually within the scene. Though panorama rotundas became unfashionable, this desire to be

in the picture continued into the contemporary. The concept of the panorama existed long before the rotunda and continues long after it.

Artists like Claude Monet capitalized upon the 360° image immersion. Although it was not about producing a ‘realistic’ image. The paintings of Monet instead capture the temporal and ethereal qualities of the scenery. His paintings demonstrated close attention to light and shadow. He usually worked on several canvases simultaneously to record the changing qualities of light at different times of the day. He worked obsessively on his paintings, adding layers upon layers of paint until he felt that the scene’s temporality was represented.

Monet created his own three-dimensional masterpiece in the form of his garden in Giverny, which provided the setting that inspired his *Nymphéas*. He created his own immersive environment through the meticulous design of his garden, first, and then translated that onto canvas. In his paintings, Monet sought to place the viewers of his *Nymphéas* on the surface of his pond, immersing them into the magical space of his garden. The duality of experience raises questions about time—the duration that is represented in his work and the time it takes for viewers to adjust and relax into the immersion.

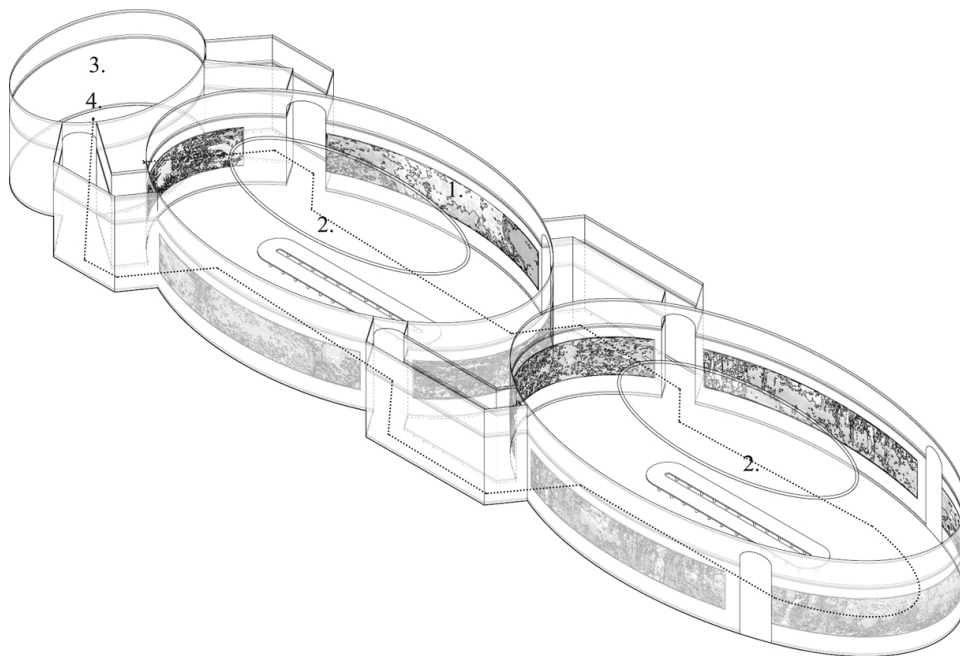


Figure 5.7 Monet's *Water Lilies* at the Orangerie, illustration.

Source: © ArchiTAG.

1. Nymphéas paintings
2. Sky light
3. Entrance
4. Possible circulation

Monet painted the Orangerie Water Lilies panels specifically for the space in which they are installed—two panorama rooms that he designed in collaboration with Camille Lefèvre. The oval rooms together form the shape of an infinity symbol and sit on the historical axis of Paris that goes from the Arc de Triomphe to the Louvre. Monet always preferred natural light, capitalizing on it in the spaces at the Orangerie by flooding the room with daylight from the ceiling (“History of the Water Lilies Cycle,” Musée De L’Orangerie). This created a temporal lighting condition. The white gallery walls, floor, and ceiling stand in stark contrast with the painted canvases. The understated physical space amplifies the vividness of the whimsical, colorful painted space. This immersion room has captivated the attention of its visitors since its installation in the early 20th century, allowing them to step onto the surface of Monet’s pond. The interplay of light, shadow, and reflection on the water and in the trees draws the viewer’s gaze inward. To appreciate the immersive qualities of the *Nymphéas* paintings at the Orangerie, it is important to understand Monet’s vision for his garden.

Monet first began cultivating his flower garden in 1893 after purchasing some land by the river Ru in Giverny. After receiving planning permission, he diverted a section of the river to create his iconic lily pond. Every element of the garden has been designed and manicured, with even the flowers carefully curated. He commissioned his botanist friend, Joseph Bory Latour-Marliac, to cross-breed lilies, producing specific hues. His first colors in 1894 were pink and yellow. Later he also used red water lilies.

As Monet expanded his water garden, he added four new bridges and installed a trellis for wisteria to the existing Japanese bridge. His landscape included water chestnut, bog cotton plants, bamboo, rhododendrons, Japanese apple and cherry trees, and the famous willows. To put the endeavor into perspective, Monet spent 40,000 francs per year on his garden. While this may seem extravagant, it served as material for about 300 paintings ([King, 2016](#)).

It was in 1895 that Monet began to paint the space he had so meticulously created, although he did not exhibit these works until 1909 at an exhibition entitled *Nymphéas: Séries de paysages d'eau* in Paris.¹⁹ The success of the exhibition fueled his ambition to represent his garden on an even grander scale. Through his abstracted painting method, Monet mastered the effect of creating inverted reflections on glistening water, showing the world onto the pools overlaid with the partially visible depth of the pond. This is what Monet brought to the space of the Orangerie—visitors are enveloped by approximately 100 linear meters of landscape. Monet's *Water Lilies* installation is reminiscent of the garden rooms of ancient Rome, or, on a smaller scale, the panorama rotundas of the 18th century. The immersion relies on the design of the painted space that responds to how someone moves through the physical space. From a vision-oriented perspective, they used techniques that draw the gaze inward, allowing for an immersion into a virtual space that defines a mode of experiencing and understanding the world.

In the case of optical devices like the camera obscura, the human tendency for voyeurism is activated by peering through the aperture—bringing the gaze in through the peephole. Linear perspective relies on the eye following the diagonal lines of the drawing deeper into the image. The panorama rotundas attempted a realism at a scale never achieved before and took advantage of an understanding of optics and the use of other sensorial stimuli that could amplify the reception of the visual spectacle. The ancient garden rooms created depth through an understanding of light, shadow, and color, a strategy also employed by the impressionists and cubists.

Trompe L'œil and Architectural Illusion

To bridge these artistic renditions of three-dimensional space with the architectural, I will conclude this chapter with the Chiesa di Sant'Ignazio di Loyola, a Baroque church from the 17th century located in Rome, Italy. While another illusionistic painting example, the artist of the ceiling frescos, Andrea Pozzo, considered the architecture of the space and employed linear perspective and trompe l'œil to give the impression of a dome that opens to the heavens.²⁰ Despite the ceiling's actual flatness, the manipulation of vanishing points, light, and shadow creates an incredibly convincing three-dimensional experience. Pozzo designed the fresco so that the architectural elements of the church's interior converge in a way that mimics the curvature and depth of a true dome. The physical spatial elements continue into the painted space. As a viewer of the space, it is difficult to decipher what is painted and what is architecture. It pulls the eye up, instilling a sense of awe, symbolic for its spiritual and religious significance; the VR blurs the boundaries between the physical structure of the church and the painted illusion, unifying the space of the physical with the virtual. The fresco is a powerful visual narrative that is meant to communicate the divine. Adding to the effect, the Chiesa hosts a mirror where visitors can look into and up at the painted space, reminiscent of Brunelleschi's experiment.



Figure 5.8 Chiesa di Sant' Ignazio ceiling, illustration.

Source: © ArchiTAg.

1. Physical Architectural Elements
2. Painted Architectural Elements
3. Illusionistic Dome Opening to the Heavens

These various case studies demonstrate that VR is not a new phenomenon but an evolution of long-standing practices of representing and manipulating space. They employ a variety of representational strategies and create spaces that are symbolic of their cultures and societies and the virtual constructs instituted by these. They materialize the immaterial, making 'real' the virtual. All of these case studies have relied on the two-dimensional pictorial space. In the next chapters, we will go into case studies that are concerned less about the pictorial and more about the qualities of architecture in the production of immersion.

Notes

1. J.J. Gibson was an influential American psychologist known for his work in visual perception and ecological psychology. His theories challenged conventional cognitive psychology and

emphasized the direct perception of the environment without the need for internal mental representations. [↵](#)

2. In this text he writes about direct perception and his theory of affordances. Affordances refer to the possibilities offered by an environment or object. For example, a chair affords sitting. These are relative to the perceiver's capabilities. It is a theory that has greatly influenced design thinking. He also wrote about the concept of optic flow which explained that movement through an environment creates a dynamic pattern of light on the retina that allow us to perceive distance and speed. His work has been influential in psychology and design. [↵](#)
3. There is an apparent contradiction between his direct perception theory and the way he describes the environment's role in shaping perception. This contradiction arises from the tension between his rejection of cognitive processing and his reliance on structured environmental information to explain perception. Gibson strongly rejected cognitive psychology that emphasized that perception required internal representations, inference, or computational processes. He instead argued that information in the environment is understood directly, meaning that the brain does not need to construct reality, it detects what is already there. This would be in opposition to what other philosophers and cognitive psychologists have put forward—that subjectivity affects how someone senses the world, ultimately making direct perception impossible. Even in Gibson's own writing he acknowledges the role that previous perception plays which suggests that there is an information processing similar to the theories he opposed. We can recognize this shortcoming since we know that different people perceive the same environment differently based on their previous experience with space. We also know that perception can be trained, we can learn to notice certain things in our environment. His theory of affordances also had a contradiction: he described affordances as existing independently to perception, suggesting they are objective, but then they depend on the capabilities of the perceiver, suggesting they are subjective. [↵](#)
4. Gibson also made another interesting observation. When a person tilts their head, the world doesn't appear to tilt. This is because the person is aware of the position of the head such that the perception of the world stays in place. [↵](#)
5. Ptolemy also devised a cartographic method of linear perspective (in his *Geographia*)—The Oikoumene depiction of the earth. The earth surface is organized by a grid of longitudes and latitudes. His maps did not replace the portolan sea charts until the 18th century when there were tools that could measure latitude and longitude at sea. Until then, they were used to rationalize the world. [↵](#)

6. Heidegger wrote, ‘the person who represents also represents himself in each act of representing’ ([Carr, 1999](#), p. 19). This statement similarly acknowledges the subjective nature of perception applied to the act of interpretation involved in representing experience. [↵](#)
7. A retinal afterimage occurs when an image remains visible in our vision after the original stimulus has been removed. This happens because of photoreceptor adaptation in the retina. Overstimulated photoreceptors in the retina take time to reset, leading to the afterimage. We can experience a positive afterimage, when the original colors remain visible for a brief moment or a negative afterimage, when the colors appear inverted. Persistence of vision is a brain-based phenomenon where visual images continue to appear due to the neural processing of motion and frames. When a series of images appear in rapid succession, the brain blends them together, creating a sense of continuous motion. This effect allows us to perceive animations and film smoothly rather than as a sequence of still images. [↵](#)
8. This is likely the reason why when children draw objects and people, they do so in a way in which all the sides of the object are shown at once. Children struggle with the representation of the face and its appearance versus the definition of the face that they understand. They represent the experienced ‘image’ rather than the static one. The image information from all perspectives is merged into one. [↵](#)
9. The Villa Livia was the country estate of Livia Drusilla, the wife of Emperor Augustus. The villa sat on a hill with views of the Tiber Valley and was renowned for its gardens and orchards. Livia Drusilla was a central figure in early Imperial Rome. She came from an important family and later, with her marriage to Augustus, counselled him in decisions for the Empire. Her public image was steeped in ideological symbolism being portrayed in relation to the goddess of agriculture and fertility. Her association with fertility, prosperity, and peace is directly relevant to the art in her villa. The Garden Room frescoes can be viewed as an extension of Livia’s persona and influence within this private sphere. The scenes reflect both her personal taste and the broader Augustan ideals. Livia helped cultivate an image of Rome as a well-tended garden, thriving under the ‘benevolent’ care of the imperial family. [↵](#)
10. The fresco was removed from its original site and has been restored and installed in the National Roman Museum [↵](#)
11. August Mau, a 19th century German art historian and archaeologist classified Pompeian fresco painting styles. It is based on the evolution of decorative trends in Pompeii and Herculaneum from the 2nd century BCE to the eruption of Mount Vesuvius in 79 CE. It is common to see a combination of these styles in a villa space, signifying different aspects about the spaces they

are in. The four styles represent distinct artistic approaches in fresco painting. The first style (or Incrustation Style) aimed to imitate expensive stonework. Architectural illusionism was limited to surface texture and three-dimensional relief effects were achieved with stucco application. We see this style many times close to the entrances, serving as a transition from the public exterior to the private interior. The second style (or Architectural Style) introduced illusionistic perspective and a greater sense of depth. Artists painted architectural vistas, making the walls appear to open into expansive colonnades, gardens, or urban settings. Architectural details were painted to resemble real structures while mythological or historical narratives were integrated within the scenes. The third style (or Ornate Style) shifted away from architectural illusion toward delicate, linear, and decorative motifs. It exhibited flat monochromatic backgrounds with finely drawn ornamental details that included intricate floral, vine, and Egyptian inspired motifs. Common in this style were slender candelabra-style columns and framed floating paintings showing mythological scenes or landscapes. Finally, the fourth style (or Intricate Style) is a composite of the previous styles, combining architectural illusionism, ornamental details, and mythological compositions. There was a return to illusionistic depth but not like the expansive vistas seen in the second style. [↵](#)

12. In an example like the *Chambre du Cerf* in the Papal Palace at Avignon, there are no framing elements to achieve no detachment of the real from the virtual painted space. This panorama room also depicts nature but instead shows the hunt. There is attention to detail in the depiction of the figures and their clothing and in some cases the figures have clay modeled three-dimensional hands and faces that project from the surface of the wall, further enhancing the illusion. [↵](#)
13. This method of painting is 'lost' in the medieval period where artists used a flatter representational style that generally depicted religious content. They were not concerned with representing things realistically but were instead concerned with the symbolism shown in the paintings. Figures were generally painted at the same scale regardless of where they were meant to be perceived in the three-dimensional space of the scene. The exception to this was with depictions of Jesus or the Virgin Mary where artists wanted to show a hierarchical importance and represented them larger than other figures. [↵](#)
14. The space and details are mesmerizing which is an interesting word to describe it given the term's psychoanalytical origins. Franz Anton Mesmer (1734–1815) developed a method using 'animal magnetism' where one could transfer 'force' to another to cure hysterics. This work led to techniques of hypnosis and the birth of psychoanalysis ([Bruno, 2002](#), p. 151) [↵](#)

15. Brunelleschi drilled the hole in the particular spot on the Baptistry doors for two reasons—one religious and one competitive. The religious reason relates to processions that moved from the portal of Santa Maria del Fiore to the Baptistry. The hole was placed at eye-level on the Baptistry doors, aligning precisely with the viewpoint of someone standing under the cathedral's portal. The competitive reason stemmed from Brunelleschi's rivalry with Ghiberti, who had won the commission to design the Baptistry doors over him. By positioning the hole strategically, Brunelleschi allowed viewers to see the overall picture and his mastery of perspective over Ghiberti's doors. Later, when Ghiberti was commissioned to create the 'Golden Gates of Paradise'—originally intended for the northern entrance but ultimately placed in the iconic eastern portal (the side pictured by Brunelleschi), Ghiberti represented two 'peep-holes' featuring himself and his son, seemingly mocking Brunelleschi ([Edgerton, 2009](#)). ↵
16. Linear perspective relies on the use of the horizon line and vanishing points. When representing people, artists used horizon line isocephalicity. This is a compositional technique where the heads of multiple figures are aligned along a consistent horizontal line, typically at the viewer's eye level. Regardless of the figure's height, their heads are positioned at the same level, suggesting a movement farther back into space. Clear examples of this are Masaccio's *Tribute Money* and Masolino's *Raising of Tabitha and Healing of the Cripple*.
[John White \(1987\)](#) also describes Alberti's mathematical instruction for perspective and Brunelleschi's panels. [Sigmund Giedion \(1967\)](#) similarly writes about Renaissance perspectival painting, with artists such as Brunelleschi, Masaccio, and Bramante, and about how perspective produces a unique point of view, paralleling it to individualism. ↵
17. It's hard not to draw parallels with the view seen at Louis Kahn's Salk Institute, usually pictured without people, the perspective equally powerful in drawing the gaze of the viewer into the space and out to the ocean. ↵
18. And resulted in the capture of Napoleon III and the eventual Prussian victory. ↵
19. Unfortunate events led him to temporarily retire his painting. His wife, Alice, and son, Jean, both died; he began to have trouble seeing, which limited his depth perception. However, three years later, he was met by his friend Clemenceau, whose positive reception to the water lily paintings Monet had done 20 years before inspired him to paint a whole new series of water lilies. When he returned, he became more ambitious in capturing the light and colors that danced upon the pond, creating a 'textural vibration' ([King, 2016](#)). ↵
20. [Isabella Buczek \(2012\)](#) writes how the immersive space produces a heterotopia of illusion. On one hand it is a real space but it is also another space that comes into existence from the real. ↵

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6 The Spectacle

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History shows us that humans are fascinated with the immersion and the production of space that engages the senses in diverse and powerful ways. This drive toward immersion reflects broader cultural and social dispositions expressed through various mediums, modes of representation, and subject matters. Particularly evident is the focus on visual perception, with architecture and art playing a pivotal role in the production of VR ([Grau, 2003](#)). Because of this, we have focused on the visual and the human inclination toward scopic engagement. The concept of body image has been defined, highlighting its connection to sensory experiences and immersion. The act of immersion is understood as not merely a passive experience but one involving cognition and identification. Additionally, the term ‘virtual reality’ has been discussed more broadly, understood as a materialization of immaterial socio-cultural conditions. Throughout, case studies in art and architecture have been used to examine a particular typology of VR environments, those that rely on scopic qualities of representation.

In the previous chapter, attention was given to VR spaces that relied on two-dimensional pictorial representations. These examples demonstrate that the immersive representation does not rely solely on linear perspective or photorealism. Rather, the immersion conveys experiential sensory attributes, including elements beyond visual media. While linear perspective has played a significant role in developing immersive environments throughout Western history, the following pages will explore an extrapolation of these ideas into the three-dimensional, moving beyond the pictorial. We will introduce additional methodologies of immersion,

examining how architectural design leverages materials, light, resonance, and other ephemeral qualities as tools for producing VR. Many of our observations will focus on theatre and theatrical spaces, where the intent is to immerse viewers within particular narratives.

Theatre, Set Design, and Spatial Illusion

Human nature compels us to watch and observe. Spectatorship can be considered embodied and associated with *flânerie* ([Bruno, 2002](#)). Despite the negative connotations associated with scopophilia, the instinct to observe is an innate part of the human condition. Our society embraces displays of spectacle. Even the act of performing a ritual falls within this category; many spiritual and religious spaces deliberately capitalize on the production of immersive spectacle. We saw this with Sant'Ignazio in the last chapter and will continue to see these patterns. Aspects of theatrical spaces can be examined in the same way as the painted spaces described previously—particularly set design, which often possesses a pictorial quality. The evolution of theater spaces illustrates how technologies and methodologies were incorporated to produce these spectacular and immersive spaces. Greek theater originated from Dionysian festivals that included people dressed up as characters in masks. The first permanent theater space was built on the slope of the Acropolis, using this to produce the seating space above the orchestra and stage, and capitalizing on the acoustical effects of this arrangement. Early amphitheaters gave way to the proscenium arch, exemplified by the first indoor theatre, Palladio's Teatro Olimpico. This involved the distillation of what defines a theater, framing the performance, and establishing what is now known as 'the fourth wall.' From the audience's point of view, this shift constructs a stage that can be read more closely as a pictorial space with the proscenium arch clearly defining its boundaries.

As with the theater, the cinematic industry is driven by scopophilia and operates within a defined frame. In cinema, the screen serves as a boundary

between what is seen and what is not seen, separating the world of the actors from that of the spectators. In the theater, this division is evident in the contrast between the stage area and the audience seating. The actors play their parts, unfazed by the audience for the most part, and the audience takes part in total voyeurism, seeing what happens seemingly unnoticed. It can be paralleled to the qualities of looking through a keyhole and not being seen. However, with this ‘looking’, there is also an identification process. The body image relies on the aspect of identification in this exchange between ‘objects’ and ‘subjects.’

Instead of offering an extensive history of theater, this text will begin by examining the major evolution of set design spurred by the rediscovery of linear perspective during the Renaissance. Before this, Baroque theater achieved the effect of depth through the use of rows of movable wings, relying on a layered approach. With linear perspective, theater began to take advantage of perspectival effects. Stage sets in the 15th and 16th centuries began using one-point perspective with foreshortening and flattening effects. Sebastiano Serlio describes this in his book *Architettura* (2005) and distinguishes between tragic and comic set designs, each employing different methods to define the perspective through the architectural and ornamental elements. Culturally, these distinctions are significant, as they assign psychological associations with particular architectural styles. In Serlio’s drawings, a dramatic view of a city street is created through perspective, with both tragic and comic sets using floor paving to emphasize spatial depth.

Tragic sets use columns, elevated pediments, and statues meant to create a regal atmosphere, rendering the architecture both triumphal and stately ([Damisch, 1994](#), pp. 200–202). In contrast, comic sets are designed to represent ordinary dwellings. They use a telescoped view with an increased presence of windows and balconies. Serlio based these set designs on descriptions provided by [Vitruvius’s \(1914\)](#) *Ten Books on Architecture*, specifically from the chapter about the plan of the theater.



Figure 6.1 Palladio's Teatro Olimpico, Set by Scamozzi, photograph.

Source: © ArchiTAG.

One of the most famous theaters of the Renaissance is Andrea Palladio's Teatro Olimpico in Vicenza, Italy. Constructed between 1580 and 1585 within an unused fortress, it signifies a departure from the religious narratives performed in outdoor stage setups during the Middle Ages. It is the oldest covered theater in the world. During the Renaissance, a renewed fascination with ancient Roman theater led many architects to study Vitruvius, resulting in the incorporation of classical architectural elements into theaters, such as the Teatro Olimpico and others of the period. Palladio adapted Vitruvius's theater plan for this indoor setting and combined classical elements, such as the columns and arches, with the innovation of Renaissance perspective.

The most impressive aspect of the Teatro Olimpico is its trompe l'œil scenery,¹ designed by Vincenzo Scamozzi to give the impression of five long avenues, with the central one appearing triumphal. This set, which conforms to Serlio's definition of a tragic set, was ideal for its inaugural performance of *Oedipus King*. It depicts the streets of the ancient city of Thebes. Although the painted set recedes only a few meters, perspective

foreshortening gives it the appearance of a far greater depth. Scamozzi used advanced linear perspective techniques to create this illusion. The buildings along the streets are constructed in a diminishing scale to make them appear farther away. The set elements are not placed parallel to the audience but are instead arranged at sharp angles to exaggerate depth. This is one of the first cases in the history of theater where the entire production was considered, giving a full immersive effect—using lighting, set design, costume design, music, the storyline, and characters—to engage with multiple senses (Berzal de Dios). Originally, the torches and candles would create a light and shadow effect that would enhance the three-dimensionality.

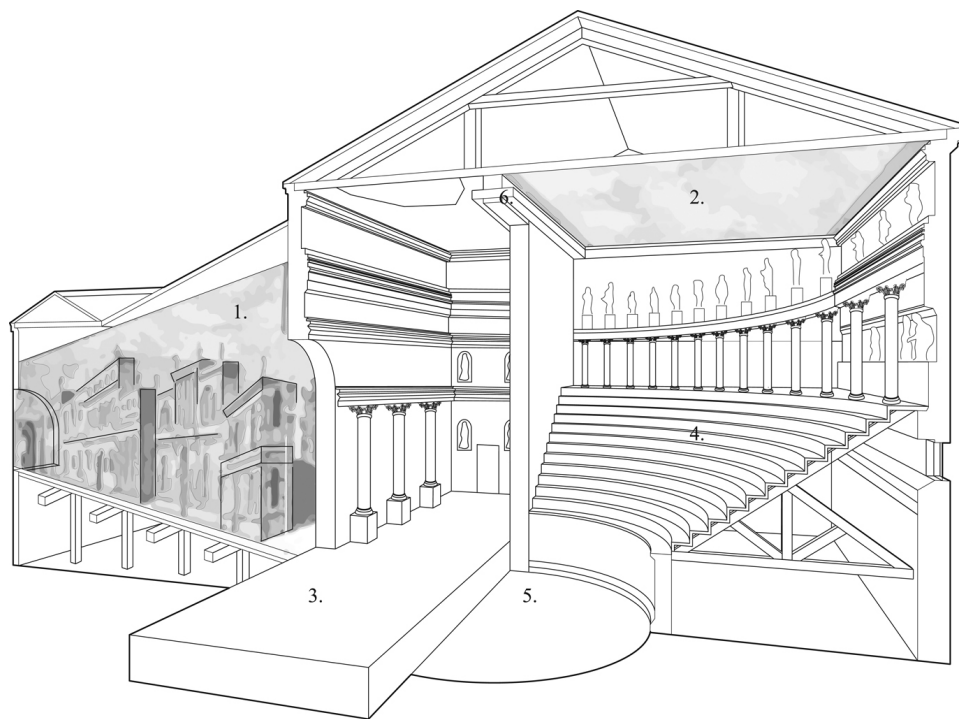


Figure 6.2 Sectional Axonometric Palladio's Teatro Olimpico, illustration.

Source: © ArchiTAG.

1. Trompe L'oeil Stage Set
2. Ceiling Fresco of the Sky
3. Stage
4. Audience Amphitheater
5. 4th Wall

6. Proscenium Arch

Constructed from wood, plaster, and stucco, the set initially did not include the expansive avenues; these were added later when the Academia could purchase more land required for the projecting set. The buildings were built using wooden frames covered with lightweight materials to allow for intricate carvings and detailing. Canvas backdrops were used for distant elements. In the painting, Scamozzi used chiaroscuro shading as well as muted colors in the distant scenery that mimicked the atmospheric perspective used in examples like the Villa Livia. The stucco and plaster were used to create sculptural details on the facades, such as columns, pilasters, and window frames, projecting out of the two-dimensional plane of the scene to enhance the depth. This is similar to techniques utilized in fresco rooms, like those of the *Chambre du Cerf*. It is also a similar premise to the panorama rotundas and their use of faux terrain. These artists employed strategies that would enhance the illusionary effects. Scamozzi's innovative design went well beyond a two-dimensional painted backdrop, effectively transforming the stage into a dynamic space for the plays.

There is an inevitable division between the audience and the actors due to the inherent structure of the stage and screen. In theater and, particularly, in cinema, the frame creates a moving picture by separating the pictorial space into an 'inside' and an 'outside.' This division is emphasized through elements such as the stage platform and lighting, which together delineate the boundary between the performance and the spectator. On the one hand, this separation establishes a clear distinction between the world on stage and the world of the viewer; on the other, it intensifies the dramatic impact by focusing attention and heightening the tension of the narrative. In film, the audience's gaze is controlled through careful framing and editing—each shot and cut guides the viewer's focus and reinforces the screen as the interface between objects and subjects.

Using the Virtual to Make Social Critiques

Cinema often serves as a critique of societal issues and contemporary realities. Through narrative, films provide a lens to examine spaces and the structures that define them ([Koeck & Roberts, 2010](#); [Shiel & Fitzmaurice, 2001](#)), conveying ideological messages in the process. By weaving together fictional narratives, settings, and characters, films create imagined realities that highlight the virtual conditions we have constructed in our societies. An example is *Blade Runner*, which presents a dystopian vision of a future Los Angeles, reflecting and amplifying the city's issues in the 1980s. The film portrays stark social stratifications—high versus low, light versus dark, and dry versus wet—underscoring racial, economic, and environmental disparities. The absence of nature suggests an ecological crisis that deepens the divide between the privileged and the marginalized. This divide is visually represented by the 'upper city,' a world of towering skyscrapers, multimedia billboards, and flying vehicles, contrasted with the 'under city,' plagued by acid rain, overcrowding, and overwhelming technological intrusion. The city in *Blade Runner* serves as an exaggerated projection of late 20th-century consumer capitalism, embodying corporate dominance and its expansion into authoritarian policing. Urban theorist Mike Davis, in ['Fortress LA' \(1990\)](#), discusses similar themes, describing how Los Angeles has been shaped by surveillance and segregation. Private residences and corporate offices are fortified with security systems and gated barriers, distancing themselves from the poverty that permeates the rest of the city. Due to this perceived danger—the paradox of installing security cameras to create a safer space is that it suggests that it is unsafe—LA experienced a White flight, with many White residents relocating to suburban areas. This migration further widened economic disparities between communities. Because of this desire to secure space, public spaces suffer since access is ultimately removed, and efforts to relegate people to certain spaces produce a greater divide. In the context of Los Angeles in the 1980s, there was a growing fear of the 'other' with a rapidly growing Asian immigrant population (Japanese, Chinese, and Korean). This was largely due to changes in U.S. immigration policy following the Immigration and Nationality Act of 1965, which removed quotas that had previously

restricted Asian immigration. Communities in Koreatown, Chinatown, Little Tokyo, Monterey Park, and San Gabriel Valley played a crucial role in reshaping the cultural landscape of LA. However, tensions between these immigrant groups and other communities also emerged. With Black and Latino populations, there were systemic racial policies put into place, creating a segregation of space. Many neighborhoods in the 1980s were still defined by historical redlining policies that had restricted where Black and Latino residents could live. Areas where minorities lived suffered from disinvestment and police brutality. This laid the groundwork for the civil unrest that would explode in the early 1990s. The film captures this reality by envisioning a world where corporate power dictates urban life, reinforcing existing social inequalities. There is a parallel made between the LAPD and the police represented in the film, the levels of dehumanization, as they attempt to determine humanity using the Voight-Kampff test. Replicants are meant to symbolize minority groups in the city, presenting a narrative of enslavement, escape, and capture. They represent ‘otherness.’ The film presents a perspective on the city. It is a medium that produces an immersion that is intended to impact how we think about and interact with the city. It provides a confrontation with the harsh realities of existing social issues. In this context, cinema becomes a tool for revealing this, aiming to change people’s perceptions. However, the separation produced by the screen means that the audience’s immersion relies heavily on their ability to identify with the experience presented. Techniques such as ‘breaking the fourth wall’ intentionally blur these boundaries, turning the focus back toward the audience and making them a part of the spectacle.

Breaking the 4th Wall

Shakespeare was a master at breaking the fourth wall, often using soliloquies to blur the boundaries between the stage and the audience. In his plays, actors frequently engaged directly with the audience, incorporating them into the scene. The Globe Theatre,² for instance, encouraged audience

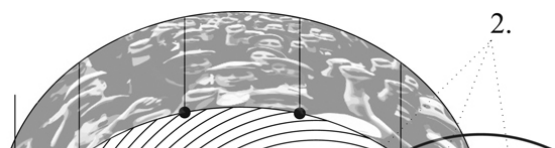
interaction by maintaining a relatively open relationship between the performers and the viewers. Although the main stage was elevated above the groundlings, audience members could heckle, comment, and receive direct addresses from the actors. Shakespeare's staging extended beyond the traditional proscenium arch: within the groundling area, additional stage platforms (elevated or not), enabled a dynamic occupation of the audience space and interaction between the performers and spectators. Many of these elements have been recreated and enhanced in the nearby contemporary version of the Globe, London's Bridge Theatre, which opened in 2017.³ This theater redefines traditional performance spaces, focusing on flexibility, immersive experience, and audience engagement. What the Bridge does that the Globe could not is the incorporation of an ever-changing stage platform using a mechanized system that raises and lowers platforms throughout the performance, constantly reconfiguring the groundling area to accommodate a growing and receding stage. In this way, the audience becomes part of the action. The entire groundling area can rise up to stage level or down to audience level and any combination in between via this modular panel system. It is one of the most versatile performance spaces in the city with this modular stage and flexible auditorium. In addition to the actors performing in the plays, there are people hired to help the audience navigate around the stage at different points in the performances. The audience is compelled to move and engage in the play as if they were in the scene. Heckling and response to action and speeches are encouraged. In *Julius Caesar*, for example, the audience is transformed into a crowd for a political rally. Based on my personal experience at a 2018 performance of the play, I can attest that the dynamic set design created a captivating and immersive theatrical experience. As an audience member in a 2019 reimaging of *A Midsummer Night's Dream*, I witnessed a production that effectively created a spectacle by flexibly transforming the space, incorporating acrobats who performed above and among the standing audience. Of the many plays I have experienced at the Bridge and other theaters, these performances have stayed vivid in my memory. The barriers and the fourth wall are almost entirely removed between the actors and the

audience, producing a collective experience. It brings to life a participatory engagement that Walter Gropius had once envisioned.

Gropius's Spatial Machine

The idea of an all-encompassing, frame-eradicating theater was devised by Walter Gropius in 1927 ([Navarro de Zuñillaga, 2004](#)). He called his theater the *Teatro Total*. Although the financial crash of 1929 meant it was never built, the design's premise was to create theatrical architecture that, by using media and technology, would become a fully immersive VR. Gropius was commissioned by the director Piscator, who wanted a theater that could fulfill the complex mechanical and technical requirements of his plays. The design featured an elliptical floor plan reminiscent of the classic Roman amphitheater, a three-part stage, and a perimeter divided into twelve equal parts, a division that carried cosmological significance, also reflected in the Roman-like cupola paintings of clouds and stars. This design represented a crisis in theater; Piscator did not want his play to be merely a spectacle and a form of consumption but rather aspired for the performance to activate and engage the audience with an immersive experience.

The project is a schematic design since many of the practicalities and conflicts were not yet resolved. Gropius used the tangential circumferences of a circle and an ellipse, a geometry also used by Monet for his water lilies at the Orangerie. Within the elliptical space, two turntables met tangentially at one end, with the smaller turntable capable of being raised or lowered to become part of the stage or audience. Gropius envisioned a revolving audience to involve them more fully in the action. Surrounding the seating, the roof sat on columns that created a space where scenes could take place behind the audience, effectively encircling them. Similarly to the Bridge Theater, the traditional frame and boundary are dissolved in the design.



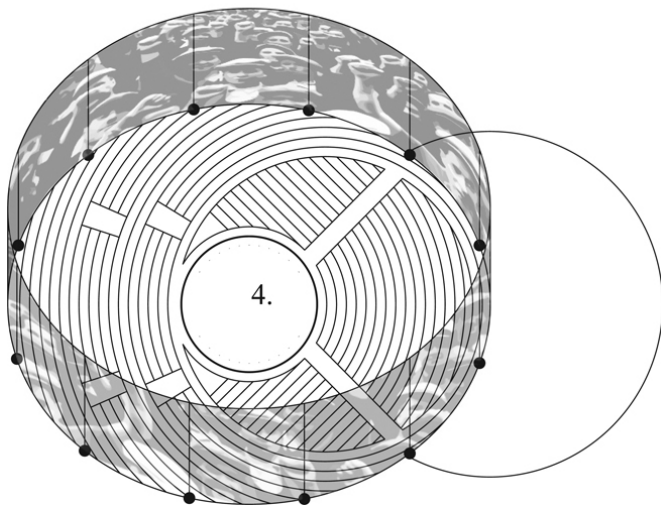
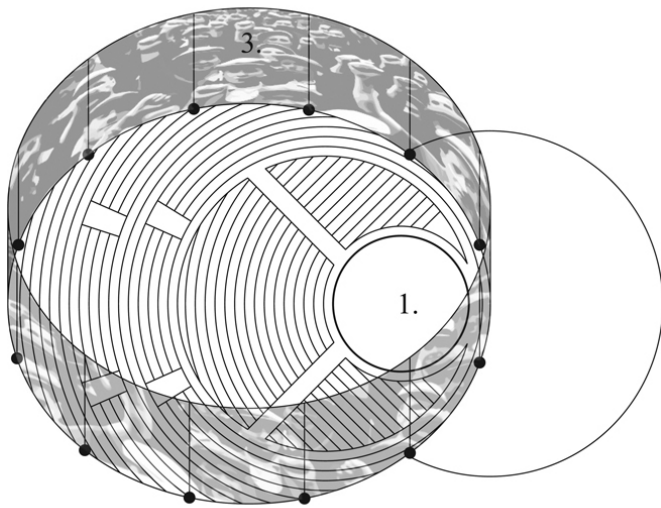
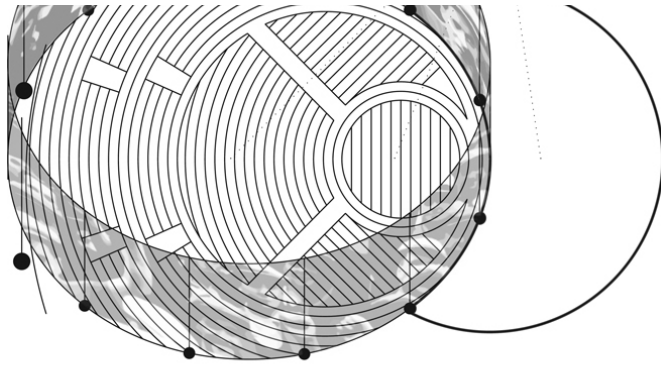


Figure 6.3 Gropius Total Theatre, diagram.

Source: © ArchiTAG.

1. Reference to Roman Amphitheater
2. Three Part Stage
3. Media 360 Immersion
4. Revolving Audience

Audience participation was crucial to Piscator's vision. He wanted to create a political theater that immersed spectators in social images and representations, challenging bourgeois notions of artistic beauty. Piscator wanted to encourage empathy and social consciousness through the use of an unrestricted flow of information, allowing the spectators to curate their own relationships with the spectacle. The design incorporated dropping stages, rotating stalls, and film projections around the entire space rather than relying on a singular surface. We can parallel this to the panorama rotundas, thinking of the space as a sister to the cyclorama, producing the experience of being inside a film. We can also see how this theater scheme could have inspired contemporary theaters such as the Bridge.

For Gropius, it was a 'great spatial machine' ([Navarro de Zuñillaga, 2004](#), p. 69). The conceptual theater can be understood as a post-Wagnerian realization of the Total Work of Art, encompassing all aspects of the performance and experience design. Although the Teatro Total was never built, it remains one of Gropius's most influential projects, representing a modernist vision of theater that sought to dissolve boundaries between the audience and the performance, thereby redefining the nature of theatrical experience.

Immersive Spectacle

In contemporary theater, as seen with The Bridge, designers are increasingly challenging the boundaries between the audience and the actors, or at the very least, creating new forms of engagement between them. Like the two-dimensional pictorial immersions, the set does not need to replicate a realistic or illusionistic environment. Rather, the set designer

creates a supporting framework that enables the audience to gain a deeper understanding of the characters and fosters a closer identification with their stories. We could argue that the more abstract sets seem to be most successful in engaging the imagination and creative participation of the audience.

One notable example is London-based Es Devlin. While she is recognized for her music industry concert sets, her multimedia theater sets and installations push the envelope in theatre and immersive design ([Devlin, 2017](#), [2023](#)). In her work, she considers the shape of the room and analyzes the energy that the audience can bring to the performance. She has asked, ‘How can you explore people’s terms of engagement?’ ([Devlin, 2018](#)) While it may seem a necessary condition of a theater typology, the relationship between the audience and the performance is paramount. Her sets depart from the traditional, and she encourages a new and unconventional dialogue between the audience and actors. Devlin’s set for *Otello* explores themes of transparency and the ‘non-illusion.’ The design allows the audience to see beyond the walls, creating an illusion of an X-ray of the building. In doing so, the audience is made privy to aspects of the space that are not revealed to the characters in the play. This deliberate acknowledgment that the environment is a constructed set underscores the voyeuristic nature of theater, highlighting the dynamics of those who watch and those who are watched, while celebrating the ethereality, fragility, and temporality of the set.

Similarly, in her design for the play *Don Giovanni*, Devlin uses multimedia elements to challenge the role of the set. Her design conveys layers of information rather than presenting a fixed, trompe l’œil cityscape. In both cases, her work emphasizes the fact that the sets are not ‘real,’ but instead virtual environments produced through transparency, abstraction, and multimedia.

Providing a counterpoint to her set designs, Devlin’s installation piece at the Miami Beach Edition Hotel takes audience engagement a step further by making the space a set in itself. In this installation, visitors are guided through passageways where they become both participants and voyeurs of

one another, experiencing the sounds and sights of the other spectators at different points along the journey. This interactive arrangement centers the experience of the other. The typology seems born out of the theater, fun fair, and art installation and reflects a broader trend in experimental theater: to intensify audience engagement by erasing the conventional proscenium arch and blurring the boundaries between the stage and the audience.

Similarly, the cinematic industry has developed techniques to create more immersive film-watching experiences, although film organizes time and space in a distinct way. In theater, there is generally a coexistence between the events on stage and how they are viewed chronologically in terms of time scale. When jumps occur within the plot, they are indicated through narration. In contrast, cinema has its own space, time, and order, exemplified in techniques like flashbacks. The space/time relationship is emphasized by the shots and cuts in film and the scenes and acts in theater. For film, the point of view is important to understand the narrative. Generally, in theater, the audience gets a framed view that remains relatively constant, albeit with set changes. The audience has more flexibility to associate with a character or multiple characters. With cinema, the audience specifically associates with the camera, and this provides a lens through which the audience can understand the story. The camera creates a point of view that can be zoomed in or out, focused or blurred. These camera angles, editing, and varying special effects control the audience's focus. Things like the 'close up' create emotional intimacy not generally possible in theater. The first-person perspective also brings a new level of immersion in film. The experience is largely mediated by the camera, making the medium very different from the immersion achieved by theater.

The Expansion of Virtual Cinematic Spaces

We can recognize the virtual nature of cinema and theater. As technology has evolved, it has opened new possibilities for experiences like the one

Gropius envisioned, creating more interactive and sensorimotor qualities. Spaces like IMAX have adopted rotunda typologies for full immersion into film spaces that use ultra-high resolution film and giant 360° curved screens. The slight curvature increases peripheral vision engagement. Sound also plays a very important role. Speakers are aligned to create surround sound that corresponds to the location of actions on the screen. IMAX 3D uses dual-lens projection, similar to how VR headsets create depth perception, mimicking natural visual perception where each eye sees a slightly different scene that combines to provide an understanding of depth. A predecessor to IMAX, Disney 360 uses a Circle-Vision screen layout. The rig that is used to record the film uses several cameras arranged in a circle from a center point that can capture the entire surroundings simultaneously to create a seamless panoramic view. These views are then projected from points around the auditorium, placing spectators at the camera point. Circle-Vision 360 has been showcased at World Fairs such as Expo 1967 in Montreal, used in the Canada and Bell Telephone Pavilions. Unlike traditional cinema, this technology allowed for the removal of a perceived frame.

Contemporary extended reality experiences are a natural evolution from cinema and theater, experimenting with immersion, perspective, audience engagement, and the construction of fictional worlds. Throughout history, storytelling has moved from more passive experiences to ones with greater interactivity.⁴

Examples like CAVE (Cave Automatic Virtual Environment) further bring this vision to life. Initially developed at the Electronic Visualization Lab (EVL) at the University of Illinois, Chicago by Daniel Sandin in 1991, the space comprises projector screens to immerse the viewer. With 3D stereo glasses and motion sensors, the user is enveloped by images and a sensory experience to create a second reality. Much like the early panorama rooms with their large 360° canvases and auditory elements, CAVE uses both visual and audio elements to heighten sensory engagement. In one scenario, a sped-up panoramic time-lapse of the sun throughout a day allowed viewers to observe subtle changes over the day that would not

otherwise be noticed. It offered an alternative perception of time and the passing of the day.⁵

Although the architecture and the construction of sets and panoramic spaces play an important role in the discussion of immersion, they are generally still understood as pictorial. Nevertheless, they remain relevant because they construct environments from which to engage with narrative.

Taking this notion to another extreme, we can examine examples of ‘fabricated’ and exaggerated urban environments that serve as escapist sites. These environments amplify particular nostalgic or fantasy aspirations. Walt Disney imagined an amusement park reflecting his memories of ‘small-town’ America ([Zukin, 1993](#)), leading to the creation of Disney World. It was envisioned to be a better, safer, cleaner city. His first park in Los Angeles fell short of this ideal because the park was built in a valley, where the surrounding urban environment remained visible. Seeking a more isolated and controlled setting, Disney selected Orlando, Florida, where Disney World came to represent the ‘collective fantasy of American society’ ([Zukin, 1996](#), p. 49). Disney successfully privatized public space with his amusement park and attempted to create a city better than those outside. While he was criticized for ignoring the conflicts that existed in American history, that is partly why it was and still is so successful. It becomes a ‘fictive narrative of social identity—not real history, but a collective image of what modern people are and should be’ ([Zukin, 1996](#), p. 55). It is authoritarian, imposing a social control that creates a space free from homelessness, guns, drugs, etc. Not only is the space a utopian (or dystopian) immersion for its clientele, but also for those who work there.⁶ Employees are trained to inhabit their characters fully. They are required to attend workshops and classes to fully embody the personas of their characters. There is clearly a consumerist aspect to this virtual environment where the experience is meant to disorient and overwhelm so that visitors consume all the park has to offer.

This is not unlike the fantasy city of Las Vegas, a city of bright neon lights that never sleeps. Las Vegas is designed to extricate visitors from everyday reality. The LV strip provides an around-the-world experience

where everything is bright, big, bold, and exaggerated—a sequence of sights meant to be experienced from a moving automobile. The city’s design favors the façade facing the highway while largely disregarding the rear, creating a clear ‘front of house’ and ‘back of house’ dynamic that emphasizes theatricality ([Venturi et al., 1977](#)). This main artery creates easy access to each of the casino hotels from the highway. Each hotel orchestrates a procession of spaces that favor the casino first, then dining, entertainment spaces, shopping, and then the guest rooms. This particular production of space, through each program, like Disney’s world, produces a disorientation that supports consumerism.

The signage is large, bright, and eye-catching. Some might consider it tacky but in the case of Vegas, simple, more traditional signage would not work in the fast-paced, competitive environment of the Strip, where each hotel, gas station, wedding chapel, and other establishments vie for attention. The city strip becomes a sea of neon signs that point people in various directions. Each hotel and casino is a simulacrum—an exaggerated, idealized version of reality. It is possible to take a gondola ride at The Venetian, under a ceiling painted like the sky, or recline by the pool like an Ancient Roman at Ceasars Palace. There is the opportunity to become a rock star at The Hard Rock Hotel and Casino or to go on safari at the MGM Grand. The list goes on: The Aladdin, The Tropicana, Paris, Rio, The Palms, The Flamingo, The Mirage, Circus Circus, Riviera, The Golden Nugget. In each of these hotels, there is a drive to imitate and exaggerate reality to create these better-than-the-original, relocated-to-Vegas VR entertainment spaces. It is like a panorama rotunda on steroids. At the Hotel and Casino Paris, visitors will find French-inspired dressed people speaking English with a French accent serving French(ish) food and drink. The décor emulates the flourishes of Versailles. The courtyard and pool reflect the Parisian garden style. The restaurants to choose from are called ‘Le Village,’ ‘Le Café,’ ‘La Brasserie,’ and ‘Le Creperie,’ ironically serving French-interpreted American cuisine. It is an amalgamation of things that are associated with France, a haven of American stereotypes of what it means to be French.

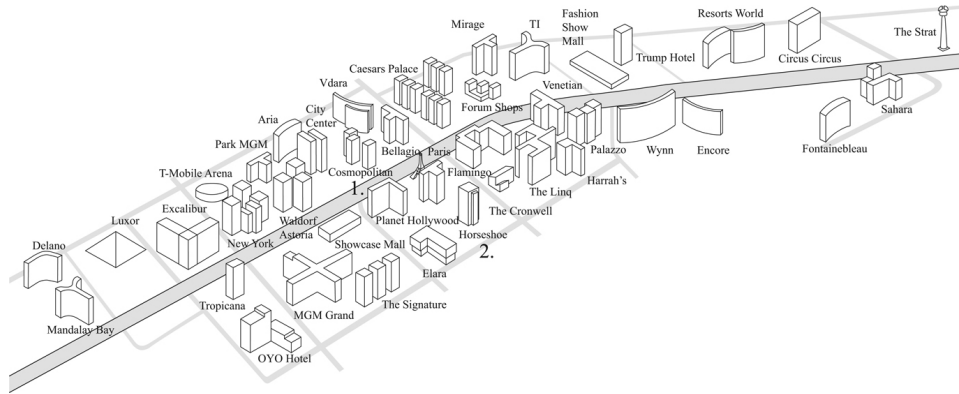


Figure 6.4 Las Vegas Strip, diagram.

Source: © ArchiTAG.

1. Las Vegas Strip Simulacrum Hotel-scape
2. 'Back of House'

The casinos use lighting and design conducive to creating a timeless vacuum where people will lose track of where and when they are. Typical of the casino hotels, the rooms for gambling are dimly lit with no windows. This produces an effect of timelessness since it is impossible to see whether it is day or night outside, and the interior lighting remains constant. The maze-like space is perfect for getting lost within. The outside courtyards are enclosed to block out imagery from the outside to maintain the particular fantasy illusion on the inside. Like Disney, the environment becomes a 'pleasure zone' where the exaggerated sensory stimuli are overwhelming and numbing.

Essential to the imagery of pleasure-zone architecture are lightness, the quality of being in an oasis in a perhaps hostile context, heightened symbolism, and the ability to engulf the visitor in a new role: for three days one may imagine oneself a centurion at Caesars Palace, a ranger at the Frontier, or a jetsetter at the Riviera rather than a salesperson from Des Moines, Iowa, or an architect from Haddonfield, New Jersey.

([Venturi et al., 1977](#), p. 53)

While these larger-scale urban examples are essentially glorified theater sets, these virtual spaces should not be taken for granted. The sensory overload is taken to new proportions. The city of Vegas embraces a culture of entertainment and immersion. In 2023, The Las Vegas Sphere opened, representing a ground-breaking entertainment venue. It is the largest spherical structure in the world, designed by the architectural firm Populous, and uses interior and exterior LED screen displays to create an immersive dome on the interior and a dynamic exo-sphere display. It is essentially a Geodesic dome that implements stereographic projection. Additionally, the space uses wind effects, infrasound,⁷ temperature and atmosphere control, and an advanced audio system ([“The Science,” Sphere](#)). U2 inaugurated the space with their 40-show residency. It has also hosted *Postcard from Earth*, a film directed by Darren Aronofsky that tells the story of life on Earth from its beginning to its fictional demise. This space is reminiscent of Étienne-Louis Boullée’s *Cenotaph for Isaac Newton*, an unrealized project from the 18th century. Like the Vegas Sphere, it was envisioned as an immense sphere resting on a base surrounded by cypress trees that represent mourning. Inside the space, Boullée’s illusion—small apertures in the dome allow light to filter in during the day, creating the impression of a star-filled night sky. At night, an artificial sun would illuminate the interior. In both cases, it aspired to create a sense of the infinite. The Cenotaph was intended as a homage to Newton to celebrate his discoveries about the universe.⁸

While spectacle has long been associated with scopic engagement, immersion extends beyond the visual into realms of sound, touch, scent, and even taste. Sound-scapes in theater and cinema, as well as in spaces like the panoramas, have played a crucial role in constructing the immersive experience, like the surround sound of IMAX theaters, where sonic design directs audience perception, or live sound effects in panoramas and early theater productions enhanced realism. Moving into the 20th and 21st centuries, the evolution of devices to create haptic feedback (such as vibrating seats, wind effects, and simulated motion), and olfactory stimulation⁹ further heightens this. These elements suggest that immersion

involves a full-body, sensorimotor, and embodied engagement with the environment.

At its core, spectacle is not just a tool of entertainment but a cultural force that influences social behavior and identity. Guy Debord's *Society of the Spectacle* reminds us that these environments do more than captivate—they instruct a particular engagement with the world, commodify experiences, and blur the boundaries between the real and the constructed. Theatricality has long been a tool of persuasion. The rapid evolution of virtual environments, from cinematic techniques to AI-driven interactive spaces, suggests an accelerating dissolution of the fourth wall, creating an even more fluid relationship between the spectator and performer. The spectacle is no longer something we simply witness but something we actively inhabit.

Notes

1. Another remarkable Trompe l'œil space, Palazzo Spada (from the Baroque period) in Rome, Italy, was designed by Francesco Borromini in 1653. Borromini was commissioned to make modifications to the original palace including this illusionistic forced-perspective gallery. The actual length of the gallery is 8.8 meters (29 feet) long but because of the perspectival tricks, it looks like it is around 37 meters (121 feet) long. The columns and the floor gradually decrease in size towards a vanishing point to create converging lines. The floor subtly slopes upward, while the ceiling slopes downward, compressing the perspective. We can think back to the formal manipulation of the Ames Room that produces the illusion using the pinched corners. A tiny sculpture of Mars at the end of the gallery, is less than 60 cm tall, and also enhances the illusion since we read it as a life-sized figure in the distance. While a small space, the Palazzo Spada is a brilliant example that converges art, architecture, and mathematics creating visual magic. The techniques used with these forced perspectives can be thought of in relation to contemporary VR and AR technologies that use ray tracing, shading techniques, and projection mapping with new mediums of immersions to create illusions of depth.

More generally, the Baroque period embraced illusionistic spectacle and drama, employing a manipulation of perception in many of the constructed spaces. Like the Chiesa Sant'Ignazio,

cathedrals used domes and ceilings painted with scenes to open their congregations to otherworldly spaces. In art, we can find this same drama, produced by an interplay of light and dark, and the desire to depict movement and scenes in action. Velázquez's *Las Meninas* captured a sense of movement in the way that the painter's hand is represented, as if in the middle of a stroke, and through the active interplay of gazes—around the infanta, between the courts people, and from the royal couple's reflection in the mirror. [↗](#)

2. It was originally constructed in 1599 by the Lord Chamberlain's Men, Shakespeare's acting company. It burned down in 1613, was rebuilt a year later, and then demolished in 1644. The Globe that exists today was reconstructed and completed in 1997 based on the historical site and traditional building techniques. It is a round, 20-sided, building, that allows spectators to surround a large part of the stage, enhancing visibility and interaction. The roof is open-air so that performances rely on natural light. The large thrust stage extends into the audience and, unlike other theaters, there are no curtains or elaborate sets. Instead, scenes are suggested through dialogue and minimal props, encouraging a greater engagement of imagination. Other elements on the stage, that assist with scenes in certain plays, include the trapdoor for dramatic entrances, the painted night sky above the stage, and the balcony. The groundlings occupy the space directly in front of the stage—the cheapest tickets historically and today. There are three tiers of wooden galleries surrounding this for seated spectators and small private boxes on either side of the stage that were more intended for being seen than to see the play.

Because of the proximity of the stage to the audience, actors can speak directly to audience members and encourage them to speak back, producing energy and engagement. It produces an immersive, all-around experience that pulls the audience into the action. [↗](#)

3. The Bridge Theatre was designed by Haworth Tompkins. [↗](#)
4. Naturally, today, we find few examples of 'choose-your-own-adventure' films and series that aim to make the experience even more interactive. This sense of agency in influencing the narrative raises questions about the cognitive load and the emotional impact of immersive experiences today. The increasing use of first-person perspective in gaming and cinema suggests a desire for heightened identification with the spectacle that further blurs the lines between observer and performer. [↗](#)
5. While still largely inaccessible to the general public, body sensors that can track the position of the body in space and tactile stimulators are becoming even more precise to provide an experience that integrates tactile and proprioceptive aspects that enhance the sensory engagement with the virtual reality. [↗](#)

6. This was picked up on by artist Banksy in the critical and collaborative piece *Dismaland*. [↗](#)
7. Audio that can be felt but not heard. [↗](#)
8. While unbuilt, it is a project that has had a consequential impact in studies on the architectural history of the Enlightenment. [↗](#)
9. Panorama rotundas implemented early versions of this through their moving platforms and use of smoke. [↗](#)

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7 The Atmospheric

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Architecture is a vehicle for immersion, through materiality, spatial manipulation, and the orchestration of sensory engagement. Contrary to [Laugier's notion of the primitive hut \(1977\)](#), it does not merely provide shelter; it constructs worlds, encodes cultural values, and shapes human perception in profound ways. We have so far seen how this has been achieved in art, theater, and cinema, recognizing the components of framing, dimensionality, temporality, and representational techniques. These have generally used the pictorial. Similarly, architects and designers manipulate space, material, light, sound, and form to evoke specific emotions, alter temporal perception, enforce ideology, and transport individuals beyond the surface-level readings of their physical surroundings.

Architecture as Immersion and Virtual Medium

While architecture has always mediated perception, its classification as 'virtual' requires further examination. In contemporary discourse, virtuality often refers to digital environments, yet architecture has long functioned as a virtual construct, shaping experience beyond its physical form. This chapter explores how architecture functions as a medium in this lineage of the virtual to produce the atmospheric, blending the physical with the psychological and describing the social, political, and cultural frameworks of their respective times and places. The historical examples demonstrate

how architecture has always extended beyond its tangible structure to construct or support alternate realities. In contrast, digital virtual spaces relinquish materiality—an idea that will be explored further in the following chapter. This distinction is crucial as it highlights that the tools used to construct VR are not limited to a single medium; instead, various technologies and design strategies can achieve this immersive intent. Rather than equating architecture itself with VR, it is more precise to view it as a medium that has continuously evolved to construct immersive, experiential worlds, both physical and digital.

Cultural Practice Materialized in Space

Practices become materialized. They define spaces and, in turn, are defined by space. Wabi-sabi, a Japanese concept rooted in Buddhism that celebrates impermanence, manifests in spaces like the Taian Tea House—attributed to Sen no Rikyū—where the tea ceremony becomes a meditative practice that encourages an appreciation of passing moments. The architecture is deliberately small and minimal—its floor area is just two tatami mats—to bring full awareness to the intimacy of the experience. The structure is made with natural materials and embraces asymmetry. To enter the space, guests must bow to access a low doorway, again reiterating a sense of humility. These design aspects ensure a particular movement within and relationship to space that then becomes the ritual experience. They ascribe a spatial condition to cultural phenomena.

Architecture has always been a form of VR that enforces particular traditions. It transcends functionality to create deeply affecting environments that shape our experience of space and our perception of reality. By framing architecture as both physical and virtual, this discussion highlights its role in crafting subjective experience and materializing ideology. In the previous chapter, we considered the vision of the architect Walter Gropius to create an all-consuming architecture that engages with all

sensory experience. While his design illustrates this aspiration, it is an innate quality of the built environment.

Through this lens, we will next explore the psychological, aesthetic, and socio-political implications of immersive environments, questioning how the built world influences behavior, constructs identity, and even mediates power. This chapter seeks to unravel the narratives constructed through and embedded in architecture and how they engage with the body.

Architecture and Power

In Foucault's text [*Discipline and Punish* \(1995\)](#), he describes the role of surveillance in architecture that disciplines bodies. Specifically, he references Jeremy Bentham's Panopticon. This was a schema for a prison model that used the gaze to control the prisoners. The design is a circular building with cells arranged around the central watchtower. What is interesting about it is that Bentham envisioned all cells to be open to view from the tower such that one guard can observe all the inmates without them knowing when they are being watched. This highly psychological architecture creates a self-regulating effect where prisoners behave out of fear of being surveyed. We can think back to Sartre's ontological dimensions of the body, where subjects behave in a specific way because they are objects for the other's gaze. The key premise of the architecture is this illusion of observation, rather than the observation itself. Bentham proposed this architectural methodology for other institutional buildings such as hospitals, schools, workhouses, and factories. He believed it would produce order, discipline, and efficiency. Through Foucault's work, the Panopticon has become a symbol of disciplinary architecture and can be likened to contemporary surveillance-heavy spaces. Instead of a guard watching from their tower, cameras record our movements; digital technologies track our online presence. These methodologies produce a condition of control. While the Panopticon as Bentham designed was never built, other prisons and institutional buildings were designed with these

principles. Factory towns like the Royal Saltworks similarly applied a surveillance model under the guise of utopian architecture. The design, by Claude-Nicolas Ledoux,¹ incorporated Enlightenment ideals of rationality and efficiency and used neoclassical style to emphasize this sense of monumentality and power. It is also reminiscent of theatrical design in its semi-circular arrangement.

We have already discussed the philosophical and phenomenological, likening architecture to Deleuze's fold where it exists as an extension of the 'outside' ([Deleuze, 1988](#); [Parr, 2010](#)). This is demonstrated in case studies like the frescoed walls of Ancient Rome where mythologies, cultural narratives, and rituals are literally transcribed through the imagery and act as memory palaces. As [Bergmann and Victoria \(1994\)](#) describes, these spaces were intended to be walked through, allowing the observer to map knowledge onto architectural elements. The frescoes create a spatiotemporal narrative where movement dictates experience and the construction of thought. This exists at the scale of the body but can be applied to architecture and the larger urban condition.

Spectacle and Ideology

Keeping with this study of Rome, the Foro Italico (originally Foro Mussolini), with its monumental planning and mosaics glorifying the idealized Fascist body, functions as an ideological statement. It is a very demonstrative example of Deleuze's reading of space, where the built environment both reflects reality and constructs it. In this case, architecture is used as a tool for political messaging. The Foro Italico was designed to reflect the strength of the Fascist regime and uses the spatial experience, materiality, classical composition, and iconography to reinforce this ideological narrative.

At the beginning of the 20th century, the eugenics movement led to a rethinking of health. Although we know today that the principles of eugenics are false and hugely problematic, we can see how this thinking

was structured within the architecture and ideologies. Italy, at the time, created several welfare programs and training campaigns to produce athletic and physically fit young Italian men and women ([Dogliani, 2000](#); [Morgan, 2006](#)). These efforts went hand-in-hand with imperial attitudes and expansionism. War and sport were aligned since strong, young, athletic men would produce strong soldiers, ready to fight for their country. Physical activity became an expression of patriotism ([Riordan, 1998](#); [Teja, 1998](#)).

Buildings within the Foro Italico employ symmetry, references to ancient Rome, and grand structures and colonnades to produce an environment that glorifies nationalism. The architecture was designed to produce *romanità* (Romanness) using ancient Roman visual culture combined with modern sensibilities, materials, and modes of construction. The integration of mosaics depicting idealized athletic bodies creates an overwhelming sense of aspirational physicality, aligning with the Fascist vision of the *New Italian*—a disciplined, virile figure embodying the regime’s ideal man.

The complex leverages principles of spectatorship and theatricality to heighten a nationalistic agenda. The main piazza, Piazzale dell’Impero, designed by Luigi Moretti, includes a series of black-and-white mosaics that depict figures similar to those you would find at the ancient Roman ruins. Modernity is combined with mythology ([Tymkiw, 2019](#)). The symmetrical planning of the complex and axial alignment produces a processional experience that imposes ideological conformity.

The Palazzo delle Terme, which contains the indoor swimming pools on the complex, has a main pool housed in a space with orthogonal simplicity ([de Mendonca, 2018](#)). The combination of Carrara marble, stone, concrete, glass, and steel furthers the point that the space takes reference from antiquity but has modern sensibility. The pool area is meant to be read as elevating athleticism to the level of mythological performance. It reinforces Mussolini’s vision of sport as both physical exertion and political spectacle, where Italian athletes serve as ambassadors around the world to the greatness of Italy. There is a strong psychological component to the design, selection of materials, and surrounding imagery. Wall and floor mosaics cover the surfaces and function similarly to panoramic frescos, guiding the

viewer's gaze across sequences of heroic struggle and victory, producing new Roman triumphal narratives. The mosaics use a gradient of colored tiles to create shading that emphasizes the muscularity of the figures. The design captures a sense of movement and energy. Repeated figures suggest a stop-animation-like sequence of images that can be considered in relation to the nascent cinema of the time. Athletes within the space are juxtaposed with the competing figures in the mosaics, producing a psychological doubling as they identify with these representations. The body is both subject and object. Spectators within the space become part of the collective identity. It is a highly charged space that is meant to exude a sense of power, strength, and victory ([Crossley, 2025](#)).



Figure 7.1 Mosaics at the Palazzo delle Terme, photograph.

Source: © ArchiTAG.



Figure 7.2 Palazzo della Civiltà Italiana, photograph.

Source: © ArchiTAG.

A parallel can be drawn with the Roman Forum, which was designed to facilitate surveillance, spectacle, and control. These methods allowed

ancient Rome to grow into the significant Empire it became ([Beard, 2016](#)). As [Russell \(2015\)](#) notes, the spatial arrangement of the Roman Forum directed movement and attention, reinforcing hierarchical power dynamics. The Triumphal monuments and arches served as reminders of the empire's successes. Mussolini was inspired by ancient Rome, and the architecture built during his time reflects a drive to reproduce the classical and monumental structures of history in a modernist way. Spaces like the Foro Italico and EUR with the Palazzo della Civiltà Italiana, also known as the Colosseo Quadrato after the ancient Colosseum, reinforced particular ideologies and served as representations for power. The Palazzo is even popularly believed to have been designed to reflect the number of letters in Benito Mussolini's name: a six by nine arched building. These structures orchestrate a spatial narrative of dominance, using colonnades and geometric order to enforce disciplined bodies and political and ideological presence. It is clear with examples like these that architecture is not neutral and can operate as a mechanism of power and persuasion.

Architecture as a Colonial Tool

Imperial architecture clearly demonstrates the use of architectural design as a strategic tool for cultural imposition. Throughout history, empires have used these monumental structures and architectures to assert their authority, reinforce ideological narratives, and assimilate or suppress local cultures. The drive for expansion can be attributed to political ambition and economic motives. Imperial powers have appropriated and transformed existing architectural symbols to serve their own narratives. They have constructed key buildings that disrupt traditional spatial organizations, forcing local populations to conform to the imposed colonial order. The ideological function of imperial architecture is evident in the grandeur of structures meant to impress and intimidate. From the palaces of the Chinese emperors to the neoclassical edifices of European colonial rulers, these buildings were designed to convey a sense of permanence and superiority.

The aesthetic choices create a hybrid style that reinforces foreign dominance.

In the case of British colonialism, buildings like the Victoria Memorial, located in Kolkata, India, demonstrate this hybridity. This is one of the most famous designs of British architect William Emerson, who is known for his contributions to colonial-era architecture in India. He generally used elements from Indian, Islamic, and Gothic styles in his designs. The idea was that by incorporating local aesthetics, the British Empire could more easily assert control. It was meant to make Britain seem benevolent in their control over the region. However, the architecture clearly reflects colonial attitudes of superiority, as it combines misappropriated design elements and symbols. This approach highlights Britain's belief that it was 'civilizing' India through a superficial application of style while disregarding local culture.

The Victoria Memorial uses white marble sourced from Rajasthan extensively in an attempt to parallel the Taj Mahal. By replicating the white marble domes, minarets, and symmetrical layout, the British sought to position themselves as successors to India's past empires, reinforcing their right to occupy the territory. However, these architectural elements in Indian contexts would have traditionally been used to show religious significance. In Islamic architecture, domes are used in mosques and tombs as a symbol of the heavens. Instead, at the Victoria Memorial, they are purely aesthetic. The Angel of Victory, atop the main dome, is a distinct symbol of triumph. It creates a visual hierarchy with the Indian architectural elements that emphasize the power structure. The building incorporates European Classical Elements similar to Palladian traditions.² Columns, pediments, and the neoclassical aesthetic with Mughal style arches and domed pavilions emphasize the opinion of the British bringing order and progress to India. Gardens and reflecting pools mirror both European and Mughal designs, erasing religious and philosophical meaning from the designs to serve the imperial message ([Ingersoll, 2019](#)). The mix of cultures produces an interesting condition that positions the British as both conquerors and custodians of Indian cultural heritage.

While technically opened as a public monument and presented as a ‘gift’ to the people, access to the Victoria Memorial was deeply stratified by class, race, and colonial politics. The building itself was filled with imperial iconography. For the Indian population subjugated to these structures, these hybrid buildings were not simply architectural symbols of progress but embodied the violence of erasure, domination, and appropriation. While the grandeur of the Victoria Memorial was meant to impress, it also served as a reminder of their subjugation. The appropriation of sacred architectural elements into secular imperial monuments stripped these features of their spiritual and cultural weight, this recontextualization a form of desecration. The Memorial was part of the broader colonial tactic of symbolic inclusion that maintained cultural and political exclusion, making Indians spectators to their own history, watching it be rewritten and curated by the colonizers.

This process of borrowing, adapting, and appropriating is very prevalent in colonial architecture around India, also seen in the designs of architects Henry Irwin, who designed the Fatehpur Sikri-inspired Victoria Memorial Hall in Chennai, and George Wittet, with his nod to the Ancient Roman triumph in his Gateway of India in Mumbai ([Ingersoll, 2019](#)). These British architects reconstruct reality, creating an artificial cultural order that legitimizes imperial dominance. By integrating Indian architectural motifs into these British monuments, they make it appear as though this rule is natural and an inevitable continuation of Indian history. It is a curatorial exercise where the structures dictate what is celebrated and what is erased. By emptying symbols of their original meaning, they were able to repurpose them to serve a colonial ideology. They created built environments that dictated how Indian history was to be remembered and who was allowed to narrate it. The buildings and monuments functioned as didactic tools of empire, attempting to ‘teach’ Indians to see themselves through the imperial lens. The built environments serve to manipulate perception, distort history, and impose new cultural narratives. However, Indian intellectuals, artists, and the nationalist movement increasingly critiqued these structures of architectural propaganda, voicing concerns about cultural erasure and reclaiming Indian aesthetics through new forms

of art and architecture. In this way, colonial architecture also unintentionally provoked new modes of resistance and the construction of identity through architecture and the virtual.



Figure 7.3 Gateway of India, photograph.

Source: © ArchiTAg.

While today the original ideological intent has been stripped from many of these spaces, their symbolic power persists. This raises questions about how architecture outlives its original contexts and takes on new meanings for future users. It suggests an evolving relationship between society and its structures of immersion. However, the legacy of such spaces persists in contemporary architecture. National monuments, stadiums, political forums, and the design of the urban (whether in digital or physical space) continue to regulate behavior and identity formation.

Embodiment in the Digital

Taking the design of the virtual into a digital environment, devices such as the head-mounted display create a completely immersive VR. We can argue that these spaces go beyond the pictorial since, though digital, the entire space is designed three-dimensionally, and the viewer is positioned within this using an avatar. VR, historically and in the digital era, has attempted to supplant sensorial experience ([Grau, 2003](#)). They can also be related to devices like Stratton's, though there is a difference between an augmentation versus an entirely virtual digital environment. In a digitally rendered space, it is not necessary to imitate reality or laws of physics to be effective—as demonstrated by Zaha Hadid's Leicester Square immersion. In evaluating these tools, we can identify elements derived from the panorama rotundas, the peepshow devices, and film. The addition of the specific technology produces an interactive space that has the potential to feel embodied. Depth perception allows for an understanding of self within the space. As defined by Julieta Aguilera, embodiment occurs when 'the body has shaped the basic structures through which we acquire knowledge and interact.' It is also understood as related to 'social, cultural and physical circumstances.' And it is 'how the human mind constantly reorganizes itself while interacting with the environment ... the malle-ability of the mind' ([Aguilera, 2012](#), p. 258).

In these digital environments, users can choose where they move and how they interact with the space, and the environment responds accordingly.³ Although experienced in isolation through the device, the environment can be shared and cohabitated by people from all around the world, creating a new medium for communication comparable to the inventions of the telephone and video call with even stronger spatial implications ([Crossley, 2023](#)).

At this point, it is crucial to acknowledge the issue of the avatar. Because digital virtual realities (VRs) create entirely virtual environments, users can control the attributes of their avatar, which may differ significantly from their 'real' body, providing a distinctive perceptual experience. This aspect of identity has been examined by artists and scientists as a means to foster a new understanding of the self. [Lucy McRae \(2012\)](#) describes this in her

work and in her TED Talk where she explores how technology can transform our physical and perceptual boundaries.⁴ While it is often suggested that walking in someone else's shoes might promote more empathy, we must acknowledge that we can never fully experience another's subjectivity, as our perceptions are always filtered through our own experiential lens. However, narrative is a powerful tool, and these experiences have the potential to communicate perceived experience. In this capacity, these tools have been used, for example, to show the experience of space perceived by someone who is autistic. In these simulations, light and sound are amplified, and there is a representation of information overload as the visual field goes into and out of focus. In the experience of seeing how autism might affect the perceptions of a situation, someone without can gain better insight into the condition and how to respond to an autistic individual who is overwhelmed by their environment. The simulation ultimately raises greater awareness and reduces the social stigma by making the perceptual experience understandable and relatable to those without autism.⁵

Perceptual Invention and the Extension of the Body

Artists, designers, and architects have long been driven to explore new ways of perceiving the world. In their efforts, they create VRs that communicate particular messages about society and the contemporary condition. While not necessarily considered conventionally 'productive,' these designs provide valuable information.

Haus-Rucker-Co, driven by utopian ideals in the 1970s experimented with scale and form to create installations that questioned accepted modes of perceiving space. Their *Mind Expander* project used helmets to distort and augment what viewers saw. They were a set of experimental, immersive architectural and artistic works. Different iterations of the project explored the idea of the helmet isolating, enhancing, manipulating, and distorting sensory perception. It emphasized a mediation of reality through the

technologies. They played with ideas of engagement using the body and design to create immersive tools that altered the perception of the city. Their larger-scale projects generally incorporated inflatable structures that were both playful in their execution and thought-provoking, reappropriating the public sphere to create a different interaction between the people and the environment.

Architecture itself is a medium that molds our perception of both interior and exterior space through form, material, framing, and narrative ([Coates, 2012](#)). In architectural history, a widely discussed architect, Adolf Loos created introspective spaces where the focus was on the interior of the space. His architectures, for this reason, take on a theatrical quality and rely on a processional nature. His Moller House exemplifies this. The journey through the space reveals where the user has come from while hiding where they are going creating an architecture of surveillance. He used mirrors to reflect the interior and located windows above eye level so that their sole purpose was to allow light to enter, not the gaze to pass through. Even the furniture is arranged to look inward. In an unrealized project like the Josephine Baker house, we can see how strongly narrative and the gaze play a part in his design process. The various spaces, again introverted, were each inspired by the roles that Josephine Baker, an African American burlesque dancer and actress of the 1920s and 1930s, played. A main feature of this design is a central glass swimming pool where Loos envisioned Baker swimming, allowing her guests to watch her from the corridors that lined it. The sunlight above the pool would make the glass from the interior of the pool reflective reinforcing the gaze on her within this space. She is objectified by both her guests and herself, not only immersed in the water of the pool but in the space of gazes. Beatriz Colomina writes about this space as a violent and dehumanizing architecture where Baker is enjoyed only for her role as a performer. She becomes an object for the other ([Colomina, 2008](#), pp. 73–130).

Architecture can either disregard its site and surroundings or enhance them. Through its design, it can serve as an extension of its user. A striking example of this is OMA's Maison Bordeaux, designed for a man with

paralysis. Rather than designing a simpler single-story house for ease of movement, Rem Koolhaas worked with his client to create a dynamic world of his own that empowered him. A central volume functions as a giant elevator ([OMA, 2011](#)). Depending on what level the platform occupies, the space radically transforms. The house acts as a prosthetic device, becoming a symbol of the resident and part of his identity.⁶ Pallasmaa writes about how identity is intertwined with place and how it is not static but fluid, molding to suit the environment. This furthers the notion that the boundary between the body and the architecture becomes blurred as the architecture shapes identity ([Pallasmaa, 2005, 2012](#)).



Figure 7.4 Soane House Collection, photograph.

Source: © ArchiTAG.

The Soane House similarly becomes an extension of Sir John Soane, creating a cabinet of curiosities that describes his architectural and art interests. Upon entering the space, one is transported to a VR of his mind's inner workings and the archives that inspire it. The layout of the spaces and the arrangement of artifacts are composed and curated to tell a specific

story about the architectural Grand Tour and the education of the designer. The house contains many surprises, from hidden doors and secret spaces to clever uses of mirrors, enhancing the illusion. Multiple readings of virtuality can be made with this space: the collection as a whole—how it is organized—and the narratives associated with each piece, in addition to the virtual spaces he commissioned Michael Gandy to create, showcasing Soane's architecture, built and unbuilt. We can liken this to spaces like the Isabella Stewart Gardner Museum that become materialized worlds representing the minds of their creators. These cabinets of curiosity curated to express particular viewpoints about the artifacts and their historical narratives. This also brings to mind the role of curation in constructing the virtual and the issue of museums today when addressing questions of bias and accessibility. In the next chapter, we will consider this further.

Ritual Spaces

When defining architecture, it is not limited to the walled and roofed spaces of buildings but includes landforms and memorial spaces.⁷ In this broader sense, architecture constitutes a manipulation of space, essentially constructing a virtual condition. While this definition posits all constructed spaces as virtual, it is more productive to consider this relationship by looking at socioculturally significant architectures. These structures produce virtual environments that embody specific social and cultural frameworks.

Historically, ritual and religion have played a crucial part in these frameworks. Gothic Cathedrals used mosaics, stained glass, reverberation, and impressive structures to evoke reverence among congregations. They capitalized on the sensorial properties of materials and form to enhance acoustics and refract light. Similarly, Hindu temples used intricate carvings to both educate and immerse people into narratives about their Gods. Across cultures, temples and religious structures have been designed to

facilitate particular practices and patterns of use, demonstrating architecture's powerful role.

The carvings at Angkor Wat are a compelling example of how culture is materialized through architecture. Intricate bas-reliefs portray scenes of cosmic and temporal significance. Notably, the *Churning of the Ocean of Milk* carving tracks the summer and winter solstices. As sunlight and shadows move across the imagery over the course of the year, the carving functions as a natural calendar, indicating key moments through the mythological narrative of the Devas and Asuras. This site preserves a historical collective memory. Furthermore, the temple complex and city as a whole are designed to encode the complex astronomical and calendrical knowledge of the Khmer civilization through its carvings, orientation, and hydraulic engineering. Entering this site and experiencing these relationships means submitting to this cosmological VR. This embedding of cosmic knowledge has been practiced in many societies throughout history. It was an important determining feature in the ancient Egyptian pyramids, and across the ocean, we also see it in many Mesoamerican examples such as the Mayan pyramid at Chichen Itza.

Light as a Medium of Immersion

Light plays a powerful role in architecture, and many architects and artists have harnessed its otherworldly qualities to transform spaces. The Pantheon, remarkable for many reasons, amplified an experience with light. The only source of light comes from an oculus at the apex of the concrete dome.⁸ As it was originally a temple structure, the sunlight coming through could be emblematic of divine presence as it tracked across the space throughout the day, like at Angkor Wat. For this reason, it also functions as a sundial, marking time across the floor and walls. During the spring and autumn equinoxes, the light aligns with the entrance, which is believed to be intentional for ceremonial purposes. Since the oculus is fully open, rainfall can pass through. This also creates a shimmering effect as water

catches light.² Similar to the theatricality and pursuit of spectacle explored in the previous chapter's case studies, the performance of light has been instrumental in immersing audiences, fostering spiritual atmospheres for diverse rituals, religious practices, and contemplative experiences.



Figure 7.5 Pantheon Oculus, photograph.

Source: © ArchiTAG.

Byzantine churches, such as the Hagia Sophia¹⁰ in Istanbul, Turkey, demonstrate what is known as the Luminous Cloud effect. The dome, in this example, is punctuated by a ring of windows that bathe the interior space with a soft, ethereal glow. Sunlight filtering through the windows, combined with dust particles and incense smoke, creates an ambient atmosphere where the space seems to glow, amplified by the mosaics within the interior of the dome that also glisten. The light in these cases redefines spatial perception with the intent of serving as a conduit for spiritual contemplation. A similar effect is produced in a more recent example at the Cathedral of Christ the Light in Oakland CA, designed by SOM. Only in this example, in addition to diffused light, the architects use a literal representation of Christ in the windows that allow for the light to pass through and create a glowing figure both inside and outside of the space. While, historically, religious spaces have employed techniques such as the Luminous Cloud to create a sense of reverence, this ability to capitalize upon lighting carries through to other contemplative spaces.

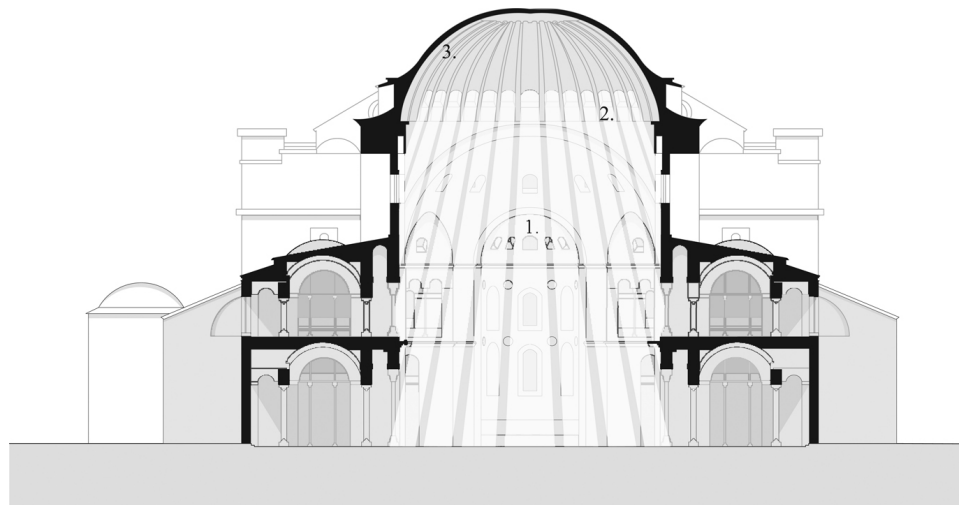


Figure 7.6 Hagia Sophia section of the Luminous Cloud effect, illustration.

Source: © ArchiTAG.

1. Luminous Cloud Effect
2. Ring of Windows
3. Mosaic Covered Dome

The Chichu Museum, designed by Tadao Ando on the island of Naoshima, uses light and circulation in the construction of an experience around the art. Galleries are connected by transitional spaces that open the museum to natural elements. It is not solely about seeing and experiencing the artwork itself but about experiencing the space of art. Built largely underground to both harmonize with and isolate itself from its natural surroundings, the museum uses natural light to create an ever-changing interplay between illumination and shadow, guiding the visitor's experience through the gallery spaces. Ando's use of concrete and sharp lines attempts to produce a space that heightens perceptions. Skylights are used in a variety of ways, demonstrating the versatility of light to create both soft and hard effects. In some spaces, the light glows; in others, it directs focus. Visitors circulate through winding paths and open corridors, with the museum's design orchestrating their movement to build anticipation and deepen engagement. The museum becomes a narrative device, choreographing movement and deliberate pauses at key moments. It functions scenographically, similar to Devlin's installation in Miami—guiding visitors through a carefully curated experience that unfolds spatially. Galleries include artwork by Monet, transplanting his *Nymphéas* once more, Walter De Maria, and James Turrell.

James Turrell has designed several installations that, while similar in construction, yield unique framings and interactions with their respective sites. At Rice University in Houston, Texas, his Skyspace is part architecture, part landform. Turrell's use of light as a material dematerializes architecture while producing new forms within space ([Andrews et al., 1992](#)). In the Skyspace, the primary area frames the sky above and invites viewers to sit and experience its interplay of light and space. At first glance, the skylight aperture might read as a two-dimensional image of the sky since the architecture framing becomes so thin that dimensionality is imperceptible. In effect, Turrell flattens the roof plane, making the sky seem within reach—as if it is a canvas that one could touch. Above the main space, a secondary layer frames the Houston skyline, offering another panoramic experience. Consistent with his body of work, a

temporal dimension is evident in the gradual changes in lighting. In Turrell's installations, light is the primary medium and is used to question what is 'real' and what is 'imagined.'¹¹ This is strongly felt in *The Light Inside* at the Museum of Fine Arts, Houston, where visitors walk through a lit corridor that blurs the distinction between space and material; the light itself appears to have weight.

While Turrell's works are typically classified as art installations, they also serve as successful architectural case studies that intelligently interrogate our relationship to our environment and senses. By employing light and spatial framing, he produces perceptual shifts that are meant to be psychoanalytical, challenging conventional notions of reality, prompting us to ask: what is real?¹²

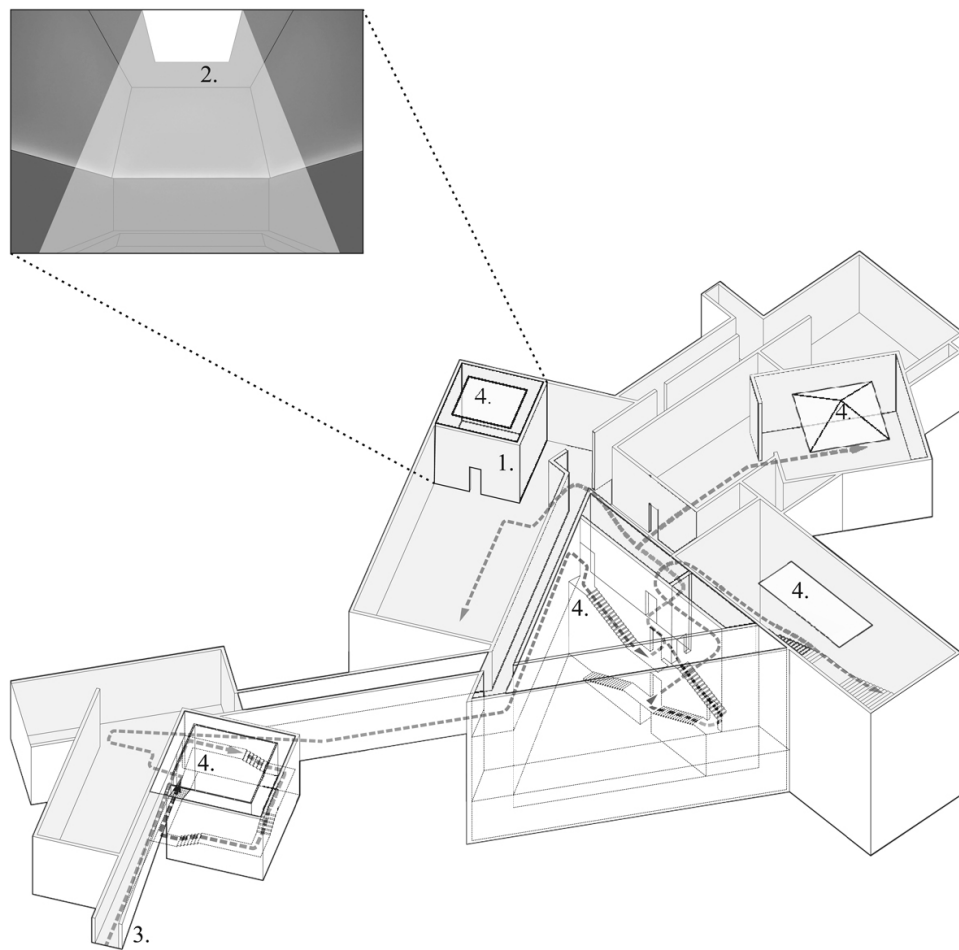


Figure 7.7 Axonometric of the Chichu Museum and Turrell space, diagram.

Source: © ArchiTAG.

1. Turrell Gallery
2. Turrell Skylight
3. Entrance
4. Sky Lit Spaces



Figure 7.8 Turrell Skyspace, Houston, photograph.

Source: © ArchiTAG.

Similarly, the artist Antony Gormley uses light as a medium in his installations, though his pieces take a more literal approach to the body. Many of his large-scale works assume the form of a cubist human figure, fragmenting the exterior to create intimate interior spaces. Gormley designs slivers of light to cascade into specific areas while plunging others into complete darkness. Rather than merely representing form, his use of light creates contrast with darkness, emphasizing the massing and spatial qualities. MODEL, designed in 2012, and ROOM, designed in 2014 for the Beaumont Hotel in London, are examples of this strategy.

In ROOM, the permanent installation atop a section of the hotel resembles a pixilated body composed of blocks that take the shape of a seated figure with knees drawn to the chest. From the interior, the massing produces cave-like pockets, while a solitary white bed contrasts sharply with the dark, dimly lit room, emphasizing the sense of intimacy. The entrance further reinforces this interplay of light and dark, featuring a white marble-clad bathroom and staircase leading to black curtains that define the

entryway. Turrell's and Gormley's works illustrate how contemporary installations transcend traditional architectural boundaries.

Captured Ephemerality

Alternatively, in contrast to the closed-in spaces produced by Gormley, Yayoi Kusama uses the concept of infinity—in the form of reflection and light—to create her immersions. She has developed a series of infinity rooms at various scales, each evoking a different mood. *All the Eternal Love I have for the Pumpkins* surrounds individual viewers with glowing psychedelic pumpkins. Kusama's work is characterized by its abstract quality, and the use of mirrors erases the perception of spatial bounds. Her work is so effective that she has garnered immense popularity, with visitors often queuing for hours just to spend a few moments inside these captivating spaces.

A perhaps overlooked work by Kusama, *The Passing Winter* (2005), operates at a much smaller scale and is exhibited at the Tate Modern in London. This unassuming cube—measuring only 805 mm³ and mounted on a pedestal—plays upon the curiosities of those that enter the gallery. The circular cutouts in the mirrored box invite voyeuristic engagement. Looking into these peepholes, the viewers find themselves immersed in an infinite space composed of their own reflections and the reflections of those who may be looking in at the same time. In this way, it echoes and enforces themes discussed earlier—Sartre's ontological dimensions, and how the gaze constructs identity and influences behavior. Kusama describes her art as a means to control her mental health and her feeling of 'self-obliteration.' This piece can be read from that perspective, the infinite self-reflections obliterating the unitary identity of the observer.

In the same vein of transcendence and working at a larger scale, Peter Zumthor, has often spoken about his work as a means of producing atmosphere. His *Therme Vals*, completed in 1996, is an iconic architecture located in the Swiss village of Vals. While the building is celebrated for

many reasons, its relevance to this book lies in its use of materials and design strategies to heighten sensory experience. The tactile, textured stone plays a crucial role in the experience of the spa, providing a contrast with the softness of the pools and the interplay of water, light, and space. Like the structures previously discussed, Zumthor is a master of highlighting the relationship between natural light and shadow. The space follows a narrative—a sequential design that gradually transitions users into a deeper meditation that engages with different senses. In addition to the typical bathhouse typologies such as the frigidarium, caldarium, and saunas, Zumthor creates spaces that question perception, activating a full sensorium through sound, touch, smell, and even taste. Each space is designed to evoke distinct moods, reinforcing the idea of a spatial journey. While materials like stone are central to the experience, it is the interaction between water, space, and light that defines the architecture. Water extends beyond mere functionality, instead actively producing an atmosphere of fluidity and impermanence. The architecture is designed to be emotional.

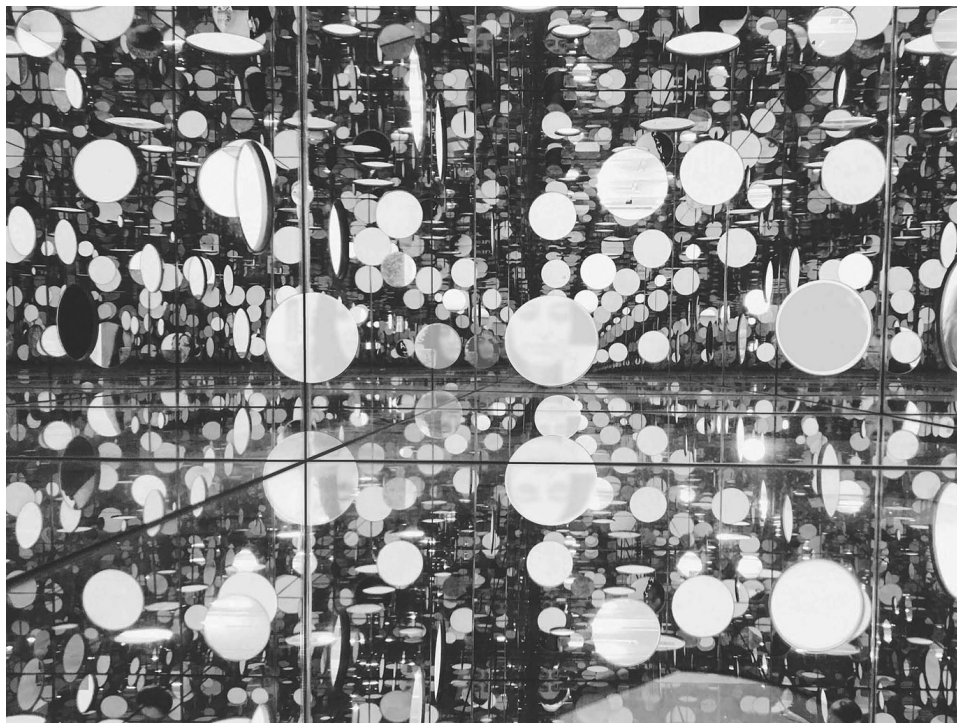


Figure 7.9 Yayoi Kusama's The Passing Winter (2005) at the Tate Modern, photograph.

Source: © ArchiTAG.

If we consider that Turrell works with light, Gormley with contrast, Kusama with reflection, and Zumthor with atmosphere, another medium emerges in Diller + Scofidio's *Blur* installation¹³—namely, fog. Designed for the 2001 Swiss Expo over Lake Neuchatel in Switzerland, *Blur* produces a spectacle in which the architecture itself is composed of fog, supported by a structure that generates it. Water and air become primary building materials that then ‘dissolve distinctions between nature and artifice’ ([Diller & Scofidio, 2002](#), p. 16). Both visual and auditory senses are engaged: the fog-producing system also emits white noise, while the dense, white cloud heightens sensory awareness. Visitors are compelled to notice subtle details such as the temperature on their skin, the sound of the water spraying, the sensation of inhaling and exhaling the fog, and even its scent. Like Turrell, the effect dematerializes the architecture.

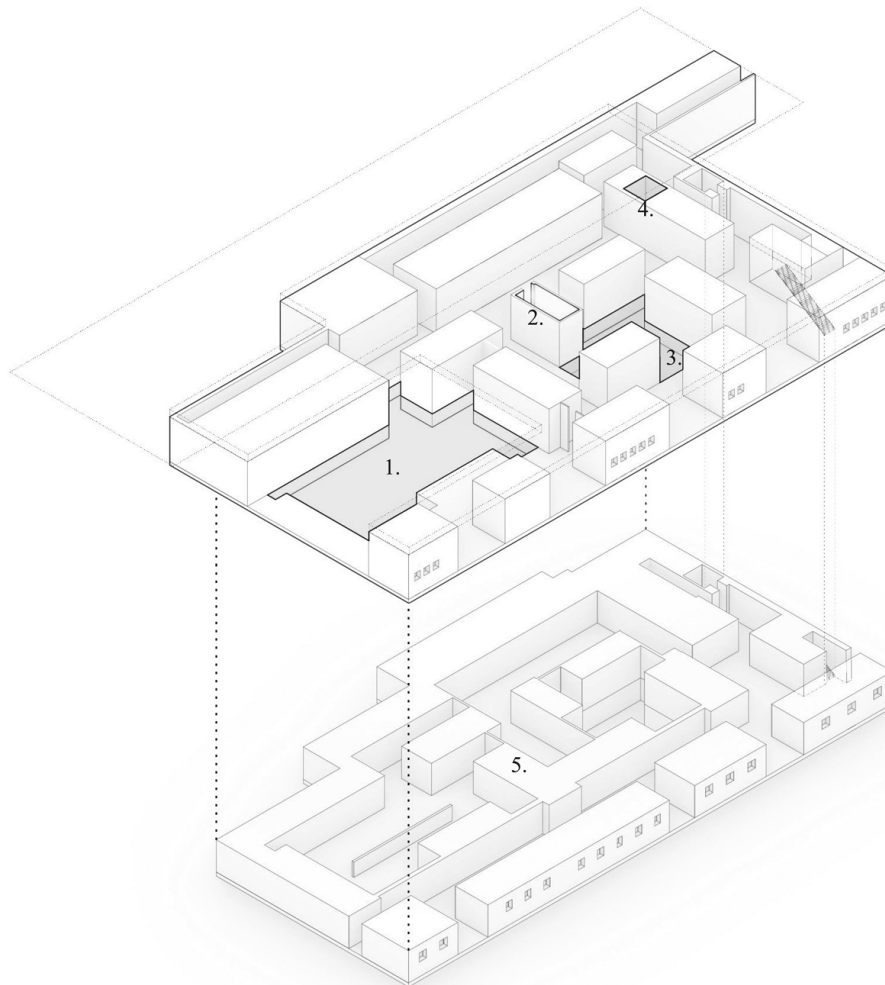


Figure 7.10 Zumthor's *Therme Vals*, diagram.

Source: © ArchiTAG.

1. Main pool
2. Frigidarium
3. Caldarium
4. Sound pool
5. Supporting programs

The original design envisioned a media component. Diller and Scofidio described the project as a 'new model for the panorama, the first mass-media phenomenon' ([Diller & Scofidio, 2002](#), p. 92), intending to showcase technological advancement reminiscent of iconic past expo pavilions. Like the panorama rotundas, *Blur* uses a processional space to gradually transition visitors from a space with clarity of vision to one that is engulfed by the fog. Given the reduced visibility, the architects designed the 'Braincoat' device to aid navigation and foster the recognition of others with shared sensibilities within the blur. Although not implemented, this raincoat with incorporated sensors and lights used data from a series of questions, ranging from politics to personal preferences, that people would fill out before entering the environment. When two people with similar responses came into proximity of each other, the lights on the suit would respond. The project was meant to illicit a theme of sensuality and intimacy through the blur and the new sensory orientation based on data and media. The physical cloud produced by the vapor and the metaphorical 'cloud' produced by the information relay produced a new mode of interaction, communication, and understanding of the other ([Hight, 2007](#), pp. 40–41).

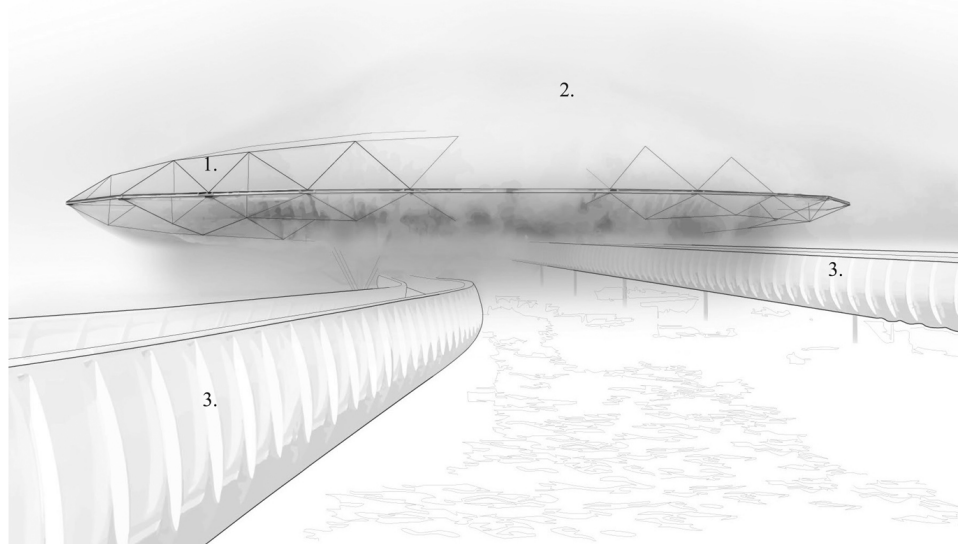


Figure 7.11 Diller & Scofidio's *Blur*, illustration.

Source: © ArchiTAG.

1. Architectural Structure
2. Fog
3. Arrival and Departure Bridges

The interplay between materiality and immateriality in architecture raises questions about the nature of spatial experience. In examples like the *Therme Vals*, weight and texture of the stone play an important role in the sensorial experience of water and light. However, projects like the *Blur Pavilion* suggest an architecture that is entirely ephemeral, defined not by the structure but by the manipulation of environmental conditions. *Blur* dematerializes the built form, replacing walls with mist, dissolving spatial boundaries, and heightening awareness. From this, we can recognize that the immersion is derived less from the physical and more from its capacity to manipulate intangible elements.

Urban Virtuality

VR possesses a cross-scalar, cross-dimensional, and cross-disciplinary nature that extends even to the urban scale. The design of cities shapes social frameworks and reflects societal values ([Hillier et al., 1987](#)). A city that prioritizes sidewalks and pedestrian infrastructure will support a population that believes in the value of walking, while one that emphasizes public and civic spaces nurtures an active, engaged citizenry. A historical examination of architecture and urban planning exposes these social frameworks—they are a record of their histories ([Scott & Watkin, 1980](#)). Radial cities, with their central focus, suggest a hierarchical order that moves inward; irrigation methods reflect a community's relationship with water; and grid patterns convey order and efficiency. By considering these methodologies globally, we can see how diverse cultures have produced virtual frameworks that govern not only their physical environments but also the attitudes and lifestyles of their inhabitants.

[Janet Abu-Lughod \(1987\)](#) writes about the architectural implications of culture in the 'Islamic city.' While she argues that defining the city as such is problematic, she acknowledges the role of culture and defines the forces that determine the design of space: terrain and climate, technology, distribution and transportation, social organization, and legal/political systems. In the case of the social organization in an Islamic city, veiling and a layering of space is important. Historical gender segregation has created architecturally special conditions through various divisions of space and visual screens. Residential quarters are subdivided into smaller quarters, and convoluted paths further subdivide areas into smaller sectors while preventing the gaze from passing through. Abu-Lughod discusses how Islamic law produced a mutual responsibility among people to guard visual privacy, and this takes form in architectural elements such as the mashribiyya—the lattice wood screening device—bent entrances, and a gradient of private to public spaces. The design of the city immerses its users within the laws and socially accepted ways of living.

Veiling is an important aspect of the culture, coming from a tradition of modesty and privacy. With the separation of men and women, architecture in this context evolved to serve this veiling function. A strong example of

this are the gendered spaces of the typical Cairene house. Windows overlooking the street, generally smaller and higher up to limit direct views in, included these ornate mashrabiyya so that women could look out without people being able to see in. In addition to the role they played in creating privacy, they allowed for airflow, helping to cool the interior, and produced diffused light into the interior. The facades were often unadorned, again to emphasize a sense of modesty in line with Islamic values. This house typology in Cairo includes a courtyard that provided additional ventilation and natural light. Many times, there was landscaping and fountains to produce a space where people could enjoy being outside in privacy. We can also consider these garden spaces as VRs, creating a micro-climate space of tranquility within the domestic space not so dissimilar to the garden fresco rooms of ancient Rome. The reception spaces of these houses were generally relegated to men, again producing spatial conditions based on the virtual construct.¹⁴

We see the direct implications of urban planning on the function of the city in examples like the Haussmannization of Paris, an urban renewal project that happened in the mid to late 1800s under the direction of Georges-Eugène Haussmann. Before this radical reimagining of the city, Paris was medieval in its structure, with narrow, winding streets, poor sanitation, and a high population density. It was overcrowded, unhealthy, and prone to uprisings. As there was no proper sewage system, waste was dumped onto the streets or into the River Seine, causing outbreaks of diseases such as cholera. The narrow streets and alleyways were ideal for revolutionary barricades that blocked access and resisted military forces. The architecture of the city before Haussmannization was a mix of medieval, Renaissance, and early neoclassical structures. The poor and working-class lived in poorly built housing in areas that lacked fresh air. The congestion meant that there was a lack of public and green spaces.

Though Haussmann's project was aggressive, it transformed and modernized Paris. Some of the main aspects of his plan included widening boulevards and streets, creating a uniform Haussmannian style of architecture, and improving sanitation and public infrastructure. The wider

avenues improved traffic flow and, importantly, allowed for more sun and fresh air. He dramatically demolished sections of the city to create his boulevards and avenues that connected important buildings and sites. These wider streets also reduced the risk of barricades and provided direct access for French military forces.¹⁵ Along these new streets, Haussmann designed a uniform building style that has since given Paris its distinctive aesthetic. These structures are five to six stories high with stone facades and wrought-iron balconies. They include commercial activities on the ground floor and apartments above, with wealthier residents living on the lower floors and servants living on the upper floors. Parks and green spaces were created for everyone to use, opening up space in the urban fabric that allowed for a healthier city while supporting new forms of public engagement and leisure. His project changed how people could use and interact with the city.

While it turned Paris into the place we know today, these decisions meant that working-class residents were moved to the outskirts. Paris suffers the ramifications of this zoning system and the development of the suburban banlieues. These banlieues represent a history of peripheral displacement into suburban low-income neighborhoods. The wealth gap present in these neighborhoods is rooted in historical geography, urban planning policies, and wind patterns. Under Haussmann's urban renewal, the destruction of medieval slums meant that working-class families moved to the eastern and northern banlieues as they were cheaper and closer to factory jobs. Factories and warehouses were built up in these banlieues so that they could be near river transport routes and railway lines, while the western banlieues were developed into wealthy residential zones. Since Paris' prevailing winds blow from west to east, pollution and smoke from factories were carried eastward. As a result of this, the wealthier classes chose to settle in the cleaner, less polluted western suburbs. Historically, the western suburbs had hunting grounds used by the nobility and spacious plots of land that attracted the bourgeoisie.

After the world wars, a need for housing led to the rapid construction of large low-income housing projects concentrated in the northern and eastern banlieues. As a result of French colonization, many immigrant workers

(from Algeria, Morocco, and Senegal) were housed in these estates. This has led to a worsening of discrimination, as these neighborhoods are associated with crime and disorder, and heightened social tensions. Although not all banlieues experience economic and social marginalization, the spatial stratification and displacement of working-class residents have intensified these challenges, making them a pressing issue in contemporary French politics and demonstrating the social consequences of the design of space. Urban planning becomes a means to organize social hierarchies. In this sense, it constructs a virtual condition that amplifies particular relationships between bodies and space.

The Haussmannian style of grand boulevards and urbanism was also applied to the French colonies, serving the same purpose that British architecture had in India. In Algiers, major sections of the city were cleared to make room for the new Parisian-style spaces. [Ingersoll \(2019\)](#) compares the Avenue de l'Imperatrice to the Rue de Rivoli and writes about how the European architecture in this context signified colonial expansion. Structures in a Neo-Moorish style, such as the Central Post Office by Jules Voinot, incorporated Oriental features on European typologies as an effort to assert control over local authority.

In Morocco, the urbanist Henri Prost, was responsible for creating master plans for major cities, including Casablanca, that maintained the medinas but segregated the locals from the European populations. Because of this, there is a stark divide between the historic maze-like centers and extending French boulevards with white modernist buildings ([Ingersoll, 2019](#)). This segregation highlights two realities, one intended for the European colonizers and one intended for the Moroccan locals, where architecture literally represents the social divide and exclusionary policies.

While much of urban planning history demonstrates the role of design as a tool of control, there also exist counter-movements that resist these impositions ([Awan et al., 2011](#)). Informal settlements challenge top-down planning models, creating organic urban environments that prioritize communal agency. They develop spatial strategies that adapt to local needs rather than adhering to rigid urban grids. Jan Gehl's human-centered urban

planning philosophy, which prioritizes pedestrian-friendly environments, also challenges ideologies of efficiency and control. This reveals how architecture and urban planning can also serve as a medium for the negotiation of alternative social, political, and cultural frameworks.

Speculative Futures

The idea of reconstruction is taken to an extreme in Liam Young's radical speculative design and storytelling project, *Planet City*, which explores the role of the built environment in the amplification and redefinition of culture around climate change. His book and project are a provocation that envisions a hyper-dense megacity that can house the entire population of Earth so that nature may rewild. It is a critique of urban sprawl, the Anthropocene, and the effects of this on the planet, proposing an alternative future where most of the earth can be relinquished to nature. It takes place in a post-national, post-capitalist world where cultures can fuse, mutate, and adapt in an environment where all of humanity coexists. Instead of groups maintaining ethnic enclaves, *Planet City* proposes an interwoven, hyper-diverse society. Hybrid languages develop similarly to how languages have evolved throughout history. Festivals, rituals, and symbols blend elements from this multicultural Earth. Fashions represent a multiplicity of backgrounds. The fictional city takes on a design inspired by the densest cities in the world,^{[16](#)} with an architectural style that absorbs global aesthetics. It incorporates international cultural diversity, representing a new kind of planetary identity that is collaborative and moves beyond national borders. The premise of the mega-city is to create self-sufficient energy, food production, and water systems that create a new social character for the urban condition. All the technologies represented already exist. Digital culture plays a strong role, adding layers of virtuality.

The project is represented through film and a book. Using realism and abstraction, it combines the expertise of scientists, technologists, economists, and political theorists. The speculative fiction reimagines the

relationship between humans, cities, and nature, asking whether hyper-dense living could be the key to planetary survival while supporting cultural crossover and evolution. It addresses important questions about the constructs that define our reality and the role they play in shaping space.

Young describes this ambition: ‘I believe that by creating imaginary worlds, we can connect emotionally to the ideas and challenges of our future’ ([Young, TED, 2021](#)). I believe this sentiment can be applied to much of the human drive to tell stories, as a means to immerse ourselves into worlds of our own making. The large and small-scale devices create interesting opportunities to challenge how we perceive and expose specific social frameworks. Through this analysis, we can understand how architecture and design influence the way people inhabit space and the relationships that are manifested, and we can envision new virtual futures that challenge contemporary constructs. This raises questions about who curates these narratives and what realities they reinforce or challenge.

Notes

1. He also designed the unrealized Oikema, a brothel where sexual activity was controlled through the architecture. It is an example of Ledoux’s belief in architecture as a tool for social engineering. This was part of his larger plan for the ideal city of Chaux. [↗](#)
2. The dome is raised on a drum like St. Paul’s Cathedral in London and uses embellishments similar to the Renaissance structures of Italy. [↗](#)
3. For this reason, VR has become a large part of gaming culture, used as a device to support single-player and multiplayer games. Game environments have embraced different aesthetics, some producing virtual worlds that are simple in their colors and forms, others producing highly detailed worlds that attempt to mimic ephemeral qualities of the experience of space. Similar to the Villa Livia, the artists of a game like *The Legend of Zelda: Breath of the Wild* have taken the effort to study and represent the wind passing through leaves, birds flying, and the sun sparkling on the surface of dew-covered plants. The game becomes much more than the objective of completing the tasks and winning but rather a space to immerse oneself into the fantasy.

In the case of multiplayer games, users can cohabitate space and can communicate with one another, generally to form alliances to get to the next level. This provides an opportunity to rethink the makeup of 'community,' the forums in which we communicate, and the ways in which we can come together as a community. ↵

4. The notion of the cyborg, discussed by [Joanna Zylińska \(2002\)](#), redefines the self and blurs the boundary between the other and the self. Technology is seen as an extension of man. [Madeline Schwartzman \(2011\)](#), in her book, provides several examples on how design and technology extend identity through new perceptual attitudes. Many of these case studies can be paralleled to the work of Lucy McRae. ↵
5. There have been a few artists who experiment in both speculative and concrete ways with how VR can produce empathy towards certain experiences. Sputniko!, a Japanese-British artist has created several semi-fictional devices where she explores technology and different layers of subjectivity. She promotes these devices in the form of Japanese pop songs and music videos where she weaves an entire narrative around each one. Her final project at the Royal College of Art was called the *Menstruation Machine* and this device simulates the gendered experience of having a period. It takes blood from the user (through an IV) and dispenses it, and includes electrodes on the lower abdomen that imitate cramping. We can think of the device as producing an immersion for the wearer that does not rely on visual stimuli. We can also recognize this device as working against the normalized taboo in many cultures of having a period. ↵
6. This is an interesting point: the idea that architecture serves as a representation and extension of identity. The house becomes a receptacle of memory holding the artefacts of an individual's life. This is not new. Ancient Romans believed this so strongly that they had the practice of 'damnatio memoriae,' the erasure of someone from history through the elimination of any trace of their existence, including their home. ↵
7. Memorials serve an important role not only in remembrance but in acceptance and closure. They are a crucial part of culture and identity and have been a mode of human expression since the birth of built form. Archeological evidence points to the profound importance of memorial architecture in prehistory not only for the commemoration of the dead, but also in the marking of celestial events.

In modern contexts, many of these spaces attempt to produce an experience that seems enclosed, in spite of them generally being open monuments. The Armenian Genocide Memorial, Tsitsernakaberd, in Yerevan, is designed by Arthur Tarkhanyan, Sashur Kalashyan,

and Hovhannes Khachatryan. The twelve stone slabs are arranged in a circle and represent the 12 lost provinces of Western Armenia. Within this enclosure, an eternal flame burns in memory of the victims of the genocide. The angles of the stone slabs, leaning inward, give a sense of feeling the weight of history, a genocide that is still denied by Turkey. In addition to this highly charged space, a split obelisk on the site represents the separation of Western and Eastern Armenians and the idea of re-unity. Finally, an alley of trees and a memorial wall commemorates the towns and villages where the massacres occurred. The complex relies on movement through the space as it recounts the history through the symbolic forms. An example like this one depends on symbology and abstract monumentality to produce a space of contemplation and memory. The site is removed from the urban fabric, making it a place to seek out and visit. Employing another technique, the Memorial to the Murdered Jews of Europe in Berlin, Germany, designed by Peter Eisenman, uses a grid and a ground level change to bring visitors into the memorial and away from the surrounding city. It is embedded within the urban context and because of this provides a continuous confrontation with history that makes it both a memorial site as well as an active public space. It consists of 2,711 concrete stelae of varying heights that have no inscriptions. Because of the stelae and the descent into space, sounds become either muffled or amplified. Though the stelae are arranged in a grid, the effect is disorienting and maze-like, removing the locational awareness granted by seeing one's surroundings, and symbolizing confusion, loss, and isolation. Similarly, Maya Lin's Vietnam Veterans Memorial in Washington, D.C. uses bold form and descent. It consists of a black granite wall set into the earth. Visitors walk alongside it, gradually descending until they reach the apex of the 'V.' This 'cut' through the earth emphasizes the scar that this war left in American history. Unlike the memorial in Berlin, the material is engraved with the names of the fallen and reflective which creates a deeply personal experience. Unlike memorials that glorify war, her design brings attention to loss and remembrance. We can recognize how these memorials have produced new methodologies of materializing commemoration and how that has influenced the designs like the 9/11 Memorial in New York. ↵

8. This also serves a structural purpose acting as a compression ring. This space is impressive for its use of concrete—the largest unreinforced concrete dome. It was built in 126 AD by Emperor Hadrian, replacing an earlier temple. Later it was used as a Church which aided in its preservation. ↵
9. The rain is cleared by a slightly convex marble floor and small strategically placed drainage holes. ↵

10. The Hagia Sophia was reconstructed multiple times. The resulting architecture drew knowledge and inspiration from other churches. The central dome represented an achievement in engineering, using windows placed around the drum where cracking had previously been observed in solid domes. It seems to hover over other semidomes, arches, and vaults, supported by the building's buttresses. This adds to the ethereal atmosphere produced inside ([Ingersoll, 2019](#)). ↵
11. This idea of architecture shaping the way light is cast and the manipulation of what is perceived is examined in exhibits like the RA's 'Sensing Spaces,' particularly in the installation done by Grafton Architects ([Goodwin & Ursprung, 2014](#)). ↵
12. Turrell studied perceptual psychology which has influenced his art career in the use of light projections and the manipulation of form to produce perceptual effects. ↵
13. Fujiko Nakaya's 1970 Osaka World Fair installation was a precedent for the project ([Diller & Scofidio, 2002](#)). It was an installation that pioneered the use of fog as an artistic medium to dematerialize space. ↵
14. During French and British occupation, many of these buildings were taken down in favor of European style buildings not suited for the Egyptian culture or climate. A feature describing this difference is the prevalent exterior facing balconies. Not only did these buildings go against local customs of modesty and privacy, but they created a housing typology that was not functional in this culture. While in European contexts, balconies are celebrated and used for social as well as domestic tasks (eg. drying laundry), this was not suitable for Egyptian contexts.

During the modernist movement, the architect Hassan Fathy wrote against modernism in Egypt because of its lack of consideration for Egyptian culture and history as well as its poor choice of materials for the climate. He especially rejected the use of concrete and steel, materials not easily acquired in Egypt, making them expensive, and ones not suitable for the desert. Instead, he proposed building architecture that learns from vernacular typologies. His architecture blended modernist ideals with vernacular construction methods. He celebrated mudbrick architecture that could create affordable and environmentally friendly structures. His architecture prioritized passive cooling, natural ventilation, and thermal mass and he revived Egyptian stylistic elements like domes, vaults, and windcatchers. He also saw architecture as a means of social reform believing that good architecture improved quality of life, working closely with poorer communities—in an example like New Gourni Village—to involve them in the construction process ([Fathy, 1973](#)). ↵

15. We can also compare Haussmann's boulevards to the triumphal march routes in ancient Rome. Key monuments are connected to produce a sense of national pride and to project power, order, and control. [↵](#)
16. In his contribution to the book, 'The Laws of Planet City,' Andrew Toland writes about the spatiality of laws and posits at one point that a Planet City would rely on a plurilegal system rather than universal law (though in the end concludes that it would rely on a new form of 'natural law'). He uses the example of the Kowloon Walled City (KWC) in Hong Kong to support this, a city structure that Young drew inspiration from (Toland, in [Young, 2021](#), p. 141). Though KWC was known for being a crime-ridden area, it developed an informal urbanism that sustained itself until it was taken down between 1987–1994. It was the densest place on Earth, a maze-like, largely ungoverned settlement. At its peak population, about 35,000 people lived on the 6.4 acres. Originally, it was a Chinese military outpost and remained under the official control of China after the British leased Hong Kong in 1898. Because of these two competing authorities, it existed in a legal gray zone. After WWII, refugees from mainland China flooding into Kowloon caused a rapid and uncontrolled expansion. Since governments did not enforce laws inside of the Walled City, it developed without zoning regulations or safety codes. Many illegal businesses thrived, and the megastructure city functioned through an informal economy. Buildings were stacked so tightly and high up on top of one another that little sunlight reached the interior streets, giving it the name in Cantonese that translates to City of Darkness. Despite this reputation, strong social networks and a self-sufficient micro-society formed. It created its own ecosystem. KWC is a symbol of organic and unregulated urbanism, serving as inspiration for fictional cities such as *Blade Runner's* LA. [↵](#)

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8 The Digital

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As we have seen, the intersection of design, technology, culture, and spatial representation has always played a crucial role in shaping human experience. From the earliest cave paintings to the ancient fresco rooms to digital metaverses today, humanity has continually sought to capture, extend, and redefine the nature of reality through immersive spaces.¹ They have been a way to represent societal values, cultural underpinnings, and collective aspirations. The contemporary philosopher David Chalmers posits that ‘virtual reality is genuine reality’ (2022, p. xvii), emphasizing that our perception of reality is inherently shaped by sensory and cognitive experiences, and the reality we perceive is a reality of our own making. As technological advancements continue to redefine the boundaries of representation and space, we must critically examine how virtual environments influence identity formation, collective memory, and cultural heritage.

Reframing Reality

This book has attempted to synthesize theories from philosophy, psychology, and architecture to explore the relationship between immersive spaces and human perception. It has considered a sample of historical precedents of virtual realities (VRs), such as Roman frescoes, panorama rotundas, architectural structures, and early digital experimentation. To address the lack of hindsight when examining contemporary examples, this

book instead proposes a framework for understanding these spaces and their significance, initiating a discussion around these topics. This final chapter will begin a conversation around contemporary digital realities, virtual museums, and extended reality platforms. These are only another iteration of what we have already seen and what is to come. With rapidly changing technology, the mediums of representation will likely change dramatically in the next few years. By analyzing these shifts and focusing on the role of VR to encode narrative, we can begin to understand how virtual mediums serve as both an extension and a reflection of human cultural evolution.

We have seen how philosophers have explored the role of perception in shaping reality. Fundamental to understanding the immersive, perception and sensory experience are subjective and are filtered through our personal history and embodied experience. Furthermore, this is not simply a passive reflection but a process of actively constructing space based on historical, cultural, and bodily influences, which makes it inherently virtual. [Merleau-Ponty \(2002\)](#) emphasizes that our understanding of space and body image comes as a result of our movements, memories, and cultural conditioning. This is also echoed in Sartre's exploration of identity in *Being and Nothingness*, where he posits that the self is continually constructed in dialogue with its environment and other bodies. He supports the idea that humans adopt multiple identities depending on their social contexts. This is important when considering the avatar and the construction and mirroring of identity within digital examples.

The notion of virtuality—that our perceptions always mediate an 'inside' and an 'outside'—is central to theories of subjectivity. Lacan's concept of the mirror stage ([Lacan, 1999](#)) illustrates how the infant's first encounter with its reflection gives rise to a virtual double, a preliminary step in the formation of self-identity. Deleuze's concept of the 'fold' ([Deleuze, 1988](#)) suggests that virtual spaces are a product of reality rather than separate or opposite entities. All spaces, whether architectural, artistic, or digital, are created by the interplay of internal and external forces, forming layers of meaning that are continuously reinterpreted ([Crossley, 2023b](#)). In these theoretical frameworks, virtuality is not opposed to reality but is an

essential component of how we experience the world. The architectural implications of these theories reveal that the design of space is not passive and instead serves an active part in the shaping of identity. The digital sphere opens up the design process to a wider collective. VR allows for a rearticulation of identity and provides a medium through which culture and history are both preserved and reimagined.

Architecture and the Evolution of Immersion

Architecture, more generally, functions as immersive—immersing users into particular spatial conditions—and is a form of VR through its materialization of social and cultural frameworks and encoded constructs. The design of VR produces specific social behaviors and identities. The Roman Forum, for example, was designed to immerse individuals into the political and social fabric of ancient Rome, just as contemporary digital forums seek to create participatory forms of online engagement.

Throughout history, these immersive experiences have relied on various artistic and architectural methods, using evolving technologies and mediums of representation. They have represented collective social frameworks that shape how people think and interact ([Turner & Whitehead, 2008](#)). The ability for the human species to adapt these changing technologies demonstrates the elasticity of identity and its relationship with space ([Antonelli, 2008](#); [Aguilera, 2012](#)). Referencing once more the ancient Roman fresco rooms, these employed perspective techniques that produced a virtual extension of the physical space into the painted space. Beyond their aesthetic and representational success, they served as memory palaces, aiding in the production of knowledge where narratives were inscribed onto walls activated by movement through the space. Likewise, the other panoramic spaces produced VRs that conveyed stories, whether mythological, historical, political, or aspirational—and these were meant to be read to instill a sense of identity and collective memory.

The panorama rotundas of the 18th and 19th centuries represented a considerable evolution in the construction of a VR space, employing techniques that enhanced the optical illusion. Never before had such large pictorial immersion spaces been built. They were designed to overwhelm the senses and often represented scenes that would foster a sense of nationalism. In the 20th century, technological innovations produced new experimentation with VR. Examples such as Morton Heilig's *Sensorama*² from 1962 and other stereoscopic devices³ furthered the pursuit of sensory immersion, engaging with the senses beyond vision.⁴

From Stereoscopes to Simulators

In the mid-1900s, computerized simulators, one of the first developed by General Electric Corporation, were developed for flight training, providing pilots and astronauts of the post-war and Cold War eras a virtual cockpit. With the visual component, these simulators incorporated movement and sound, like Heilig's device, to replicate the experience of pilots in planes and spacecraft. This example evidences the tension post-war and the competition between the United States and the Soviet Union during the space race. Ultimately, these developments laid the groundwork for today's VR spaces by demonstrating the power of multisensory engagement.

The notion of the VR device, specifically the headset, stems from the various optical devices that gained popularity from the 1800s onward. Charles Wheatstone's stereoscope paved the way for the devices we know today. The fundamental goal across all of the historical examples remains consistent: to transport users into alternate realities that reflect and shape societal ideologies. The mediums and virtualities remain inseparable from their contexts ([Baudrillard, 1983](#)). The strategies and scales to achieve this have been different, but all have engaged with some form of sensorial experience.

The digital age has introduced new mediums of immersion. Within this, several categories have become popularized: VR, augmented reality (AR),

and mixed reality (MR), all falling under the umbrella term of extended realities (XRs). Each has the ability to create new realms for social interaction, curatorial practices, and the expression of cultural identity. The experiences provided by these modalities allow for new forms of information overlay that further the concept of hybrid realities.⁵ As these technologies become more embedded in daily life and humans become more reliant on these experiences, the boundary between reality and the virtual becomes more blurred. Simulations have become an essential part of our lives ([Turkle, 2009](#)). What once existed as clunky or expensive devices for digital VR, have now become more integrated into our fashions and modes of being. XR is being implemented in a range of activities, spanning entertainment experiences to life-saving surgical procedures. Headsets like one of the first head-mounted displays (HMD)—*The Sword of Damocles*⁶—designed by Ivan Sutherland and Robert Sproull in 1968, have evolved into more streamlined cordless AR glasses that can be taken anywhere.

In the 1980s, there was a rise of consumer and industrial VR as the technologies made their way into gaming, simulations, and research. Jaron Lanier's VPL⁷ Research coined the term 'virtual reality' and developed wearables such as the DataGlove and EyePhone. The early 21st-century devices⁸ are a continuation of this lineage. The devices are becoming lighter and more powerful, and future trends suggest more integration of neural interfaces and quantum computing.

As XR technologies continue to evolve, the integration of artificial intelligence (AI), haptic feedback, and real-time cloud rendering is further redefining immersive experiences. AI-powered curation can dynamically adapt virtual environments to users' interests, offering tailored historical narratives and object interactions. Advances in multisensory engagement with different haptic feedback devices (such as gloves or body suits) and scent diffusion systems heighten the realism of virtual experiences, making digital reconstructions even more tangible. As we have seen with historic VR spaces, audio is incredibly powerful. Spatial audio technologies that track user location add another layer of immersion, ensuring that soundscapes dynamically shift based on how the user is positioned and

interacting with the space. These advances in VR mediums and technologies allow for a more personalized and participatory experience that fosters new modes of storytelling, heritage preservation, and interactive learning.

On the other side of this, projects like Google Starline and other holographic displays create real-time interactions with objects generated within space, making it possible to ‘feel’ present with others regardless of geographic separation and overlapping realities beyond coordinates. Instead of merging spatial perception, Starline embraces the idea of the interface, designing a window into the other’s space ([Google Starline, n.d.](#)). This idea of presence in the virtual is not novel: the letter conveyed intimate thoughts and transported emotions, the telephone brought people’s voices together, and the video call extended this to environments.

The interdisciplinary art collective, TeamLab (n.d.), creates spatial experiences fusing art and technology. They produce large-scale interactive installations that use projection mapping, motion sensors, and AI-driven visualizations to create an ever-evolving digital landscape that responds to visitor movement and engagement. In this sense, visitors can contribute to the artwork through how they interact with it. Within their spaces, you will oftentimes find children running around to encourage the visuals to morph, more adventurous people dancing, and others simply moving their arms and limbs or walking around to see how the space changes with them. Unlike ancient fresco spaces or historic panoramic rooms, the ‘painted’ space is not static. TeamLab’s work explores participatory and fluid spatial interactions. It fosters the idea that these digital spaces are not merely aesthetic but act as extensions of reality, representing a constantly changing relationship with the users. Their work attempts to dissolve distinctions between the digital and physical worlds. Their architecture group takes this a step further, thinking about the design of buildings and what impact these may have in producing a more interactive and co-creative built environment.

The developing technologies provide new temporalities and challenge our conceptions of spatial organization that produce greater fluidity, non-linearity, and hyper-connectedness. Unlike physical spaces constrained by

geographic coordinates, digital environments can be designed with non-Euclidean geometries, portals, and overlapping realities. These properties invite designers to rethink spatial relationships, pushing the boundaries of how environments are structured and experienced.⁹

When considering digital VR platforms, these have attempted to replicate elements of physical space and to incorporate spatial hierarchies, land ownership models, and architectural/computational design principles ([Crossley, 2022b](#)). An example like Google Earth can be understood as an accessible and large-scale case study of a digital twin in the context of urban environments. It offers a virtual representation of the Earth's surface, incorporating satellite imagery, topography, and increasingly detailed 3D building data. This integration of geographic and visual information allows users to experience and analyze world environments in a virtual setting ([Google Earth, n.d.](#)). Its open-access nature and intuitive interface democratize geospatial analysis and make it a valuable tool in architecture, urban planning, environmental studies, and digital humanities. More broadly, digital platforms such as Google Earth exemplify a larger trend: the creation of VRs on greater scales and speeds. While we could argue that these spaces provide opportunities for decentralized governance and new modes of social interaction that connect people like never before, they also raise questions about accessibility, ethical implications, and the commodification of digital landscapes.

Metaverse, a term originating from the book *Snow Crash*, is arguably first represented in the multiplayer VR *Second Life*, which gained popularity in the early 2000s. Users adopted avatars within the space and interacted with one another, creating an ecosystem that fostered a collaborative, community-driven environment.¹⁰ Unlike typical multiplayer gaming—where success is measured in wins and losses—this virtual world was centered on living and creating. *Second Life* served as a precursor for subsequent platforms, such as *Decentraland* and other massively multiplayer online (MMO) video games. Similar to *Second Life*, *Decentraland* is a 3D virtual world that has built an economy through the sale of user-produced content and virtual plots of land as non-fungible

tokens (NFTs) using its cryptocurrency, MANA. As a decentralized autonomous organization (DAO) that exemplifies the Web 3.0 paradigm,¹¹ Decentraland enables all users to participate in decision-making and the production of space ([NFT Plazas, n.d.](#); [Ordano et al., 2017](#)). The virtual world centers on Genesis City, which adopts a Cartesian representation of space rather than leveraging VR's capacity to transcend the spatial limitations of physical reality.

Cultural Preservation and Curatorial Shifts in the Digital Age

Just as the physical spaces of ancient civilizations carried cultural and historical significance, digital environments today function as repositories of contemporary heritage. A recurring question throughout this research has been how we determine which narratives are preserved. Even the accounts presented in this book are imbued with inherent biases and subjective interpretations that cannot be entirely eliminated. This is the challenge of individual authorship and the task that museums and cultural institutions will face as they increasingly turn to digital platforms to curate and present artifacts. A significant aspect of contemporary digital VR is its ability to redefine social and curatorial practices that serve as historical records for future generations. The creation of virtual spaces, as well as the narratives and objects they encompass, has expanded. In the past, museum collections have been curated by select individuals, shaping a vision of society that reinforced specific constructs. Museums today are working toward decolonizing their collections, and many have been using these technologies to create dialogue around controversial artifacts. As with the production of VR, generally, there is an opportunity for a more diverse range of voices to participate in building the historical curatorial process ([Crossley, 2022a, 2023a](#)).

The flexibility of digital media means that virtual collections can incorporate a wide range of layers of information in multiple modalities—text, images, video, and 3D objects. Designers have been using this aspect

to create experiences that are more interactive. More interactivity means that users can explore heritage and culture subjectively, producing multiple readings that foster more inclusive dialogue and new knowledge. Digital museums and virtual exhibitions provide an opportunity for democratized or decentralized access to cultural heritage. While experiences can be had on-site with digital and physical museum layers, the very nature of the digital means that it can be accessed offsite, opening up avenues to and modes of experiencing these new curated datasets. Platforms like Flyover Zone, which hosts two streaming services—a virtual museum and immersive tours of reconstructed ancient cities—started as a research group that digitized ancient Greek and Roman artifacts and cities. Google Arts and Culture has similarly transformed how people can access art from around the world. Collaborative platforms like Spatial.io provide services that facilitate the production of virtual worlds. In addition to its mission to support gaming, its versatility supports a variety of users, from artists, educators, and professionals across industries, and it has hosted events and exhibitions for user-created content ([Spatial, 2025](#)).¹²

Many contemporary digital projects offer adaptive narration, which enables users to engage with historical content in varying levels of depth based on their individual interests—from introductory overviews to expert analyses. Community-driven contributions provide a means of expanding historical narratives beyond the traditionally accepted ones. Oral histories have become an even more prominent part of curatorial processes, using first-hand narratives to describe important events. By allowing users to submit oral histories, cultural anecdotes, or alternative perspectives, digital heritage platforms can foster more inclusive and decentralized storytelling that better represents diverse cultural legacies.

This has commonly happened on web-based programs, but AR mobile phone apps and emerging devices that begin to blend in with daily objects take us a step closer to the notion of hyperreality. Technology becomes second nature ([Mensvoort, n.d.](#)). AR and MR provide interactive modes of knowledge transfer at museums or specific sites and promote engagement through movement ([Zhao et al., forthcoming](#)). Projects like *MUDI Reality* +

([ArchiTAG, 2024](#)) reconstruct historical sites that can be clicked into, rotated, zoomed in, and further explored. Information can be turned on and off based on what viewers are interested in learning more about. ArchiTAg worked with the Museo Diffuso di Castel San Pietro Romano to develop an experience within the museum space that could integrate technology in historical storytelling. The team worked with archaeologists and the museum curator to develop the AR and physical installation. The project combines both digital and physical components to create an interactive and immersive space to allow visitors to learn more about the Rocca dei Colonna. A 3D drone scan of the site allowed the team to digitally reconstruct the historical fortress. In AR, visitors to the museum can switch between its current and historic states seeing how the site has changed over time. They can click into information about key features of the site, interacting with content within the physical and digital spaces.



Figure 8.1 ArchiTAg's MUDI Reality +, immersive installation using an AR app., photograph

Source: © ArchiTAg.

Similarly, the ArchiTAg *DMUConstellation* project exemplifies how MR technologies can transform exhibition experiences by integrating digital

layers into physical installations while extending access beyond gallery spaces. Developed as part of the Dark Matter University's installation for the Lisbon Triennial in 2022, the AR application allowed visitors to engage with an interactive network of decolonial narratives and radical storytelling. Unlike traditional museum curation, where knowledge remains site-specific, *DMUConstellation* provided a multimodal experience, augmenting the physical exhibition with digital overlays and enabling off-site users to access and navigate its contents remotely. This participatory and gamified experience encouraged users to explore information actively, choosing their own paths through the exhibition's decentralized network of ideas. Both the physical installation and the digital overlay were meant to read as a constellation of points where people could interact with the information provided at each point. By leveraging AR to deconstruct spatial and institutional limitations, the exhibit could 'literally' break through the walls of the gallery. *DMUConstellation* contributes to this evolving discourse on hybrid exhibitions and the democratization of cultural knowledge. It reinforces how digital tools can redefine accessibility, engagement, and curatorial practices. It looks toward a phygital future ([Crossley et al., 2023](#)).

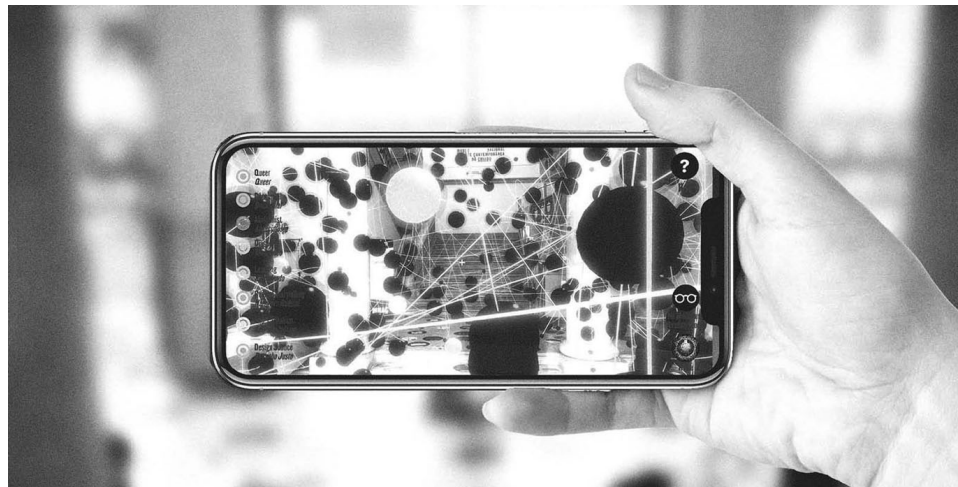


Figure 8.2 ArchiTAG with DMU and Augmented Architecture, *DMUConstellation*, immersive installation using an AR app., photograph

Source: © ArchiTAG.

VR and digital heritage platforms hold the potential to address historical biases by amplifying marginalized voices and recontextualizing artifacts beyond their colonial frameworks.¹³ Traditional museum curation has often privileged dominant narratives, but contemporary digital initiatives are increasingly leveraging XR technologies to present more holistic and layered historical accounts. Interactive storytelling tools allow users to explore multiple perspectives on historical events, facilitating a deeper understanding of cultural complexities.¹⁴ Immersive and interactive reconstructions provide opportunities for local communities to contribute to the rebuilding of lost heritage sites, ensuring a more inclusive process of historical representation. As virtual spaces embrace their ability to act as cultural repositories, the responsibility to preserve and present history ethically becomes crucial, necessitating continued dialogue between historians, technologists, and the people and cultures being represented.

Reclaiming Representation and New Ethical Considerations

In *Simulacra and Simulation* (1994), Jean Baudrillard writes about the role of the symbol and its direct connection to perceived reality, shaping understandings of subjective experience, society, and culture. With more voices determining the symbols that represent our time, the greater the picture we can understand. This facilitates a recontextualization of history and its artifacts that can both preserve and transform their meaning while enhancing educational engagement and historical and cultural awareness. The ability to create participatory and interactive exhibitions challenges the hierarchical structures of curation, fostering a more inclusive approach to cultural preservation. User-generated content, especially in light of 2D and 3D generative AI¹⁵, enables broader participation. However, it also raises questions about authorship, authenticity, copyright, and preservation. In light of all of this, curatorial practices in virtual environments today introduce new complexities. Spaces and objects construct new meanings in ever-evolving digital and phygital contexts.

Ultimately, the growing integration of AI in digital environments is reshaping how users interact with virtual spaces, curate information, and form digital identities. AI-driven systems enable the dynamic adaptation of virtual worlds based on user engagement, creating personalized experiences that enhance immersion. 3D generative AI models such as multiview diffusion or Gaussian splats participate in asset creation and digital modeling. One powerful method that supports the integration of AI in digital environments is t-SNE (t-distributed stochastic neighbor embedding).¹⁶ It is particularly powerful in digital curation. In museum collections, it can assist in classifying vast archives of artifacts based on stylistic or historical similarities, uncovering patterns that may not be easily discernible by human curators, and cataloging vast amounts of information. Google Arts and Culture has worked with several artists who have successfully curated art in this way. Since they have millions of collected images of paintings, sculptures, and artifacts from museums worldwide, instead of manually organizing them, this algorithm helps group similar artworks together. This is then translated into an interactive visual digital or web-based map where users can explore connections between artworks ([Google, Arts and Culture, n.d.](#)).

As with all technological advancements, contemporary virtual spaces present ethical dilemmas. The infrastructure supporting new digital VR spaces requires significant energy consumption, and the digital footprint of data centers and high-powered computing systems raises concerns about their sustainability. Issues of digital inclusion and data privacy must also be addressed to ensure equitable access to these emerging technologies that are becoming increasingly central to cultural and social life. The digital divide—characterized by gaps in access to technology and the internet—risks exacerbating existing social inequalities.

The monetization of virtual spaces also introduces questions about economic disparity and digital colonialism. While some metaverse projects aim to create open and democratic spaces, operating within our cultural and social frameworks, they fall prey to the same issues of our current reality ([Burke, 2021](#)). The tools are being commodified, which raises questions

about who controls these spaces and whose values they represent. The challenge moving forward is to balance innovation with ethical responsibility, ensuring that digital spaces serve diverse communities. While, throughout history, VR represented particular perspectives and those with means, today, there is an opportunity to create greater discourse around the values we wish to preserve.

Toward a Phygital Future

Throughout the text, I have argued that virtual environments are not a departure from reality but an extension of it. They encapsulate the aspirations, anxieties, and ideologies of their creators, serving as cultural time capsules for future generations. By examining the historical lineage of immersive spaces, we gain insight into how technology continues to shape human perception and social structures.¹⁷ We can understand how trends in technologies and mediums have brought us to this cultural moment as we move toward even more dissolution of the frame or device of immersion.

As architects, artists, and designers navigate the evolving landscape of digital spaces, they must consider the cultural, psychological, and ethical ramifications of their work. Digital technologies offer unprecedented opportunities for interaction, education, and community-building, but they also demand critical engagement. We will need to decide how we choose to define and inhabit these spaces. Their success will be determined by their ability to foster meaningful connections, challenge traditional hierarchies, and create new possibilities for cultural expression and preservation.

Notes

1. Julieta Aguilera calls this the ‘malleability of the mind,’ ([Aguilera, 2012](#), p. 258). Human experience and cognition are shaped by the social, cultural, and environmental factors the body interacts with. [↗](#)

2. Morton Heilig's *Sensorama* was an early immersive, multisensory virtual reality experience for film. Heilig, a cinematographer, designed this device to address, visual, auditory, and tactile stimuli. He used a stereoscopic display to enhance depth perception, a wide-angle view, stereo sound for directional audio, scent dispensers, and wind effects created with fans. The device also vibrated and moved to simulate different movements. The device is relatively small, enclosing a single person within the VR space, about the size of an arcade game. Users sat at a chair with their heads placed in the viewing hood area. One of the scenes a person could experience was a motorcycle ride with the machine providing the sensation of wind on the face, engine sounds and the smell of exhaust fumes. Though the Sensorama was not commercially successful since it would have cost too much, it is a major milestone in the history of VR and immersive media. [↵](#)
3. The *View-Master* was another important (analog) handheld, lightweight device that gained commercial success and was marketed to children and adults. It worked with a rotating reel system that could contain several pairs of stereoscopic images. [↵](#)
4. VR changes the boundaries of the body since it produces a projection of one's corporeality onto a virtual form ([Murray & Sixsmith, 1999](#)). The body is the reference point for experience ([Pallasmaa, 2005](#)). [↵](#)
5. The senses and sensory experience are what make up subjectivity ([Howes, 2004](#)). [↵](#)
6. *Headsight*, from 1961, by Philco Corporation is considered the first head-mounted display with motion tracking. It was used in military and remote viewing applications [↵](#)
7. Virtual Programming Languages [↵](#)
8. These include devices such as the Oculus, HTC Vive, and, more recently, the Meta Quest and Apple Vision Pro. [↵](#)
9. Space Popular, a design and research practice founded by Lara Lesmes and Fredrik Hellberg, explores this intersection of architecture, virtual reality, and spatial storytelling. They investigate how digital environments shape human perception and challenge notions of spatiality. Their research projects *The Portal Galleries* and *The Venn Room*, especially consider this reconceptualization of space and its coordinates. They also question ideas of ownership, accessibility, and collective memory in virtual worlds. Their work supports the Deleuzian argument that these digital spaces are not something separate from reality but an extension of it and the cultural and social constructs of our societies. [↵](#)
10. [Elizabeth Grosz \(2001\)](#) writes about the two sides of contemporary digital VR spaces. Similar to the criticisms presented for the panorama rotundas, there are those who see these worlds as

utopic, and others who see these spaces as the end of human connection. She concludes that we have always lived in a space of virtuality that does not rely on a computer screen or digital world and that there has always been a human drive for simulation. [↗](#)

11. This refers to the next evolution of the internet, emphasizing decentralization, blockchain-based technologies, and user-centric control over data. This compares to Web 1.0, which is the early phase of the internet, characterized by static, read-only web pages, and Web 2.0, which introduced interactivity, user-generated content, and social media but was centralized. [↗](#)
12. The rise of gamification and interactive storytelling within digital curatorial projects has transformed passive observation into more active engagement. By integrating quest-based learning and role-playing experiences, virtual museums, galleries, schools, and reconstructions allow users to immerse themselves in historical narratives as participants rather than simply spectators. (In education, games such as Assassin's Creed can be co-opted to provide educational experiences with ancient sites.) Multiplayer exploration further enhances this dynamic by enabling real-time collaboration and discussion among users navigating the same space. Additionally, reward-based learning—such as achievement badges or unlockable content—can encourage more engagement. Augmented reality scavenger hunts (like Pokémon GO) and puzzle-based artifact restorations offer different learning modalities and interactive experiences. These approaches enhance engagement across diverse audiences and provide multiple instructional methods, fostering inclusivity for a wide range of learning abilities. As digital environments increasingly embrace participatory models, the role of the user shifts from a passive consumer to an active co-creator in the construction of historical knowledge. [↗](#)
13. [Clémentine Deliss \(2020\)](#) writes about her observations as curator of an anthropological museum in Europe noting that European and Western artifacts generally had an artist name and more details about the work versus non-European and non-Western pieces that were missing this information. This demonstrates the value that has historically been placed on art and artifacts from certain places due to colonial attitudes. [↗](#)
14. Machine learning technologies can take this a step further by identifying commonalities that might not be noticed by humans. [↗](#)
15. [Žižek \(2001\)](#) writes on how we might consider the simulation of thought when referring to AI. How does this differ from 'real' thought? [↗](#)
16. This is a machine learning algorithm that can organize, cluster, and visualize data. The algorithm first measures the similarity between all data points in the original high-dimensional space. It models the probability that a given data point would select another point as its

‘neighbor.’ Similar points have higher probability values. It then maps similarities into a low-dimensional space representation, preserving the same probability structure. It iterates the process to refine the results. Ultimately, it shrinks complicated mapped information into an easier representation. It is especially useful to find patterns and clusters not necessarily obvious to humans. [↗](#)

17. [Yuval Noah Harari \(2015, 2017, 2018\)](#) writes about how technologies have shaped human civilization and how we must engage critically with future technologies. [↗](#)

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9 Conclusion

Mediated Bodies, Designed Realities

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Our experience of the world is entirely virtual. Societies and built environments are constructs that shape particular ways of living. Viewing virtuality through this lens fosters a symbiotic understanding of the virtual and the real, dissolving the dichotomy between them. Reality comprises different types of virtual experiences, each employing different mediums and modes of representation, governed by distinct societal and cultural frameworks.

Virtuality as Lived Experience

This text explores the conception of the virtual space in architecture and art as an immersive medium that represents these frameworks. It investigates how architectural experience relates to immersion and how immersion informs the psychological construction of the body image and subjectivity. The body image is fundamental to all accounts of experience, shaping the structures of perception. Perception is a direct function of environmental affordances that shape bodily orientation ([Gibson, 2014](#)). Immersion, a complex condition, suspends prior perceptual understandings, layering new knowledge onto the body image and its ability to spatially orient. Architecture and art, therefore, create conditions for bodies to interact with space, influencing the evolution of subjectivity through these interactions.

The virtual condition and body image can be understood with the assumption that unfamiliar environments require an adjustment period as existing perceptual understandings are replaced by new ones. In this transition, body image is temporarily suspended, causing disorientation. Once acclimated, it situates itself within the new space. In extreme cases, the body image dissolves entirely, rendering spatial coordinates incomprehensible, as depth and other spatial markers become indiscernible.

Despite significant study in philosophy and psychology, the relationship between body image, space, and culture remains largely overlooked in architectural discourse. Architectural discourse has generally focused on a Vitruvian framework of aesthetics, proportion, and function, often omitting the role of body image, the senses, and their intersections with the virtual. However, this relationship is central to how architects conceive space. Scholars such as Giuliana Bruno and Sylvia Lavin have explored the psychological and psychoanalytic dimensions of architecture, particularly through notions of spectacle and performance.

The Flâneur Voyager

In *Atlas of Emotion*, Giuliana Bruno writes about many of the theories and case studies used in this book from the perspective of film. Film, after all, is an immersive medium that creates a ^{VR} through the narrative and the expression of it. Her reassessment of the voyeur as a ‘voyager’ is most compelling since it allows a rethinking of spectatorship not only in film but also in architecture and immersive environments, both physical and digital. The body image and immersion allow for the voyeur to become a voyager, and in the case of Bruno’s analysis, this makes film an extremely kinetic experience ([Bruno, 2002](#)). This can be likened to the virtual realities (VRs) discussed throughout the text; the process of being immersed is kinetic since it relies on narrative, which operates on a timescale that cannot be singular. Virtual spaces rely on participation and interaction, activating the immersion. This inherently means that the viewer is not passive in the

spatial exchange, demonstrating a co-constructed nature of reality. In the case of the Villa dei Misteri, the subjects are taken through a ritual sequence. In the panorama rotundas we examined, they are taken to the events of a historic battlefield. In digital spaces, they are taken to collective and collaborative arenas. These spaces support the notion of the flâneur/voyager by providing a form of representation ‘permitting the spectatorial body to take unexpected paths of exploration’ ([Bruno, 2002](#), p. 61). Since the flâneur functions as an observer, we can go a step further to suggest that the VR requires a sense of production—the production of ritual, of nationalism, of community, respectively that is especially more interactive when looking at contemporary VR examples. VR enables spectators to become voyagers, actively positioning the body image within new spatial coordinates, reinforcing immersion as a kinetic process. Entering any virtual space requires the body image to inscribe itself, continuously responding to changing environments.

Immersion often demands that the material of representation—whether in architecture, art, film, or digital media—dematerialize, drawing attention to the sensorial experience itself. The representation supports the expression of cultural narrative. This quality is evident in works by Turrell, Gormley, Kusama, and Zumthor, all of whom use light, shadow, and reflection to create immersive environments that transcend materiality.

Since the body is the site of one’s lived experience ([Bruno, 2002](#), p. 64), VR is inherently sensorial and experiential. We first experience the space of our body and then the space provided by architecture. Though subjective, perception is also shaped by collective cultural and social structures that train and reiterate generational sensory interpretations. These become embedded in the way the senses are interpreted and how we understand experience. The body image is intrinsically linked to our dress, customs, habits, and environmental context.

Sylvia Lavin’s [*Form Follows Libido* \(2004\)](#) explores architecture from the perspective of sensory experience, introducing the concept of ‘mood.’ She examines Richard Neutra’s work, which he believed had therapeutic potential, linking environmental design with the psychoanalytical theories

of Freud. Lavin asserts that, from the start, architecture had an adulterated relationship with psychoanalysis since it assigned phobias, anxieties, and psychoses to space, leading to new strains of psychology in behaviorism and environmental psychology. Wundt's work made psychoanalysis architectural by discussing empathy, which linked the perceiving subject to the object of perception ([Lavin, 2004](#), p. 35). Lavin notes Neutra's use of materiality, form, and spatial organization to cultivate moods, immersing occupants in panoramic experiences of nature while enclosing them within a 'second womb.' This is not dissimilar from the panoramic bird's eye views developed throughout history. Namely, Bruno discusses the 'View of Venice' by Jacopo de' Barbari, which is one of the earliest of these representations. Albeit made during the Renaissance after the discovery of linear perspective, it does not use this method of representation. Instead, there is no clear focal point, and it displays a montage of several different vanishing points. 'The observer is not fixed to a position or to a set distance but appears free to wander in and around the space' ([Bruno, 2002](#), p. 177). This is what Neutra sought to achieve. He was interested in the architectural experience. His design decisions on material, form, opening, and enclosure were based on his interpretation of Western psychoanalysis. While pleasure in architecture was nothing new, it had not been thought about in terms of therapy. The house for Neutra became a therapeutic apparatus through the empathetic exchange between the body and the space.

Speculative Design Critiques and the Mediation of Experience

Anthony Dunne and Fiona Raby's [Speculative Everything \(2014\)](#) adds to this discourse on design as a tool for imagining alternative realities rather than simply solving contemporary problems. Their definition of speculative design challenges function-driven design by proposing artifacts and narratives that provoke critical thought about potential futures. Much like how architecture mediates perception and encodes societal values, speculative design creates new frameworks for questioning cultural

assumptions through imagined worlds, technological fictions, and conceptual artifacts. Just as VR alters spatial perception and subjectivity, speculative design reconfigures reality by presenting alternative futures that challenge existing norms.

Design and narrative compel people to engage with possible futures, revealing the sociocultural constructs embedded in design choices. Design fictions are a key aspect of Dunne and Raby's work; these speculative artifacts serve as narrative devices that highlight potential consequences of technological and social change. This is analogous to how virtuality in architecture constructs alternative spatial imaginaries. We can reconsider how the built environment functions as a space for critical engagement with emerging sociotechnological paradigms. Speculative design operates as a tool for interrogating the present by imagining what could be. Many VRs throughout history have aspired to this. While governed by cultural frameworks, available technologies, and mythology, these spaces have reimagined ways of interacting with space and with other bodies. They have innovated methodologies of representation to immerse subjects into imagined realities. They have presented new ways of perceiving and experiencing the world, in cases, challenging dominant ideologies and assumptions about space, identity, and social structures. Visual structures have historically framed cultural meaning and embodied spectatorship ([Plat & Squire, 2017](#)). Whether through Renaissance perspective paintings, panoramic rotundas, or contemporary VR environments, these speculative spaces have extended beyond mere representation, actively shaping how individuals orient themselves within the world.

Throughout history, architectural representation has served as a medium for constructing spatial imaginaries. This text supports the idea that immersion in virtual space, both physical and digital, plays a fundamental role in shaping subjectivity and perception. Recalling Grant Tavinor's *The Aesthetics of Virtual Reality*, he provides a valuable lens for extending this discussion, positioning VR as an evolution of traditional pictorial and spatial media. Architecture mediates perception, encoding cultural narratives and structuring ways of seeing. This perspective reinforces the

idea that virtuality is not an external construct but an inherent condition of experience. Just as Bruno reconceptualizes the spectator as a voyager, VR transforms the act of viewing into an interactive process, demanding the user's embodied engagement. Tavinor's insights on VR further affirm that immersion is not passive; it is a kinetic and participatory process that extends the body's relationship with space. VR situates the body within constructed spatial coordinates, reinforcing immersion as an active negotiation of perception. It is also a framework for reimagining social and cultural structures.

This condition of immersion is reinforced through the dematerialization of architectural materiality. The immersive space often transcends the physicality to prioritize sensory engagement. Tavinor similarly argues that VR is a medium where representation fades into experience. If VR is an evolution of pictorial and architectural representation, then the digital spaces today must be understood as an extension of long-standing methodologies of spatial design and representation.

Architecture has historically mediated power structures, from monumental state representations to participatory public spaces; VR extends this mediation by generating environments that remain embedded within cultural and ideological frameworks.

VRs have functioned as experimental landscapes where alternative futures are represented and experienced. The interplay between fiction and reality, real and virtual, in these spaces enables a form of critical engagement, allowing for a reconsideration of our relationship to technology, power, and embodiment. These designed worlds reveal the inherent tensions between the material and the virtual, the real and the speculative. These spaces share a common ambition in conveying stories and become tools for rethinking the built environment, agency, and the narratives that shape our collective future.

The Virtual Self

From its inception, subjectivity and the body image are understood in terms of the virtual. We can never actually experience seeing ourselves; there is always a mediated virtual 'screen.' Foucault's analysis of 'Las Meninas' explores the mirror as a site of displacement and self-representation, reinforcing the idea that subjectivity is tied to this virtual displacement. Giuliana Bruno builds upon this, emphasizing the kinetic affair of the voyager and the projection of the self onto the representational space. While Bruno does not use the term 'body image,' we can think of it in her terms: this kinetic process transforms sensation and emotion ([Bruno, 2002](#), p. 261).

After 'mirror stage' the body image enables coordinated movement and continuously evolves alongside experience. [Lacan \(1999\)](#) provides an understanding of how subjectivity and body image are initially formed. [Sartre \(1996\)](#) explains the role of the gaze and visual perception in the development of the body image. [Merleau-Ponty \(2002\)](#) continues this inquiry into perception, emphasizing the importance of the sensory apparatus as a means for developing an understanding of the self within space. [Foucault \(1995\)](#) considers the societal conditioning of the body. And [Schilder \(2014\)](#) confirms the body image through his scientific analysis of psychology. Our environment inherently affects how and what we perceive, and our body is always a part of our environmental reading. All of these theories confirm that it is a decisive process building upon the idea of a complete experiential history.

Architecture influences how people are able to read, at the large scale, an urban condition, and at the small scale, their orientation within a space. It 'participates in the construction of subjectivity, power and gender' ([Hight, 2007](#), p. 39). This is where lie the exciting possibilities of architecture as a tool for representation—in the spatial relationship to the subject and their subjectivity to culture and larger society. The creation of the city is a 'multifaceted affair of the senses. Making sense of a city requires an emotional lens' ([Bruno, 2002](#), p. 384).

Design decisions reflect cultural predispositions that produce a particular virtual environment and relationship to space. We can see how this plays

out throughout different cultures and historical times. At different moments, architecture has presented the monumental to pay homage to different values. It has venerated the Gods, religion, and power. It has supported spaces of forum, commune, and intellectual exchange. It has celebrated commerce, trade, and agriculture. It has glorified technological advancement. Today, digital VR introduces new conditions—an environment experienced through the avatar—disembodying the subject—and with the collective.

Design does not operate in isolation from political and ethical concerns; it foregrounds them by questioning how representation and technology shape our future and whose interests they serve. VRs can be read to understand the embedded social biases and frameworks. They reinforce ideologies and can expose the invisible infrastructures of power

VR is always framed by mediums of representation and cultural contexts, establishing boundaries between inside and outside. Throughout history, spatial production has represented social values—whether fostering empowerment, subjugation, nationalism, or the collective. The Great Frieze fostered a cult of women, reinforcing a new social status. Gothic cathedrals immersed congregations in divine spectacle, instilling humility and reverence. Panorama rotundas transported viewers to battlefields, cultivating camaraderie and pride. Digital technologies have been designed to decentralize power and give creative agency. Each historical moment's VR reflects its societal imperatives.

The question remains: what does contemporary VR reveal about our social condition? The body image provides a critical lens for evaluating its effects. This text underscores the necessity of situating it within architectural discourse, emphasizing its role in shaping the virtual and the production of culture. Architecture and VR come as a result of human experience and the stories we tell. We give meaning to space ([Coates, 2012](#)). Wölfflin's assertion that “physical forms possess character only because we ourselves possess a body” ([Wölfflin, 1994](#), p. 151) underscores architecture's fundamental link to human experience. We perceive space

through the sensorial apparatus of the body, continuously projecting our prior experiences onto new environments.

Across cultures and historical periods, architecture has functioned as a tool of representation, encoding prevailing social values. VR in this context is part of a continuum of architectural and artistic practices that have shaped human perception. In today's digital age, immersion is increasingly mediated by new technologies, challenging conventional understandings of body image and spatial perception. Recognizing the role of body image in the immersive experience is crucial for understanding the cultural significance of contemporary virtual environments. This text serves as a starting point for integrating body image into architectural history and theory, interrogating the production of contemporary culture through the immersive virtual experience.

As digital and virtual environments continue to evolve, their impact on spatial perception, identity, and social structures demands deeper critical engagement. The integration of virtuality into architectural discourse is not merely an academic exercise but a necessity in understanding how emerging technologies mediate human experience. Future inquiry should explore the ethical implications of these spaces, particularly in relation to power, surveillance, and accessibility. It should examine how these environments shape societal behavior, who controls these landscapes, and what ideologies they are reinforcing. As immersive technologies redefine the relationship between the body and space, designers and architects must reconsider existing frameworks of spatial representation. Virtuality challenges fixed notions of materiality, opening possibilities for new forms of interaction, engagement, and participation. The historical trajectory of spatial imaginaries reveals a persisting desire to transcend physical limitations, yet we must continue to critically examine this through a sociopolitical lens. As VRs are not detached from cultural narratives, they play a role in shaping and reflecting them. As architecture continues to intersect with digital media, it is imperative to acknowledge the role of immersion and the body image in constructing new forms of subjectivity. By addressing these complexities, we can move toward a more inclusive

and critically informed understanding of virtual space and its implications for the future of human experience.

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