BEYOND THE STAGE:

The Evolution and Transformation of Scenography in the Digital Age

Politecnico di Torino
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[1] Prague Quadrennial of Performance Design and Space, June, 2011
https://www.stolaf.edu/people/bjorklun/PQ2011/PQ2011Overview.html

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Topic Motivation

Renowned industrial design educator Rowena Reed Kostellow once said, “There is no essential difference in
the basic visual relationships between an artist, a graphic designer, an industrial designer, or an architect. The difference lies in the complexity of visual modeling required by their respective positions. Additionally, each profession uses different materials and techniques. I have always believed that there is a universal principle of vision that exists across all these fields.” This universal principle of vision is particularly relevant to stage design, a 3D space where visual language is composed of shapes, spaces, colors, and mechanisms. As a communication designer, I am intrigued by the infinite possibilities this space offers.

Humans are *Homo narrans*. who communicate, perceive, and engage in social interactions through storytelling. Storytelling is not just a mode of expression; it is a method to elicit emotions, awaken memories, foster participation, and inspire action.

Theater has long been a pioneer in immersive storytelling, bringing audiences closer to the heart of the narrative. Immersive theater, in particular, blurs the line between spectator and participant, transforming the traditional theater experience. This transformation is what drives

my exploration into stage design. By integrating modern aesthetics and digital innovations, I aim to develop new frameworks for understanding and applying digital tools in stage design, enhancing the immersive and interactive nature of theatrical experiences.

01 Introduction

Overview of Thesis

In discussing the art of stage, I would like to begin with its nomenclature. In Chinese, the term for scenography resembles the 'art of the stage,' yet this discipline has been evolving constantly— from stage decoration, scene design, and set design to stage design, and then to scenography. By 2011, the Prague Quadrennial shifted its focus to 'performance design,' continually redefining the scope of stage performance design. Such changes reflect shifts in cultural narratives, technological advancements, artistic expressions, and the evolving relationship between audiences and performances.[2]

With the advent of technology and the popularity of digital techniques, creating environments that engage more sensory experiences has become possible, further blurring the boundaries between different aspects of stage design.

This paper aims to focus on the transformation of stage scenery over the years under the influence of modern aesthetics and digital innovations, exploring broader possibilities.

By integrating the philosophy, technology, and aesthetics of modern stage scenery, this study attempts to discuss a new framework for understanding and applying digital tools in stage design. Through this exploration, it will delve deeper into the constantly changing landscape of theatrical design, where the boundaries between the real and virtual, the visible and invisible, are increasingly blurred.
To achieve this goal, the paper will first chronologically outline the development of stage design, analyze the integration of digital technologies in scenic design, and explore the interplay between stage design and audience perception and interaction.

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[2] Hann, R. (2020). NOTES ON BEYOND SCENOGRAPHY. *Cena*, *31*, 27–33. https://doi.org/10.22456/2236-3254.103570

Finally, I will attempt to develop a conceptual framework that addresses the unique demands of contemporary scenography.

Research Objectives

The primary objective of this research is to chronicle the evolution of stage design, providing a comprehensive historical overview from traditional stage decoration to contemporary scenography, and highlighting key milestones and shifts in practices and terminology.

This study aims to analyze how modern digital tools and techniques have been integrated into scenic design, examining their impact on the creative process and outcomes. Additionally, it seeks to explore the interplay between stage design and audience perception, focusing on how contemporary scenography enhances audience engagement and interaction through digital innovations.

By developing a new theoretical model that integrates modern aesthetics, digital innovations, and philosophical underpinnings of stage design, the research aims to propose practical applications for current and future stage designers.

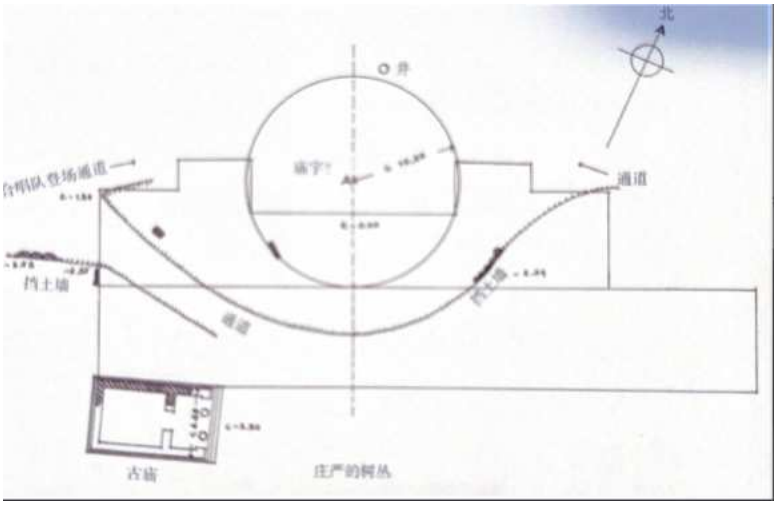
Furthermore, it will examine how modern stage design blurs the boundaries between real and virtual, visible and invisible elements, and analyze the implications of this blurring on the overall theatrical experience.

Through these objectives, the study aims to contribute to a deeper understanding of the dynamic and transformative nature of stage design in the digital age, offering new insights and practical guidelines for practitioners in the field.

02 Historical Development of Stage Design

Early concepts and evolution Ancient Greece and Roma

Ancient Greece and Rome are the birthplaces of Western theater, and their scenic designs not only witnessed the cultural prosperity of the time but also laid a solid foundation for the development of stage art in later periods. The scenic design of Greek theaters is characterized by simplicity and symbolism, primarily using natural landscapes and simple props to convey the background and atmosphere of the drama. Greek theaters were typically built on hillsides, utilizing the natural terrain to form the seating area (Theatron), with the stage (Orchestra) located on the flat ground below the seating area, and the backstage (Skene) serving as a dressing and props storage area for actors. Natural landscapes such as hills and the sky were used as backdrops to enhance the realism of the drama, while simple props like columns and altars helped the audience understand the background of the play.[3]



[3] Oscar G. Brockett, Margaret Mitchell, & Linda Hardberger. (2016). *Making the Scene: A History of Stage Design and Technology in Europe and the United States* (First Edition). China Theatre Press.

Figure 1 A conjectural plan of the oldest theater in the district of Eleuthera Dionysus in Athens. Quoted from Ernst Robert Fiechter, 《Ancient Greek Theater》

Additionally, the Greeks used painted backdrops (Pinakes) as fixed backgrounds, which gradually became more sophisticated in style and content as drama evolved. The content of these backdrops expanded from simple architectural depictions to complex landscapes, providing rich visual layers.[4]

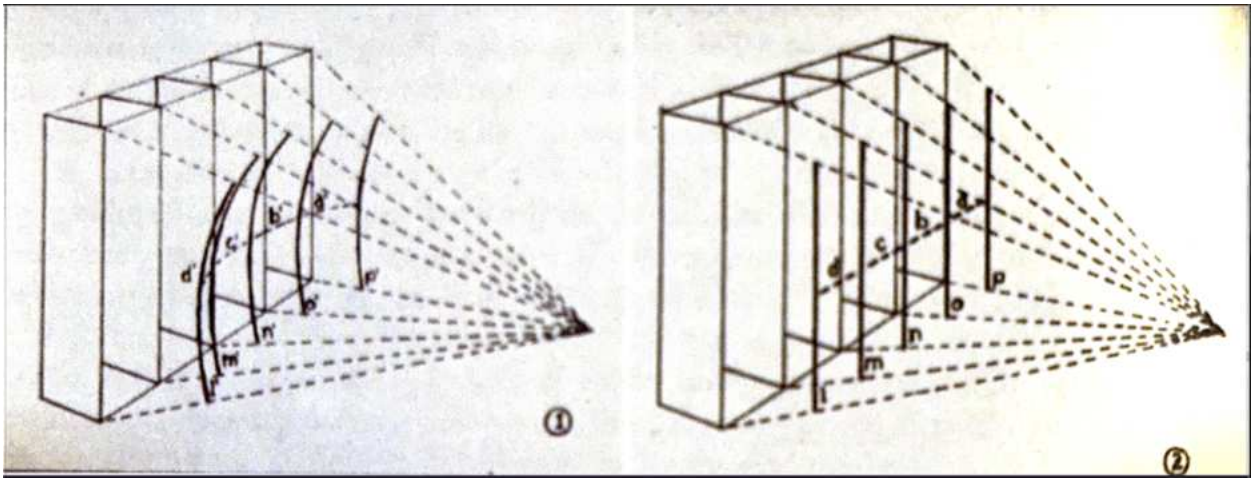


*Figure 2Comparison of perspective views between ancient and Renaissance periods. The left shows the ancient perspective system, featuring a curved image plane. Quoted from A.M.G. Little, "Perspective and Scenic Painting," *Art Bulletin*, Vol. 19, No. 3 (Sept. 1937), pp. 487-495, fig. 9.*

Mechanical devices such as the Deus Ex Machina were used to raise or lower divine characters, further enhancing the dramatic effect.[5] This device made the entrances and exits of divine characters mysterious and theatrical, greatly enriching the expressiveness of Greek drama.

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[4] Pinakes. (n.d.). In *THE ANCIENT THEATRE ARCHIVE*. https://ancienttheatrearchive.com/glossary-term/pinakes-%cf%80%ce%af%ce %bd%ce%b1%ce%ba%ce%b5%cf%82/

[5] Oscar G. Brockett, Margaret Mitchell, & Linda Hardberger. (2016). *Making the Scene: A History of Stage Design and Technology in Europe and the United States* (First Edition). China Theatre Press.

Roman theater scenic design expanded and innovated upon the Greek foundations, placing greater emphasis on grandeur and diversity in scenery. Roman theaters were independent structures, usually located in city centers, featuring larger scales and more complex structures.[6] The seating area (Cavea) surrounded the stage (Pulpitum) in a circular ar- management, and the background wall (Scaenae Frons) was elaborately decorated, often using multi-tiered structures and arch designs

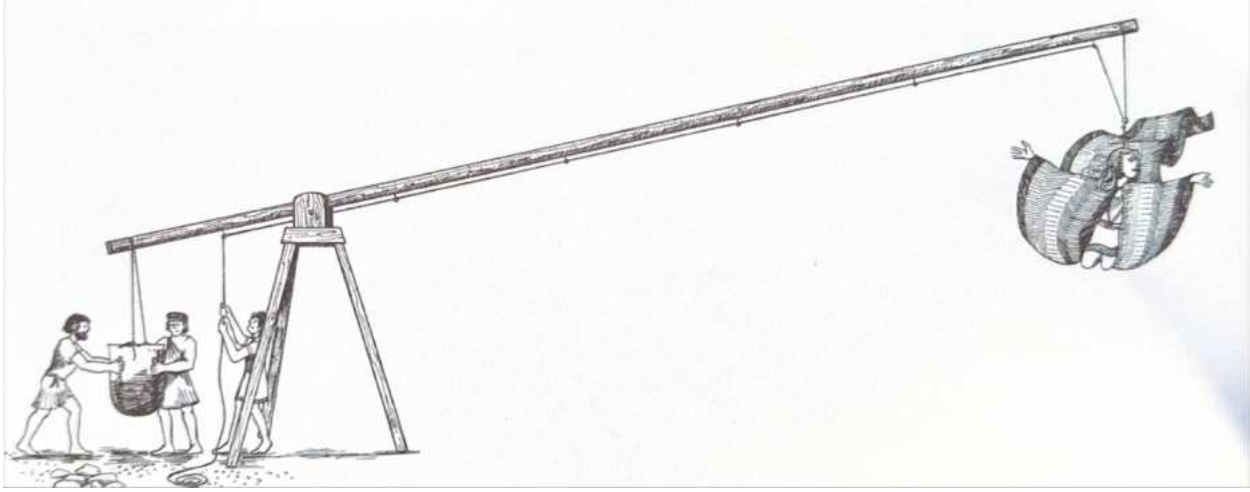


Figure 3 Ashby's conceptual diagram of stage machinery. The stage machinery achieves the effect of rising or falling by moving counterweights up and down. Actors are attached to two ropes. Artist's concept by Ian Atkinson. 《New Perspectives on Greek Drama》 Iowa City: University of Iowa Press, 1999, p. 85. Image provided by Clifford Ashby.

[6] Same as above

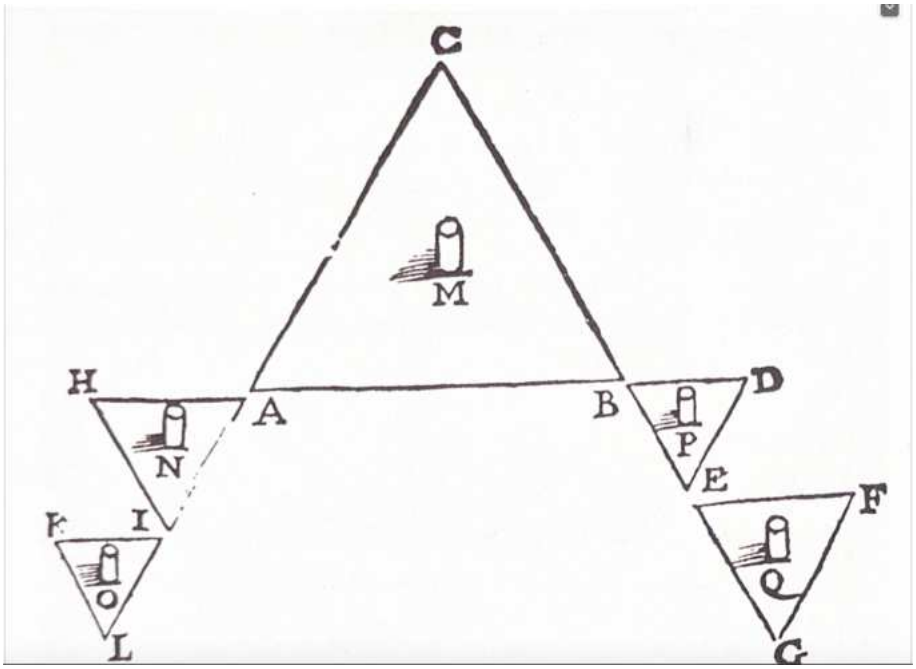


Figure 4Vignola's rotating triangular scenery design, adopting 16th-century concepts. Each of the three faces of the triangular scenery is painted with a different scene, which can be changed by rotating the central axis. Quoted from Vignola, 《The Two Rules of Practical Perspective》 (1583).

The scenic design of Roman theaters included lavish background walls, temporary scenery set up in public places like squares, and the use of complex props such as revolving scenery boards (Periaktoi) for quick scene changes. The Scaenae Frons served not only as a background but was often adorned with carvings of mythological scenes and historical events, serving educational and aesthetic functions.

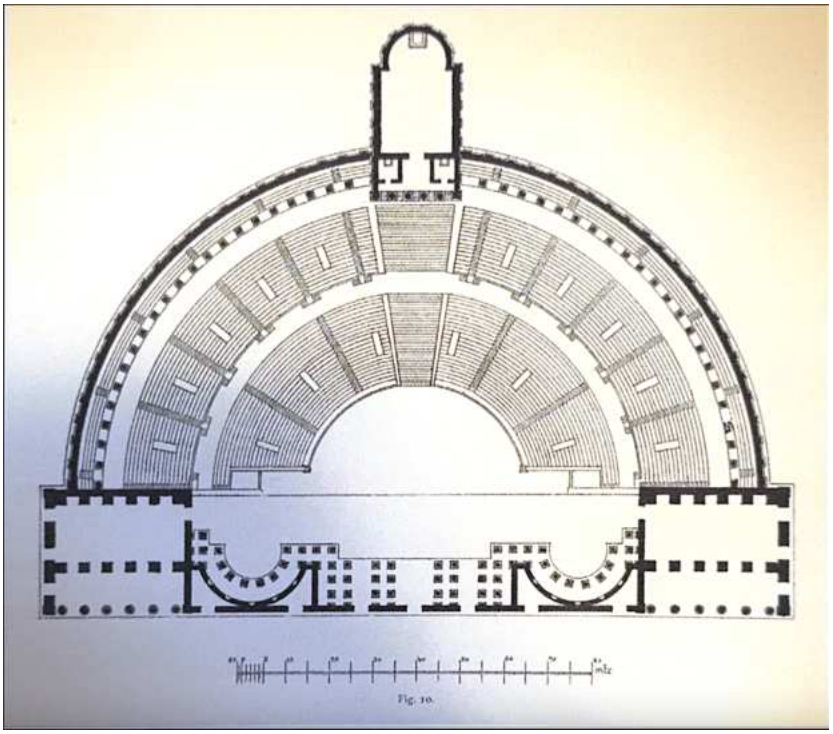


*Figure 5 Reconstruction of the first permanent theater in Rome. Quoted from Andreas Streit, *Theater Studies - Classical and Modern Architecture* (Vienna, 1903), p. 49, fig. 10. Historic Theater. Provided by Widener Library, Harvard University Library, collection number Thr1150,21F*

Mechanical devices such as stage elevators and rotating stages were widely used to enhance theatrical expressiveness and multi-level scenery and dynamic changes created more vivid theatrical scenes

Figure 6Ruins of the Flavian Amphitheater, Santa Maria Capua Vetere, 2nd century BC. Note the underground passages. Photo © Alinari/New York, 《Art Resource》

Roman theaters pursued grandeur in scenery and used complex mechanical devices to achieve quick scene transitions, enhancing the rhythm and spectacle of the drama. The use of intricate props and scenic designs allowed Roman theaters to recreate complex battle scenes, mythological stories, and epic narratives, immersing the audience in the experience.

Greek theater scenic design utilized natural terrain, while Roman the- aters were independent structures, reflecting differences in architectural technology and audience requirements. Greek scenery was simple and highly symbolic, whereas Roman scenery was lavish and diverse, focusing on visual impact. Greek theaters primarily relied on natural landscapes and simple props to convey the plot, while Roman theaters enhanced the dramatic effect through luxurious scenery and complex mechanical devices. Roman theater scenic design extensively used mechanical devices and complex props to enhance theatrical performance, including revolving scenery boards (Periaktoi), stage elevators, and rotating stages, making scenic design highly variable and flexible to meet the needs of different types of drama. The differences in scenic design reflect not only cultural and technological distinctions but also the evolution of theatrical art in different historical periods

Middle age

Medieval set design played a significant role in the development of theatrical arts. This paper aims to explore the characteristics, evolution, and influence of set design during this period on modern stage design. The medieval period (approximately the 5th to 15th centuries) was a time of strong religious faith and social upheaval. The plays of this era were primarily religious dramas, such as mystery plays and miracle plays, often performed in churches or outdoor spaces. Set design was crucial in these plays, helping the audience better understand and experience the plot.

Medieval set design was characterized by its simplicity and symbolic representation. Due to limited resources, designers often used abstract and symbolic methods to present scenes. For example, simple props and arrangements were used to suggest heaven, hell, or holy places. This minimalist approach not only reduced production costs but also enhanced the audience's imagination and engagement.

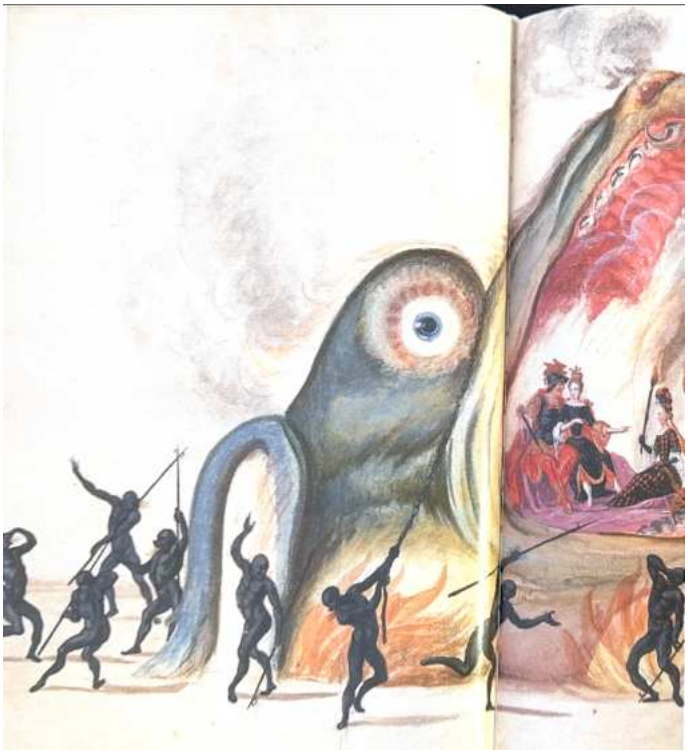


Figure 7 The Mouth of Hell Scene Illustration. ***Donated by the Tobin Foundation. Photographer: Mike Smith.***

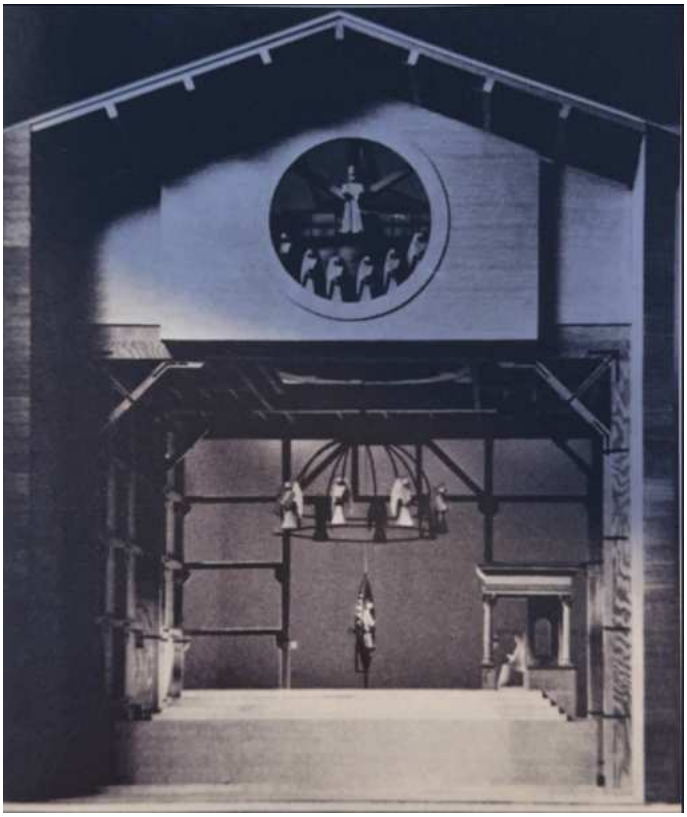


Figure 8 Hypothetical diagram of the complete mechanical apparatus used for the Annunciation to the Shepherds scene in Piazza San Felice. Wooden model made by Ludovico and Cesare, 1975

Heavenly scenes were typically depicted with bright, white colors and symbols of holiness, while hellish scenes featured dark, fiery elements to represent evil and punishment. Additionally, medieval set design reflected the social hierarchy and moral values of the time. For instance, the decor of palaces and churches was usually solemn and grand, symbolizing power and authority, while the settings of slums and battlefields were simple and rough, highlighting the hardships and turmoil of the lower classes.

The technical methods of medieval set design were relatively simple but highly creative. Common techniques included flat scenery, three-dimensional props, and mechanical devices. Flat scenery involved using paintings or carvings on wooden panels to display backgrounds, while three-dimensional props were made from materials like wood and fabric to create objects such as crosses and altars. To enhance theatrical effects, some complex productions used simple mechanical devices like lifts and rotating stages. [7]

[7] Bay, Howard , Barker, Clive and Izenour, George C.. (2024). Theatre. In *Encyclopedia Britannica*. https://www.britannica.com/art/theater-building.

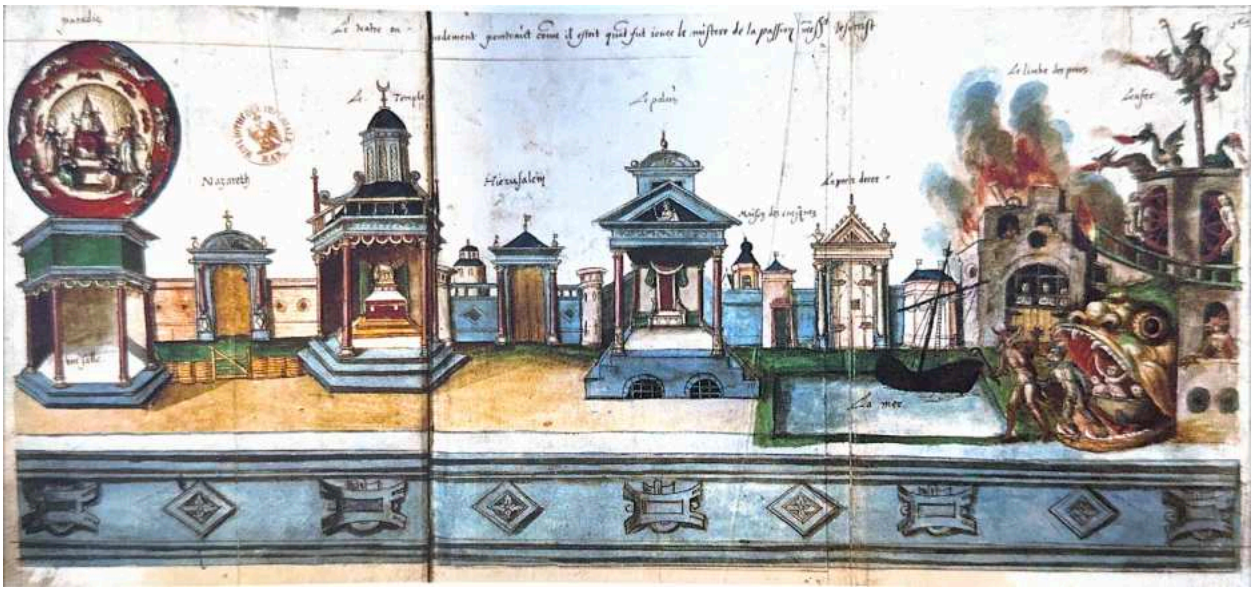


Figure 9 Passion Play performed in Valenciennes, France in 1547. Note the Heaven scene point on the left and the Hell scene point (with the Mouth of Hell) on the right. The central scene point changes with each performance as needed. The entire play was performed over 25 days.
Western Manuscript, French 12536, numbered FOL IV-2RV. Held by the National Library of France.

Although these techniques were primitive, they played a crucial role in enriching the performance and visual appeal of the plays. Medieval set design was heavily influenced by religious culture. During this period, the church was not only the center of religious activities but also a major promoter of cultural arts. Plays served as tools for religious propaganda, and their set designs naturally carried a strong religious flavor. [8]

Church interiors were often the main venues for theatrical performances, with designers utilizing the structure and decor of the church to enhance the religious atmosphere of the plays. Medieval set design served not only religious purposes but also reflected social hierarchies and moral codes. The residences of nobles and clergy were typically luxuriously decorated to display their status and power, while the settings for

[8] Oscar G. Brockett Scenery Production: History of Stage Design and Technology in Europe and America February 1, 2010

commoners were modest or even impoverished, revealing the vast social disparities of the time.

Medieval mechanical devices have inspired the development of modern stage technology. Today's stage technology, including elevators, rotating stages, and complex lighting effects, has greatly innovated and expand- ed upon the basic mechanical concepts from medieval times.

Renaissance Time

During the Renaissance, the application of perspective in painting and architecture greatly influenced scenic design. Filippo Brunelleschi was a pivotal figure in this technique. Around 1425, he invented linear perspective, which allowed paintings and scenes to present realistic three-dimensional effects on a two-dimensional surface.

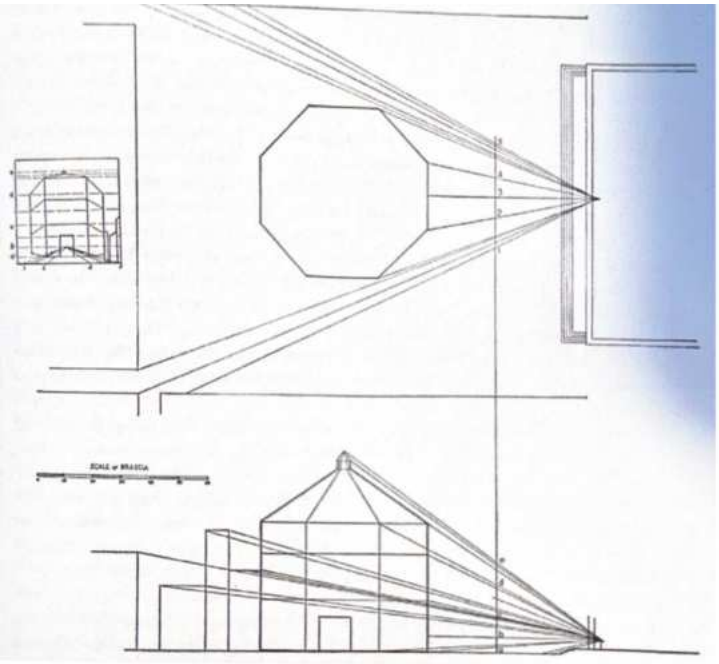


Figure 10Perspective view of the Church of San Massacio Novella, Florence, Italy, designed by Brunelleschi and restored by Clausmire. Quoted from Richard, Lorenzo Ghiber- ti (Princeton, NJ: Princeton University Press, 1956)

This technique was quickly adopted in stage design, enabling audiences to perceive a more realistic sense of depth and space in theatrical scenes.

The frescoes “Holy Trinity” and “The Tribute Money” by Masaccio are outstanding early examples of perspective application (Figure 11).

Figure 11Masaccio’s painting The Tribute Money. This is one of the earliest known paintings to use atmospheric perspective. Florence, Italy, Church of Santa Maria del Carmine, Brancacci Chapel. Photo © Scala/New York, Art Resource

Through the ingenious use of perspective, these works provided significant references and inspiration for later scenic designers. Renaissance scenic designers began to use similar perspectives on stage, making the backgrounds look more realistic and three-dimensional (Figure 12).

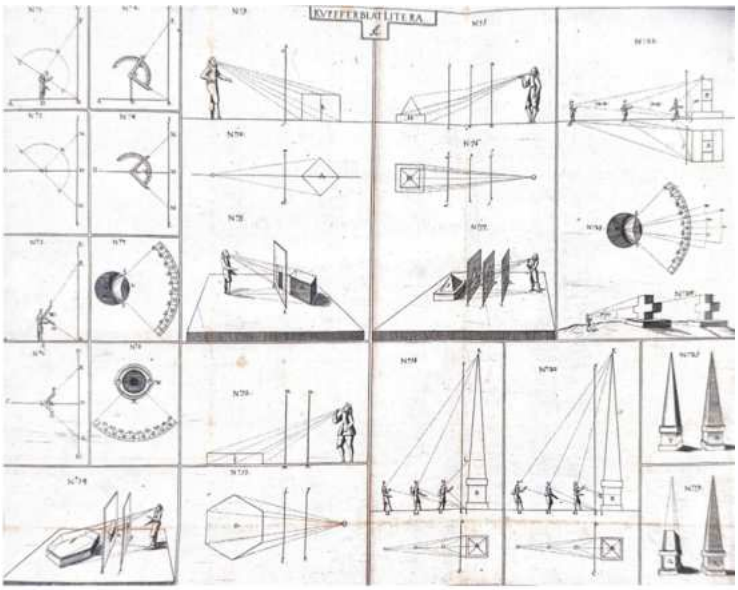


Figure 12Studies on one-point, two-point, and three-point perspective by Leon Battista Alberti (based on Alberti's works).Quoted from Andreas Albrecht and Hans Troschel, Studies on Andrea Alberti: The First Book on Geometric Perspective (Nuremberg, 1623)

During the Renaissance, stage machinery saw significant development and innovation. Leon Battista Alberti detailed how to apply perspective in architecture in his treatise "De re aedificatoria," and this theory was also applied to the design of stage machinery. Renaissance theaters began to use complex mechanical devices, such as rotating shutters (Figure 13) and the chariot-and-pole system (Figure 14), to quickly change scenes and create special effects.[9]

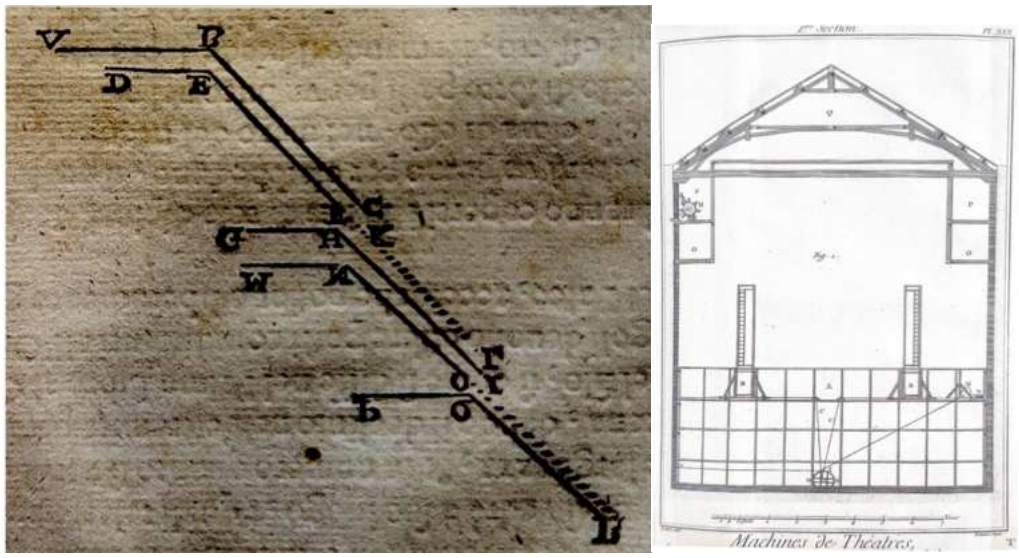


Figure 13 8th-century scenery principle diagram by Diderot shows how the wagon and pole system moves side scenes during changes. This method is similar to that described by Motta. Scenery fixed to wagon "B". Quoted from Denis Diderot and Jean le Rond d'Alembert, Encyclopédie (Paris: Briasson, 1751), collection-number TL1984.1.291. McNay Art Museum Collection, Robert L.B. Tobin donation. Photographer: Mike Smith

Figure 14 Scene-changing method introduced by Sabatini, achieved by sliding blinds. Quoted from Nicola Sabatini, Manual on Scenery and Theater Machinery Production (Ravenna, Italy, 1638), collection number 1984.1.281.1

[9] Arnoia et al. (2002). *Western Theatrical Art* (First edition). Shanghai Culture Publishing House.

Nicola Sabbatini introduced some complex stage machinery designs in his "Manual for Constructing Theatrical Scenes and Machines," such as devices that allowed rapid scene changes (Figure 2.95). These devices made stage design more flexible and variable, bringing unprecedented visual experiences to the audience. [10]

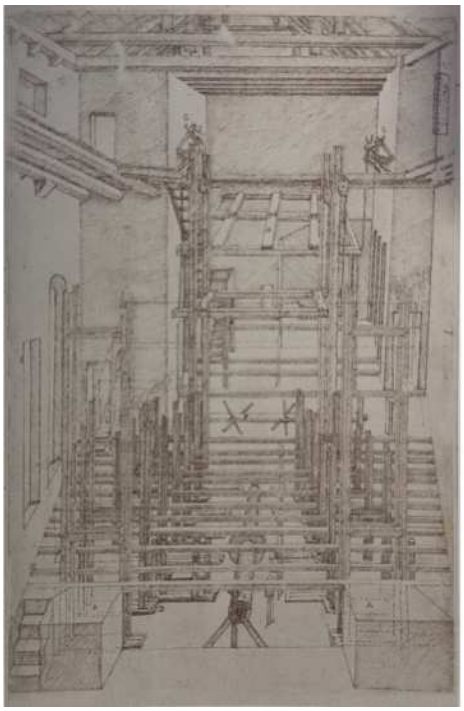


Figure 16 Unadorned brush scenery machinery, used for quick scene changes. Note the large elements below.Parma, Latona Library Collection

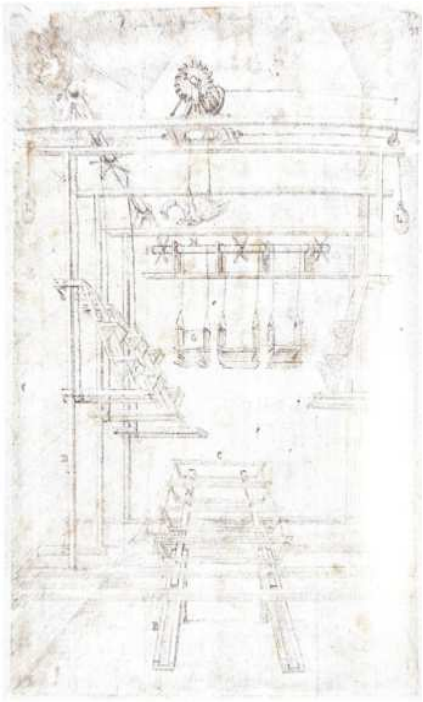
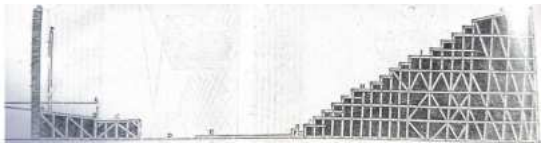


Figure 15 Unadorned flying machinery, Jupiter's swan "flying across the stage". When the machine is fully lowered, the lower part stops on the stage floor, and when the machine is activated, it covers the stage.

[10] Oscar G. Brockett, Margaret Mitchell, & Linda Hardberger. (2016). *Making the Scene: A History of Stage Design and Technology in Europe and the United States* (First Edition). China Theatre Press.

Renaissance scenic designers focused on realism and aesthetic effects in scenes. They used painting techniques to make stage backgrounds look like real environments. For example, Giorgio Vasari used complex painting methods in his works to make the audience feel as if they were in a real setting (Figure 2.96).



2.97 Fadenbach's version of comedy scenery. The left shows the first scene of The House of Comedy, the right shows the second scene: a pleasant garden.
Quoted from Joseph Fadenbach, Entertainment Architecture, collection-number TL1984.1.719. McNay Art Museum Collection, Robert L.B. Tobin donation. Photographer: Mike Smith.

2.98 Sectional view of the hall stage drawn by Serlio.
Quoted from Sebastiano Serlio, Simon Stafford, and Robert Parker, The First Book of Architecture (London: Robert Parker, 1611), collection-number TL.1984.1.299. McNay Art Museum Collection, Robert L.B. Tobin donation. Photographer: Mike Smith.

Painters commonly used materials like plaster, adhesives, and pigments to create lifelike stage backgrounds (Figure 2.97). Additionally, Renaissance scenic design emphasized the use of color, contrast, and harmony to enhance the stage effect (Figure 2.98).

The scenic design of the Renaissance had a profound impact on later generations. The application of perspective and the innovation of stage machinery not only enhanced the expressiveness of drama but also laid the foundation for modern stage design (Figure 2.99). Renaissance scenic designers, with their extraordinary creativity and

techniques, provided valuable experiences and inspiration for later artists and designers.[11]

Late 18th

In the late 18th century, European theater set design underwent profound changes. These changes not only reflected the progress in art and culture but also mirrored the social, political, and technological advancements of the time. This paper explores the main characteristics of set design during this period, the key figures involved, and its impact on theater and audiences.

The Conflict Between Neoclassicism and Romanticism

In the late 18th century, set design and theater witnessed a conflict between Neoclassicism and Romanticism. Neoclassicism emphasized imitation of Greek and Roman art, valuing symmetry and rigor, with figures like Johann Winckelmann as its proponents.

2.82 Scene engraving from Wallenstein, drawn by Chris- tian Mu ller, Weimar, 1799. Source: Friedrich Boltzmann, Schiller (Leipzig: E.A. See- mann, 1901). 203. Widener Library, Harvard University Library Collection,

[11] Oscar G. Brockett, Margaret Mitchell, & Linda Hardberger. (2016). *Making the Scene: A History of Stage Design and Technology in Europe and the United States* (First Edition). China Theatre Press.

In contrast, Romanticism focused on emotion and individuality, seeking natural and realistic expression. This dichotomy was vividly reflected in set design, where designers had to balance the aesthetic demands of Neoclassicism with the emotional expression sought by Romanticism. (Oscar G. Brockett et al., 2016)[12]

Figure 17 83 Illustration of the camp from Schiller's Wallenstein, 1798. Source: Friedrich Boltzmann, Schiller (Leipzig: E.A. Seemann, 1901). 203. Widener Library, Harvard University Library Collection

Figure 18 The first and last scenes of The Bride of Messina, 1803. Source: Friedrich Boltzmann, Schiller (Leipzig: E.A. Seemann, 1901). 203. Widener Library, Harvard University Library Collection

The Rise of Neoclassicism and Romanticism

In Germany, Neoclassicism and Romanticism flourished rapidly under the influence of Johann Wolfgang von Goethe and Friedrich Schiller. Goethe's plays, such as "Faust," were deeply influenced by Neoclassicism, while Schiller's "Wallenstein" trilogy

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[12] Oscar G. Brockett, Margaret Mitchell, & Linda Hardberger. (2016). Making the Scene: A History of Stage Design and Technology in Europe and the United States (First Edition). China Theatre Press.

displayed a tendency towards Romanticism. Their works were not only significant in literature but also had a profound impact on set design.[13]

Figure 20 Fourth act of Schiller's The Maid of Orleans, the coronation scene, drawn by Yves Lante, 1801, with scenery designed by Bartolomeo Verona.

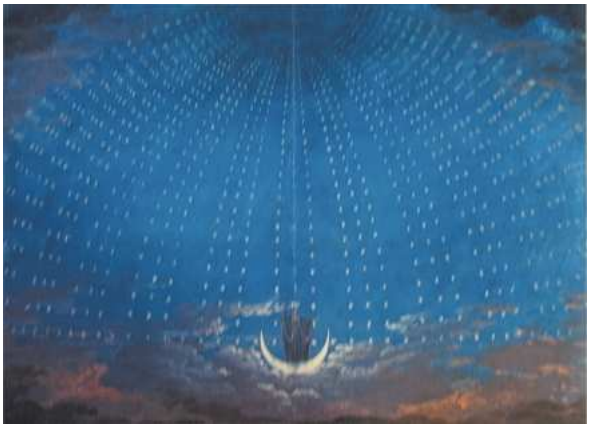

Figure 19 First act of Mozart's The Magic Flute with the "Queen of the Night" starlit hall scenery, designed by Karl Friedrich Schinkel, 1815.

Romanticism's emphasis on individuality and emotion was fully reflected in set design. Designers like Karl Friedrich Schinkel created complex architectural backgrounds and natural scenes to evoke strong emotional atmospheres. His designs not only paid attention to detail but also used lighting effects to enhance the dramatic impact (Figure 19). For example, in the set design for "The Magic Flute," he combined a starry sky backdrop with a fantastical stage effect, creating a world full of mystery and fantasy. (Oscar G. Brockett et al., 2016)[14]

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[13] Oscar G. Brockett, Margaret Mitchell, & Linda Hardberger. (2016). Making the Scene: A History of Stage Design and Technology in Europe and the United States (First Edition). China Theatre Press.

[14] Same as above

Figure 21 First act of Mozart's The Magic Flute with the "Queen of the Night" scenery, designed by Simon Quaglio, 1818. New York, Morgan Library Collection. Donated by Mrs. Donald Onslager, 1982. 1982.75:524.

By the late 18th century, mechanization and innovative technologies began to play significant roles in set design. Mechanics like Joseph Baltha-Zar Bonet de Treyches designed stage machinery that enabled complex set transitions and dynamic effects. The introduction of revolving stages and movable sets allowed audiences to experience different scenes in a short time, greatly enriching the theatrical presentation.

The Revolutionary Change of Gas Lighting

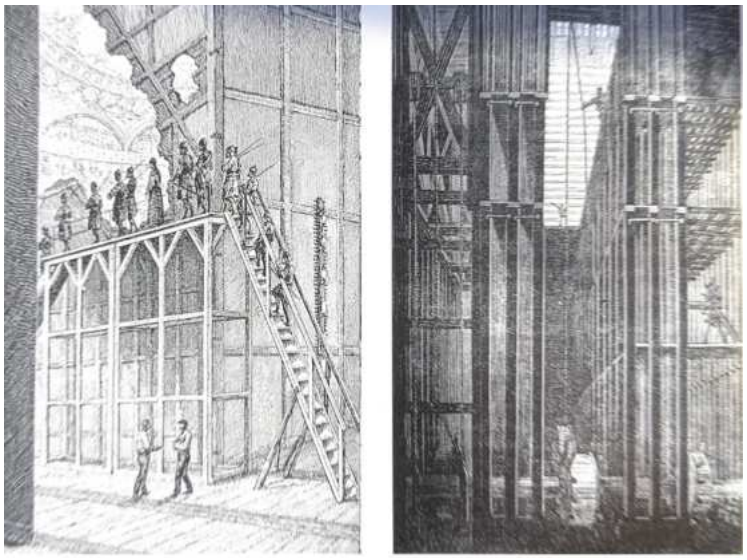

Figure 22 Practical scenery representing cliffs or high places.

(right) A trapdoor opening from above below the stage floor. Quoted from J. Moine, Behind the Theater: Mechanics and Decoration, Miracles Library (Paris: Hachette, 1875), collection number TL1984.1.1077. McNay Art Museum Collection, Robert L.B. Tobin donation. Photographer: Mike Smith.

In the early 19th century, the advent of gas lighting technology revolutionized the appearance of theater sets. Gas lamps provided stronger light sources, allowing for greater freedom in using lighting effects to enhance the visual impact of set designs. Designers adjusted the bright- ness and color of light sources to create realistic scene effects, further improving the audience's viewing experience.(Arnoia et al., 2002)[15]

[15] *Arnold, A. (2021, March 30). Staging the Future Keynote: Where Are You Now? Staging the Future featured as part of UAL's Research Season 2021. https://www.youtube.com/watch?v=Lpv_S_MEXRo*

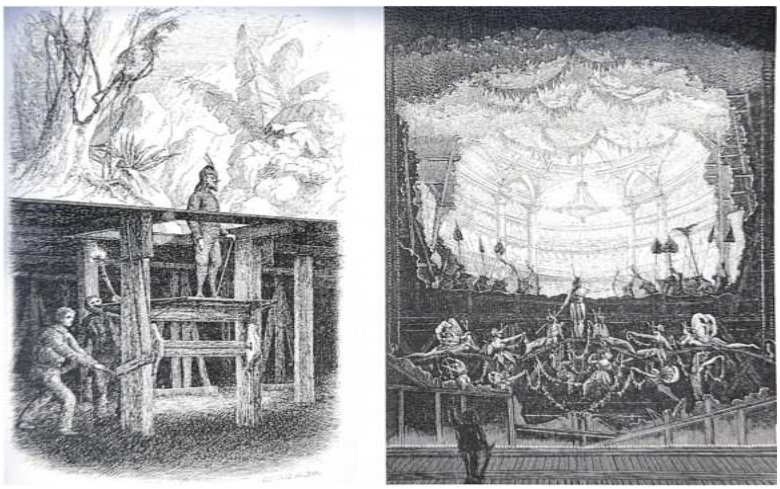

Figure 23 Stagehands raising a vertically moving trapdoor. Quoted from Arthur Bogan, Historical Dictionary of Picturesque Theater and Relat- ed Arts: Poetry, Music, Dance, Mime, Decoration, Costume, Machinery, Scenery, Public Festivals, Pleasures, Carousels, Competitions (Paris: Firmin Didot, 1885), collection number TL1984.1.1148. McNay Art Museum Collection, Robert L.B. Tobin donation. Photographer: Mike Smith.

(Right)Scenery suspended from below rising upwards when viewed from the back of the stage.
Quoted from J. Moine, Behind the Theater: Mechanics and Decoration, Miracles Li- brary (Paris: Hachette, 1875), collection number TL1984.1.1077. McNay Art Museum Collection, Robert L.B. Tobin donation. Photographer: Mike Smith.

Panoramas and realistic models also began to be used in set design in the late 18th century. This technology, through large-scale background paintings and three-dimensional models, created immersive effects that made audiences feel as though they were in real environments.

Figure 24 Fourth act scenery of Eumenides designed by Cicero.

For example, Daguerre's panoramas and Pierre Prévost's realistic models achieved great success in theaters of the time, significantly enhancing the visual impact of plays.[16]

[16] Oscar G. Brockett, Margaret Mitchell, & Linda Hardberger. (2016). *Making the Scene: A History of Stage Design and Technology in Europe and the United States* (First Edition). China Theatre Press.

Figure 25 Second act scenery of Ildegonda, designed by Daguerre, written by Victor Ducange, French Comic Opera, Paris, 1822.Curtains used to cover the hanging space at the back of the stage.

The set design of the late 18th century evolved continuously amidst the shifts between Neoclassicism and Romanticism, while the introduction of mechanization and lighting technologies brought revolutionary changes to stage effects. In their pursuit of aesthetics and technological innovation, designers constantly challenged themselves, creating one visual and emotional miracle after another. The set design of this period not only enriched the expressive means of theatrical art but also laid the foundation for future stage design, having a far-reaching impact on the history of art.

Figure 26 Second act scenery of Ildegonda, designed by Daguerre, written by Victor Ducange, French Comic Opera, Paris, 1822.

Figure 2776 Model diagram of realistic scenery designed by Daguerre, illuminated from the front, depicting daytime in an Alpine village, 1836.

Realism and Naturalism in Set Design

From the late 19th century to the early 20th century, stage design in Europe and America underwent significant transformations. As social and cultural environments changed, realism and naturalism in set design gradually became mainstream. These styles not only reflected the social and artistic trends of the time but also influenced the development of stage art in later years.

Realism originated in the mid-19th century, emphasizing precise imitation of real life. The main characteristic of realistic set design is the meticulous reproduction of reality, aiming to immerse the audience in a true-to-life environment. Charles Kean (1811-1868) was a significant figure in this period, leading the historical accuracy in set design from 1850 to 1859. Kean emphasized historical and regional authenticity, making sets more realistic through detailed research and reproduction.

A classic example of realistic set design is the set for Shakespeare's "Macbeth" designed by Kean in 1855. This set featured a medieval Scottish castle background, creating a rich historical atmosphere through precise architectural details and the recreation of natural environments. Additionally, the battlefield set in "Waterloo" from

1852 is another masterpiece of realistic set design, transporting the audience to a real battle scene through a vivid reproduction of the battlefield environment.[17]

Naturalism is an evolution of realism, with its theoretical foundations stemming from the scientific and philosophical thoughts of the late 19th century. Naturalistic set design not only seeks realistic appearances but also emphasizes the impact of the environment on human behavior and destiny. André Antoine (1858-1943) was a significant promoter of naturalistic stage design, pioneering the approach with his Théatre Libre founded in 1887, which reproduced real-life scenes with realistic sets.[18]

Naturalistic set design highlights the authenticity of the environment and the richness of detail. For instance, in Henrik Ibsen's "A Doll's House," the set design recreated a typical 19th-century Norwegian middle-class living room, making the audience feel the dense atmosphere of everyday life through detailed depiction of furniture, decor, and ornaments. Another example is Emile Zola's "Germinal," where the set design reproduced the underground working environment of miners, portraying the real life of the working class through realistic mine structures and the daily activities of miners.

From the late 19th century to the early 20th century, significant changes in stage set design occurred due to the Industrial Revolution and advances in electrical technology. The invention of electric lights made stage lighting more flexible and varied, offering new possibilities for set design. In 1890, London's Richmond Theatre used electric lighting for the first time on stage, combining different lighting effects to make the set more three-dimensional and realistic.

Realistic and naturalistic set design had a profound impact on the theater stage at the time and laid the foundation for the development of modern stage art. Modern set designers inherit the traditions of realism and naturalism while incorporating modern

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[17] Oscar G. Brockett, Margaret Mitchell, & Linda Hardberger. (2016). *Making the Scene: A History of Stage Design and Technology in Europe and the United States* (First Edition). China Theatre Press.

[18] Arnoia et al. (2002). *Western Theatrical Art* (First edition). Shanghai Culture Publishing House.

technologies and materials, continuously innovating to create more diverse and vibrant stage effects.

03 Modern Scenography

Contemporary Trends in Stage Design

Postmodern design style may be difficult to categorize as a single style, but its characteristics can still be recognized.

First, a large number of metaphors are used on the stage. Secondly, is the concept mentioned by Adolphe Appi organic unity) stage design, Postmodern design often introduces meta-narratives and art, demonstrating a dual self-awareness. Between realism and abstract art, artists face challenges in the realization of stage art. This is particularly evident in the works of Adolphe Appia and Edward Gordon Craig, who capture the essence of stage design through the mind's eye.[19] The ballet by Igor Stravinsky, demonstrates the blend of abstract forms and vibrant colors that were innovative for its time.

Figure 28 Sketch for the ballet by Igor Stravinsky: Fireworks (Feu d'artifice)Giacomo Balla https://www.wikiart.org/en/ giacomo-balla/sketch-for- the-ballet-by-igor-stravin- sky-fireworks-feu-d-arti- fice-1915-1

[19] Arnold Aronson. (1991). *Postmodern Design* (pp. 1-13 (13 pages)) [Theatre Journal].

At the end of the 19th century, the artistic revolution was changing in various aspects, profoundly impacting culture. Drama, as an art form, also underwent a profound evolution. The evolution of stage design is not simply the result of developments in other arts. Although each art form has its own uniqueness, there are no invisible barriers that strictly divide them. Stage design, due to its strong interdisciplinary nature, participates in the evolution of visual arts, as well as in propaganda tools, television, film, literature, music, and even political interference. The creation of drama cannot be separated from political allegory, and drama also relies on the economy. If poverty is a virtue, then drama is often forced to accept this virtue.[20]

The next image, "The Creation of the World" by Fernand Léger is an excellent example of how interdisciplinary influences shape stage design, blending elements of Cubism and Futurism.

Figure 29 The Creation of the World
Fernand Leger The Creation of the World
Fernand Leger

https://www.wiki- art.org/en/fer- nand-leger/the-cre- ation-of-the-world

To interpret the world through new principles or rules of painting. Our interest lies not in depicting the surface phenomena of trees, rivers, or roses, but in revealing their internal growth, surge, and bloom.

---------- Josef Svobda

[20] Lotker, S., & Gough, R. (2013). On Scenography: Editorial. *Performance Research*, *18*(3), 3–6. https://doi.org/10.1080/13528165.2013.818306

Researching any form of creation cannot be separated from the cultural and historical context, especially in the case of stage design, which is closely connected to culture. Stage design is an organized space, filled with various signs and symbols, shapes and objects, colors and materials. This setup creates a world that can capture the audience's attention and serves as a revelation. The set is not just a visual experience; when it stimulates the audience's emotions, it needs to be read and understood like a book. The audience grasps the meaning of the set and becomes its captive. This interaction illustrates the type of action and the function of stage design. Furthermore, the set must also reveal action and facilitate its unfolding.[21]

If a set designer were to design a piece, would he spend time thinking about its structure, themes, poetic qualities, and imagined world? For academic designers, the most important aspect is the location, and the author or consciousness makes no difference to them. Hugo wrote in the preface to "Cromwell": "Accurate locality is a primary factor of authenticity." Academic designers spend most of their time re-constructing and restoring scenes. They use academic painting techniques and perspective, extensively applying them on canvas, aiming for the audience to believe that everything on stage is real. At this time, set designers are more like craftsmen, manufacturers, who replicate and fill the stage with detailed original elements but do not create.

Such flat paintings interact with live actors in a three-dimensional space, combined with the intrusion of real props, making the stage appear fragmented. It is precisely because of these three-dimensional objects that the flat sets become ridiculous. Under such circumstances, it is impossible to discuss the integrity of stage art. Ac- tors interacting in three-dimensional space and the reality presented on flat sets lacks a holistic concept.[22]

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[21] Arnoia et al. (2002). *Western Theatrical Art* (First edition). Shanghai Culture Publishing House.

[22] Same as above

Some designers, proficient in archaeology and geography, merely bring these curious anecdotes to the stage without engaging in discussions and expressions of the script. This trend leads to decorative theater, stifling the essence of drama.

Against this trend, Wagner and Craig proposed resistance. Wagner envisioned the idea of "Gesamtkunstwerk" (total artwork), an art form that combines music, poetry, performance, architecture, and "landscape painting." Craig emphasized that each theatrical performance is a collaborative effort between actors and the audience. From a theatrical standpoint, the good and beneficial aspects establish direct communication between actors and the audience, while the harmful aspects are the barriers to this communication. This view is strikingly similar to postmodern art's advocacy of shifting the foundation of art from the object to the transaction between the audience and the object.

"Let us ask ourselves what we really want to see in the theater. Beautiful pictures can be seen elsewhere, fortunately not fragmented; we can travel the world through photographs from the comfort of an armchair; literature uses the most moving scenes to inspire our imagination; few are so shallow as to not find beautiful landscapes in nature. No! We come to the theater to see dramatic action, which unfolds with characters on stage. Without them, there is no action. Therefore, the actor is the main element of the performance. It is he we want to see, from whom we seek the emotions we desire. Thus, it is necessary to base the performance on the actor's performance. To achieve this, everything on stage that conflicts with it must be eliminated."[23]

The origin of true modern stage design lies with Adolphe Appia and Edward Gordon Craig. Despite their different motivations, their responses to the naturalistic drama

[23] Same as above

were remarkably consistent. Adolphe Appia was a follower of Wagner, but he did not advocate for a Ge- samtkunstwerk built on the union or will of other arts. Instead, he sought a way to connect the various elements of a performance, maximizing the expressive power of drama.

For Appia, the main element on stage is the actor, and thus the set should be subordinate. The illusion should not be created by realistic sets. He believed that: "Stage design is an organized space, filled with various signs and symbols, shapes and objects, colors and materials. This setup creates a world that can capture the audience's attention and serves as a revelation. The set is not just a visual experience; when it stimulates the audience's emotions, it needs to be read and understood like a book. The audience grasps the meaning of the set and becomes its captive. This interaction illustrates the type of action and the function of stage design. Furthermore, the set must also reveal action and facilitate its unfolding."[24]

Appia needed a combination of three-dimensional spaces, coordinating the vertical sets with the actors' three-dimensionality. His sets required lighting, not just for illumination but to enhance the actors' movements. Appia sensed a mysterious connection between light and music, making lighting the visual counterpart of music. As a designer with an architectural background, Appia was more sensitive to volume, and his designs were monochromatic, while the actors were in color.

Mr. Craig excels in capturing the intrinsic meanings of language and theatrical scenes, surpassing the actors themselves in their actions on stage. With the simplest means, he magically conveys the sensations of almost any time and space, and even suggests various changes in characters' emotions through the scenery itself. ... The performance is Craig's extraordinary triumph. The full realization of his principles' success could potentially have immeasurable effects on European theater."

[24] Same as above

— <London Times>

Like Appia, Craig concluded that painters were intruders in theater; their talents held no value on stage, and he emphasized the potential of stage lighting. Craig's set language was more stylized and theatrical. He did not focus on the location of action itself but valued the symbolic meaning of drama. Using simple elements, he allowed the audience's imagination to roam freely. He also abandoned continuous scene changes, experimented with silent theater, and in 1907 designed famous screens. Craig's influence on stage design was significant, impacting many postmodern designers. He mentioned the imagery of the mind's eye: "The question here is not how to create distracting scenery, but how to create a place harmonizing with the poet's thoughts."[25]

The following design by Marc Chagall incorporates surreal elements, challenging the audience's perception and evoking a dreamlike atmosphere.

Figure 30 Finale Of the Ballet, ALEKO is a painting by Marc Chagall https://pixels.com/featured/finale-of-the-ballet-aleko-marc-chagall.html

[25] Arnold Aronson. (1991). *Postmodern Design* (pp. 1-13 (13 pages)) [Theatre Journal].

The current trend is to consider stage design as an integral part of the entire visual and auditory image that influences the audience. Since the early twentieth century, the function of stage scenery has undergone many changes, and in the last two decades, this evolution has become even more pronounced. The habit of language is deeply ingrained, and it is convenient to use the French word "decor." However, this word has become outdated, as it naturally connotes showiness, splendor, and decoration. Today, primarily in drama, but also involving ballet and opera, scenery has lost its strict function as mere decoration. The task of the set designer is no longer to adorn, embellish, or create a set of scenes for the play. Regardless of the vast stylistic differences, contemporary scenery has become an interpreter of drama and can be considered an "actor" communicating with the audience because it simultaneously directly or indirectly affects the audience's perceptions. Of course, scenery can still indicate the location of the action or contribute to creating aesthetically pleasing scenes according to the style of the performance. But primarily, the scenery embodies, enhances, or reveals the dramatic meaning of the work.[26]

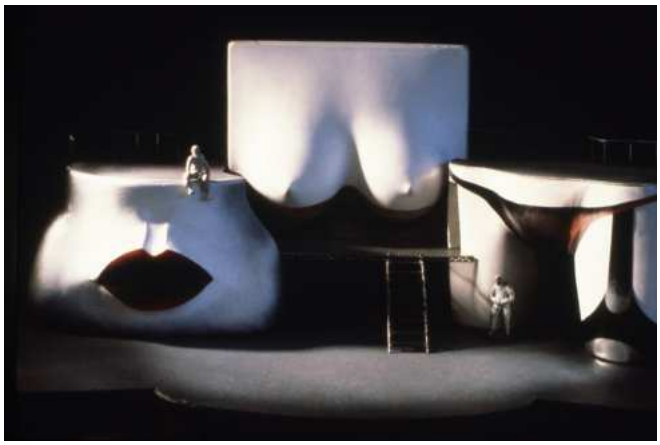

Figure 31 Maquette for Die Soldaten (The Soldiers) Ralph Koltai, British, born Germany,

https://collection.mcnayart.org/objects/13266/maquette-for-die-soldaten- the-soldiers

[26] Arnoia et al. (2002). *Western Theatrical Art* (First edition). Shanghai Culture Publishing House.

Figure 32 Sundenlly Last summer, Ralph Koltai, Nottingham 1998 Sundenlly Last summer, Ralph Koltai, Nottingham 1998 https://www.slideshare.net/slideshow/ralph-kol- tai/11981421#34

Other fundamental principles of modern design can also be seen in these works and pieces. Firstly, the stage is not an illusion. It is recognized as a stage or a performance space, not some other place like a room, forest, etc. Another location is established through dialogue, action, references, or suggestive rather than explicit scenery. The scene includes platforms, ramps, stairs, screens, walls, and curtains. It may also include three-dimensional elements that depict objective items such as castles, landscapes, or rooms, but in themselves, they are concrete. Although naturalistic scenery is the physical expression of psychological or sociological theories, the new modern decor conveys a spiritual essence.

René Allio defined the task of the designer as follows: "To create a visual language for each play, enhancing the ideological meaning of the play within a chosen style, extending or resonating with it, sometimes expressing it in a precise and critical manner, and sometimes in a more general or subtly indirect way. This is much like the imagery in poetry, where thoughts that emerge by chance can be as important as those deliberately sought." Additionally, viewing the world from a particular perspective or using specific artistic techniques suited to both the dramatic work and the designer's concept to convey certain images on stage is also his task. The diversity of imagination, perspectives, and techniques determines the ever-changing styles of performance.

Today, various contradictory styles appear on stage. However, two prominent trends can be identified, each with many variations: one tends towards abstraction, while the

other leans towards various forms of realism. The opposition between these two recalls the long-standing confrontation between symbolism and naturalism at the end of the nineteenth century. Abstraction, as a theatrical style, can be the interplay of shapes, materials, and colors. Alternatively, it can represent the unique concepts or fate of a person—a supernatural being, a meditative person, or a theological hero. The scenery can then be an abstract universe where forms, colors, and light resemble many symbolic signs or mystical elements appealing to our senses.

In 1972, after Wieland Wagner's death, the Bayreuth Theatre faced criticism from many commentators. Similarly, abstraction as a theatrical style can be the interplay of shapes, materials, and colors. Alternatively, it can represent the unique concepts or fate of a person—a supernatural being, a meditative person, or a theological hero. The scenery can then be an abstract universe where forms, colors, and light resemble many symbolic signs or mystical elements appealing to our senses.

In 1930, Brecht wrote: "' Gesamtkunstwerk' is seen as a homogeneous mixture of various elements. When different arts are considered combined, all elements blend into one tone, each element following the others, giving a monotonous impression. Moreover, this fusion process includes the audience, who are also thrown into the melting pot, becoming a passive (suffering) component of the Gesamtkunstwerk. Such magic should be abolished, as should anything that induces hypnotic effects, cheap intoxication, or stupefaction."

In 1947, Brecht further clarified his views: "The primary task of the theatre is to tell a story, using appropriate means to maintain a certain distance between the audience and the play (the Verfremdungseffekt). Although nothing can be done without actors, not everything depends on them either. The 'story' is introduced, unfolded, and interpreted by the entire theatre—actors, set designers, makeup artists, costume designers, musicians, and dancers—each contributing their talent to the common cause without giving up their independence." All the features of Brechtian theatre, especially its scenery, stem from these beliefs. As a proponent of socially reveal- ing theatre, Brecht condemned traditional "kitchen" theatre and all forms of sham and illusion in drama. He believed theatre should not conceal its theatrical nature, thus inventing the Brechtian curtain.

Postmodern stage design builds on modern design, delving deeper and more diversely. According to the document, postmodern stage design often uses discordance, ugliness, and juxtaposition to constantly remind the audience of the viewing experience. This design emphasizes the interaction between visual elements and the audience rather than merely presenting objects themselves This can be achieved through disharmonious elements in design, references to historical and social contexts, and even rebellion against traditional aesthetics.

For instance, the works of Robert Israel and Pina Bausch challenge the audience's perception through the introduction of real objects and changes in the stage environment Bausch's "1980" covered the entire stage with sod, even watering it during the performance, engaging the audience's sense of smell as well as sight.

John Conklin's design for Wagner's "Ring" at the San Francisco Opera illustrates the use of historical and social references in postmodern design. By incorporating architectural elements from different historical periods, he created a stage set symbolizing Wagner's creative environment, allowing the audience to experience the weight of history while watching the performance.

Through the study of contemporary, modern, and postmodern stage design styles, it is clear that stage design is not only an embodiment of art but also a product of culture and era. From simple reproduction of reality to spaces filled with metaphors and symbols, from focusing on objects themselves to emphasizing the interaction between the audience and objects, this evolution reflects artists' profound understanding and innovation of the stage. Whether it is Wagner's "Gesamtkunstwerk" or the explorations of Appia and Craig, they have provided valuable theoretical and practical foundations for future stage designers.

In postmodern design, designers challenge the audience's perception and traditional aesthetic concepts through various techniques, making stage design a multi-dimensional and multi-perspective artistic experience. This not only enriches the audience's viewing experience but also expands the expressive space and possibilities of stage design.

Blurring the Boundaries of Stage Design

At the PQ2011 conference, practitioners from around the world gathered to discuss the stage art practices related to this term in various countries. Rachel Hann believes that using English does not constitute a universal stage design. She argues that certain things can be "of the stage design" but not necessarily "stage design." In this context, the concept of stage scenery expands to include any aesthetically performative environment, not just those created by stage designers.[27]

These similar environments make up our lives.

In Rachel Hann's paper, she mentioned an example from 2013. During the G8 summit, a local council in Northern Ireland attempted to attract international investment by commissioning trompe l'oeil posters for the windows of closed shops in Fivemiletown and similar areas. These posters depicted thriving businesses, such as a butcher's, a travel agent, a stationery store, and a café, creating an illusion of economic prosperity. The intention was to seduce passing observers into perceiving Northern Ireland as a flourishing and attractive place for future investments.

This scenario demonstrates how scenographic interventions, intended to project success, can paradoxically emphasize the very problems they aim to conceal. It reveals deeper political and social dynamics, showcasing how attempts to superficially enhance appearances can reflect broader socio-economic challenges and governmental policies. This case illustrates the complex interplay between scenography, politics, and social perception, revealing the power and pitfalls of visual manipulation in shaping public and international perceptions.

Scenographic interventions in our lives extend beyond our imagination. A scene is also a narrative, containing multiple sensory information. Whether actively or passively participating in a narrative, it disrupts, challenges, and influences us. It is not just a

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[27] *Hann, R. (2020). NOTES ON BEYOND SCENOGRAPHY. Cena, 31, 27–33. https://doi.org/10.22456/2236-3254.103570*

backdrop but inspires us to take action, directly shaping our actions. We create stories within stories and are influenced by those stories.

Scene design, much like writing and creation, showcases the power of narrative. Designers, by constructing a meticulously designed world you have never visited, enable you to imagine your relationship with other people, places, and events. Through world narratives, world politics can be reinforced. Peter L. Berge suggests that human life is narratively rooted, and scene design is a means for people to narrate the world. Stephen Di Benedetto writes that "stage design can be said to be divine."[28]

Additionally, various cultural activities, if they create a sense of place through a sensory framework, are scenographic to some extent, illustrating the blurred definition of scenography.

Blurring Boundaries Between Dramatic Creation and Scenic Design

Performance as an interaction between movement and environment blurs the lines between dramaturgy and scenography, as well as their respective roles.

Scenography has evolved from the functional apparatus of the ancient Greek skene to the visually focused and symbolically simple backgrounds and movable stages of the medieval period, to the complex stage machinery and linear perspective systems of the Renaissance. By the 19th century, influenced by realism and naturalism movements, scenography emphasized detail and authenticity, incorporating new materials and technologies brought about by the Industrial Revolution.

The responsibility for scenography has shifted over time. Initially, playwrights and craftsmen handled it. During the medieval period, simple stages and backgrounds were designed and constructed by church and community members. In the Renaissance, specialized scenographers emerged, integrating painting, architecture, and engineering techniques. Eventually, professional scenographers became standard,

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[28] Lotker, S., & Gough, R. (2013). On Scenography: Editorial. *Performance Research*, *18*(3), 3–6. https://doi.org/10.1080/13528165.2013.818306

and their status elevated from non-existent to technicians, and finally, to crucial roles in theatre production and creative teams.

Modern stage design owes much to pioneers like Adolphe Appia and Edward Gordon Craig. They argued that stage decor is not merely a backdrop but an integral part of the theatre's inner life. Craig wrote in his essay: "The artists of the Theatre of the future, it is idle to talk about the distraction of scenery because the question here is not to create some distracting scenery, but rather how to create a place which harmonizes with the thoughts of the poet." [29]

Figure 33 Transcend Reality and Function as Symbol: Stage Design of Edward Gordon Craig

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Figure 34 Craig Hamlet final scene

https://socks-studio.com/2014/02/15/to-transcend-reality-and-function- as-symbol-stage-design-of-edward-gordon-craig/

In such a space, all emotions and actions are naturally projected, harmonizing with the core of the drama. They are continuous, mutual, and integrated.

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[29] Arnold Aronson. (1991). *Postmodern Design* (pp. 1-13 (13 pages)) [Theatre Journal].

Robert Edmond Jones, the father of modern American design, echoed Craig's ideas, explaining that stage design should cater to the mind's eye, encompassing beautiful things. It is an entity, a mood, a symphonic accompaniment to the drama, fanning the flames of the performance. It resonates, amplifies, and invigorates. It is an anticipation, a premonition, a tension that says nothing yet gives everything. [30]

Performances consist of "two actively interacting layers – 'movement' and 'environment,' action and space, dramaturgy and scenography." These elements interact dynamically during a performance, often making the boundaries between them unclear and fluid. Theatre can become part of the environment, and stage design can become part of the action. The combination of light, sound, and scenery transforms the theatrical space from a mere setting into a sensory experience crafted by the designer. Actors interact within this space, observing and engaging with their surroundings through their physical presence, creating an emotionally resonant experience for the audience.[31]

Blurring Boundaries Between Disciplines

The interdisciplinary nature and multifaceted perspectives between disciplines blur the boundaries. Scenography should be classified as
a unique phenomenon, utilizing principles from science, fine arts, architectural styles, painting, sculpture, art design, large-scale three-dimensional projections, color characteristics, and ethnic colors. The history of scenography is dynamic and multi-dimensional, closely linked to the development of technology, architecture, visual arts, literature, and national culture. It continuously evolves, serving as a practical tool for understanding contemporary art and reflecting on reality. This inherently determines its

[30] Arnold Aronson. (1991). *Postmodern Design* (pp. 1-13 (13 pages)) [Theatre Journal].

[31] Lotker, S., & Gough, R. (2013). On Scenography: Editorial. *Performance Research*, *18*(3), 3–6. https://doi.org/10.1080/13528165.2013.818306

complexity, multi-perspective, and inter-disciplinary nature. Thus, from every angle, scenography is inherently plural.[32]

Any sensations, smells, textures, designs, sounds, and tactile experiences within a space collectively contribute to a certain atmosphere and are all part of scenographic techniques, even down to the dust. This mobilization of different senses defines its interdisciplinary nature.

However, for a long time, academic and naturalistic design styles dominated the theater stage, adhering to Hugo's principle in "Preface to Cromwell" that "exact local color is a primary condition of truth; the place is the indispensable witness to the event." Thus, since the Renaissance, a large number of perspective paintings were placed on huge canvases, trimmed, and placed within the stage framework, making it look like a real painting. However, in such a 3D space, coupled with real objects, the stage became a cluttered heap of trivial things.

In this context, the stage background lacked coherence. The set designers were craftsmen and manufacturers, working separately according to their expertise, charging per square meter of scenery. Performers often wore their own clothes, creating a disordered mix of elements. This lack of aesthetic design on stage presented a crisis.[33]

Richard Wagner was the first to attempt a solution. In 1876, during the Bayreuth Festival, the auditorium lights were turned off for the first time, focusing all attention on the stage. This was an attempt to use lighting and scenery to engage the audience's emotions. He proposed the concept of the Gesamtkunstwerk (total work of art), advocating for the integration of music, lyrics, dance, performance, and set design into a unified whole.

However, it was not until the emergence of Adolphe Appia that modern stage design began to establish a sequence. He emphasized that the stage background is not

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[32] Anna Alisher. (2021). *Art history dynamics of theater scenography*. https://doi.org/10.32461/2226-3209.2.2021.240004

[33] Arnoia et al. (2002). *Western Theatrical Art* (First edition). Shanghai Culture Publishing House.

merely decoration but an integral part of the inner life of the drama. "What we see on stage in the future should not look like what we know but like what we feel."

The music dictates the true dramatic time, controlling actors' movements and determining the proportions of lifeless images and scenic space structures. Lighting reveals the actors and also enlivens the space, while painting is subordinate to these three elements. This established the sequence—actors, space, lighting, and painting.

Robert Edmond Jones said:

"Stage-designing should be addressed to this eye of the mind. It is an expectancy, a foreboding, a tension. It says nothing, but it gives everything. Recurring motifs of musicality (including harmony and unity) and spirituality suffuse the writings on design by these artists, and, by and large, these themes have pervaded modern design. In the modern mise en scène, the text, the performance, and the sce- nography ideally unite into a seamless, beautiful whole."[34]

All these components should project the essence of the play and coordinate with the actors' performances, interacting with the audience.

Lastly, I would like to extend the discussion with geographer Doreen Barbara Massey's concepts:

"First, we recognize space as the product of interrelations; as constituted through interactions, from the immensity of the global to the intimately tiny. Second, we understand space as the sphere of the possibility of the existence of multiplicity in the sense of contemporaneous plurality; as the sphere in which distinct trajectories co-exist; and as the sphere, therefore, of coexisting heterogeneity. Without space, no multiplicity; without multiplicity, no space. If space is indeed the product of interrelations, then it must be predicated upon the existence of plurality. Multiplicity and space are co-constructive. Third, we recognize space as always under construction. Precisely because space, in this reading, is a product of relations— relations that are necessarily embedded material practices that have to be carried out—it is always in the

[34] Arnold Aronson. (1991). *Postmodern Design* (pp. 1-13 (13 pages)) [Theatre Journal].

process of being made. It is never finished; never closed. Perhaps we could imagine space as a simultaneity of stories so far."

Stage space is where the human body and the environment collide, co-created by our collective thoughts. Stage design is interpreted by the actor (the human body), whose constant change, interdisciplinary nature, and multiple perspectives are the only constants.

Blurring Boundaries Between Humans and Environments

Humans perform in different environments, and different scenes alter human behavior, and vice versa. The environment and human behavior mutually constitute and influence each other. This interactive relationship breaks traditional boundaries and blurs the lines between scenery and humans. For instance, Mount Everest, as an extreme environment, remains incompletely understood by humans yet deeply tracts and shapes them.

The human experience within this space is not that of an outsider or mere observer; everything is shared with the audience, as humans coexist with space. Humans are always a part of the world, an integral part of the scenes around us. Traditional landscape aesthetics positioned humans as observers, viewing the world from afar as an object of pleasure and imagination.

Today, in new materialism, the binary distinction between subject and object, humans and environments, and scenery and the world becomes blurred. The concept of the world becomes a continuous process where change is a constant parameter. Likewise, scenography is no longer fixed but continually changing and evolving. Different scenes (such as parking lots, public squares, theaters, etc.) impact and challenge human behavior and perception in diverse ways, further blurring boundaries. [35]

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[35] Hann, R. (2020). NOTES ON BEYOND SCENOGRAPHY. *Cena*, *31*, 27–33. https://doi.org/10.22456/2236-3254.103570

In 1921, Adolphe Appia stated: "The theater of the future will be the difference between watching a young girl run across a field and running hand in hand with her." Even without such interactions, audiences sitting in churches are closely linked to adjacent seats' sounds and smells.

Kathleen Stewart argues that the world consists of sensory aesthetics and power lines that shape our experiences. This suggests that the world is not merely a neutral place but an emotional and sensory landscape in constant formation. This further emphasizes its non-static nature, breathing and dancing alongside narratives, actors, and audiences throughout the performance.

Scenography can create and complete itself through the interaction of the body and the environment. Audiences reinvent and experience environments through active witnessing and bodily engagement, blurring the boundaries between body and environment. This relationship not only affects people's perceptions and experiences but also redefines the scene itself.

The blurring of boundaries between humans and environments, scenery and boundaries, manifests primarily in the interaction and transformation between humans and the environment, the participatory and flexible nature of scenography, the relationship between body and environment, and the diversity and dynamism of scenographic design.

"We can no longer see so-called typical stylistic features because our styles and forms have been hybridized and fused.

I believe there is no longer a so-called French style… You might talk about a European style, but that is even less likely, as it too is a product of globalization's influence."

———< Guy- Claude Francois>

Blurring of Styles

Postmodernism is characterized by a lack of distinct or consistent

design styles and unified theories. Apart from design thinking centered around dual self-awareness and shifting perspectives, there is a greater emphasis on individual, personal styles invented by designers and artists. This diversity grants designers/artists a prominent position within creative teams in theaters.[36]

Various styles are mixed and cross-disciplinary approaches are common. For example, in a stage design, classical and modern, Eastern and Western elements may coalesce, presenting a unique and unclassifiable style.

Designers breathe new life into traditional cultural symbols on modern stages through reinterpretation and re-creation. This approach not only blurs the boundaries between tradition and modernity but also offers audiences new aesthetic experiences between familiarity and novelty.

In the context of globalization, modern stage design often incorporates and integrates cultural elements from around the world. This cultural fusion not only enriches the expressive power of stage design but also presents a scene of multicultural coexistence on stage.

In contemporary design processes, there is a collage phenomenon where attempts to embrace classics on modern stages result in a cluttered amal- gamation of past styles and elements, lacking a harmonious, unified structure.

Arnold Aronson poses the question: "Does French space exist? Or American space? Or Japanese space? ... If the Prague Quadrennial removed identity labels, could observers still distinguish designers' national identities based on space, color, or imagery?" In an era of the fluid movement of designers, directors, and transnational works, the national identity of design works becomes less defined due to emphasis on subjective experience, interdisciplinary design practices, dynamic development, and international exchange, leading to the dissolution of boundaries in visual vocabulary. Stage design is moving towards a more universal aesthetics, where specific defining characteristics of design are becoming increasingly blurred.[37]

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[36] Arnold Aronson. (1991). *Postmodern Design* (pp. 1-13 (13 pages)) [Theatre Journal].

[37] Oscar G. Brockett, Margaret Mitchell, & Linda Hardberger. (2016). *Making the Scene: A History of Stage Design and Technology in Europe and the United States* (First Edition). China Theatre Press.

CASE 1: Fluid Landscapes of Ligh

Lakmé


دار الأوبرا السلطانية مسقط
ROYAL OPERA HOUSE MUSCAT

Script Author: Léo Delibes

Creation Date: Premiered in 1883

Script Overview: "Lakmé" is an opera in three acts set in British-occupied India. It follows the tragic love story of Lakmé, the daughter of a Brahmin priest, and Gérald, a British officer. Their forbidden romance is set against the backdrop of cultural and religious conflict.

Director: Paul-Émile Fourny

Stage Designer: Paul Gepicook, Creative Director at D-Wok

Stage Design Date: 2023

Theatre/city： ROYAL OPERA HOUSE–MUSCAT

Types of performances: Opera

Design Concept

When conceptualizing the creation of "Lakmé," Paul and his team envisioned using LED screens on different planes over a water scene to create the set. One of the most important arias in "Lakmé" is the "Flower Duet," which inspired Paul to use flowers in the set design. They employed the "Phantom" high-speed camera, which can shoot at a frame rate of up to 500 fps, capturing extremely slow-motion shots. Paul arranged flowers on the set and used water, liquids, and powder materials, filming with the high-speed camera. This approach allowed them to create the effect of flowers exploding, project water screens above the flowers, and even create flower waterfalls. In this way, the set becomes part of the narrative, with the flowers themselves acting as storytellers.[38]

Technical Application

Projection Mapping: Utilizing high-resolution projections to transform the stage into a dynamic landscape. This technology allows seamless transitions between different scenes, such as lush Indian gardens and the interiors of sacred temples, enhancing the storytelling with vivid visual backdrops.

Interactive Video Installations: Large vertical panels on the stage serve as canvases for interactive video installations. These panels display animations and visual effects that respond to the actors' movements, creating a smooth interaction between the performers and the digital environment. For example, floral patterns bloom and dissipate in sync with the music and narrative, adding a poetic visual metaphor.

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[38] Georgina Benison. (2019). Lakmé: A superb fusion of arts for all senses. *Observer*. https://www.omanobserver.om/article/34702/Features/lakme-a-superb-fusion-of-arts-for-all-senses

High-Speed Photography and Special Effects: Behind the scenes, high-speed photography and creative special effects are used to capture intricate visual elements, such as bursts of color and texture, which are then projected onto the stage.

CASE 2: Immersive Fantasy Worlds.

Dream of the Red Chamber: Theatrical Fantasy City

Script Author: Based on the classic Chinese novel "Dream of the Red Chamber" by Cao Xueqin

Creation Date: 1736-1765

Script Overview: "Dream of the Red Chamber" is one of China's Four Great Classical Novels, depicting the rise and fall of the Jia family and the love story between Jia

Baoyu and Lin Daiyu. The novel is a rich tapestry of Chinese society, culture, and philosophy during the Qing Dynasty, exploring themes of love, fate, and the transient nature of life.

Stage Designer: Wang Chaoge

Stage Design Date: 2021

Theater/City: Langfang

Types of performances: immersive theater experience.

Design Concept:

The goal is to make readers the protagonists, telling the story of the readers of "Dream of the Red Chamber." The greatness of "Dream of the Red Chamber" extends beyond the original work. Countless readers have left their mark on the novel, intersected with it, experienced stories, and even changed their lives. Therefore, the "Dream of the Red Chamber" is deeply ingrained in our cultural and bloodline heritage. The theatrical fantasy city attempts to make readers the protagonists, telling stories of readers scattered throughout history.

Technical Application:

Projection mapping: creates dynamic backgrounds that move and change in real-time, reflecting the emotional and thematic shifts in the narrative. The combination of digital and tangible elements achieves both realistic and abstract representation.

Active Audience Participation: The audience plays an active role in the experience. As they move through various stages of the performance, they encounter actors and interactive installations that respond to their presence and actions, making each visitor's journey unique.

VR and AR Integration: Certain parts of the performance utilize VR and AR technologies to immerse the audience in the world of Jia Mansion. These technologies allow for a deeper level of immersion, providing intimate and detailed explorations of key locations and events from the novel, such as the Grand View Garden or Baoyu’s dream sequences.

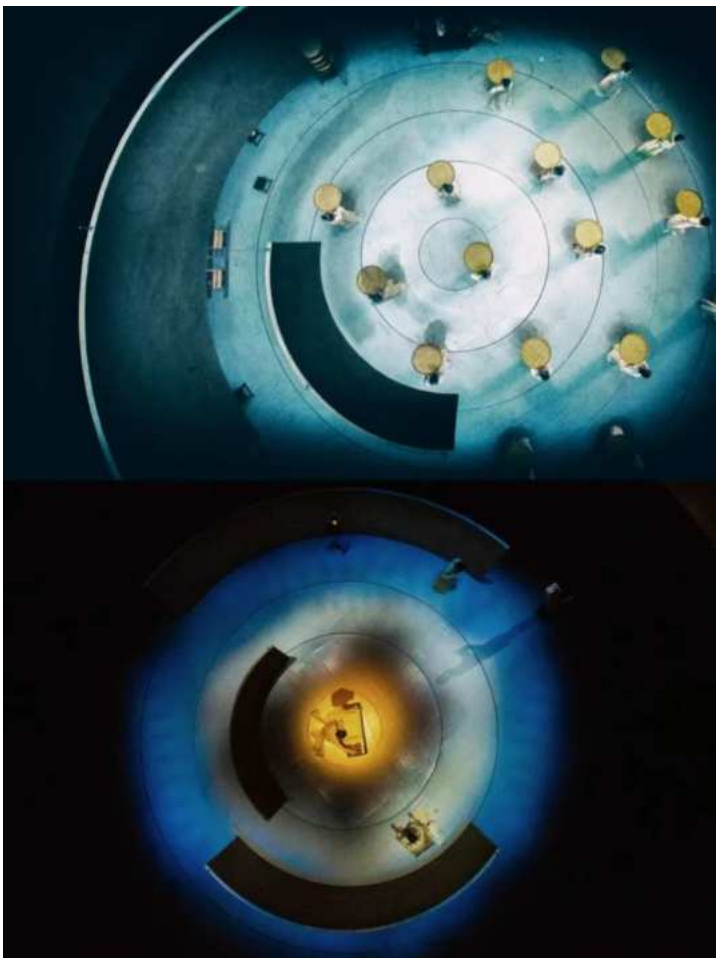
Multisensory Elements: Each scene includes a range of sensory elements such as soundscapes, diffused scents, and tactile experiences. Audiences can hear the babbling of brooks, smell the fragrance of flowers, and feel the texture of ancient fabrics, enhancing the realism and depth of the experience.

Transforming a Classic Novel into an Immersive Theatrical Exhibition:

The design concept involves transforming a classic novel into a large-scale immersive theatrical exhibition, featuring situational gardens, immersive theatrical viewing, and expressive artistic techniques. The total area covers approximately 150,000 square meters, with a total building area of around 72,000 square meters. It comprises five core theaters, over 40 situational theater garden plots, and 22 sets of micro-plays. The five theaters have a total seating capacity of 6,000. The total duration of the performances exceeds 800 minutes.

CASE 3: Holographic Echoes of Art.

Only This Green




只此青绿


只此青绿

Script Author: Based on the Song Dynasty painting "A Thousand Li of Rivers and Mountains" by Wang Ximeng

Creation Date: 1113

Script Overview: "只此青绿" (Only This Green) is a theatrical production that brings to life the essence and artistic beauty of the ancient Chinese painting "A Thousand Li of

Rivers and Mountains". The performance delves into the historical and cultural significance of the artwork, exploring themes of nature, artistry, and heritage through dance and visual storytelling.

Directors: Han Zhen and Zhou Liya

Stage Designers: Gao Guangjian and Ren Dongsheng

Stage Design Date: 2021

Types of performances: dance drama

Design Concept:

The story revolves around the protagonist, a cultural relic researcher, who travels back to the Northern Song Dynasty, witnessing the creation process of this painting. The drama unfolds in seven chapters, with a smooth narrative flow and a classical yet artistic expression.

"Only This Green" employs a circular, rotatable stage centered around the visual of the painting scroll. This allows dancers to freely "enter and exit the painting." The narrative approach of the drama abandons traditional stage design methods that build scene-by-scene chapters. Instead, it establishes a new visual continuity narrative system.

The use of green, the most iconic visual symbol, connects the entire dance. This shade of green captures the audience's attention, recreating the elegant aesthetics of the Song Dynasty and showcasing the characteristics of Song aesthetics. The beauty of the green hues allows the audience to appreciate the profound cultural heritage and the deeper meaning behind this color. Between movement and form, the green color of a thousand years unfolds before the eyes.

Through projections, an immersive sense of the misty rain of Jiangnan is created. Several white, arc-shaped screens rise and rotate, adding a dynamic and lively touch. This creates an atmospheric setting that enhances the visual and emotional impact of the performance, allowing the audience to feel fully immersed in the historical and cultural context.

Technical Application:

Holographic Technology: The designer integrates holographic projection to create ethereal figures and elements that float and interact with the performers. This technology adds a magical dimension to the performance, blurring the boundaries between reality and the painted world.

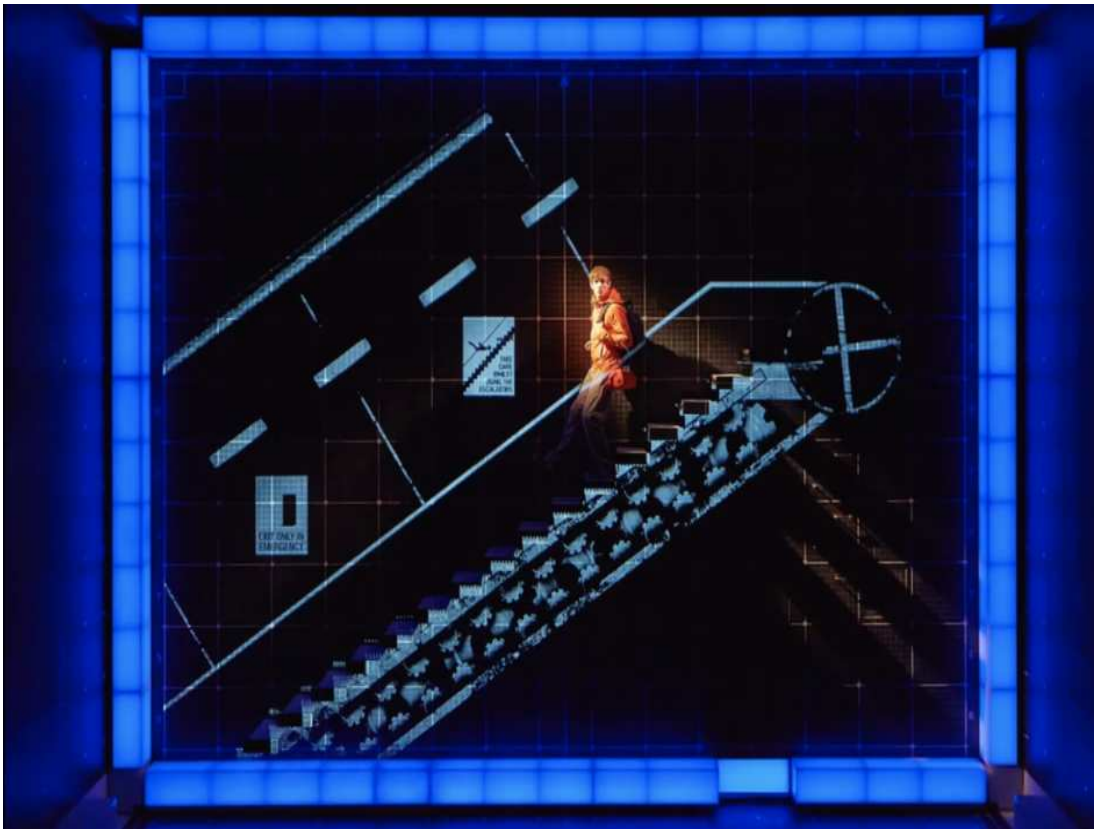
Lighting Design: The lighting design adopts color tones inspired by the original painting, emphasizing the various greens and blues characteristic of Song Dynasty landscape paintings. This approach not only enhances visual authenticity but also evokes the tranquility and meditative quality of the painting.

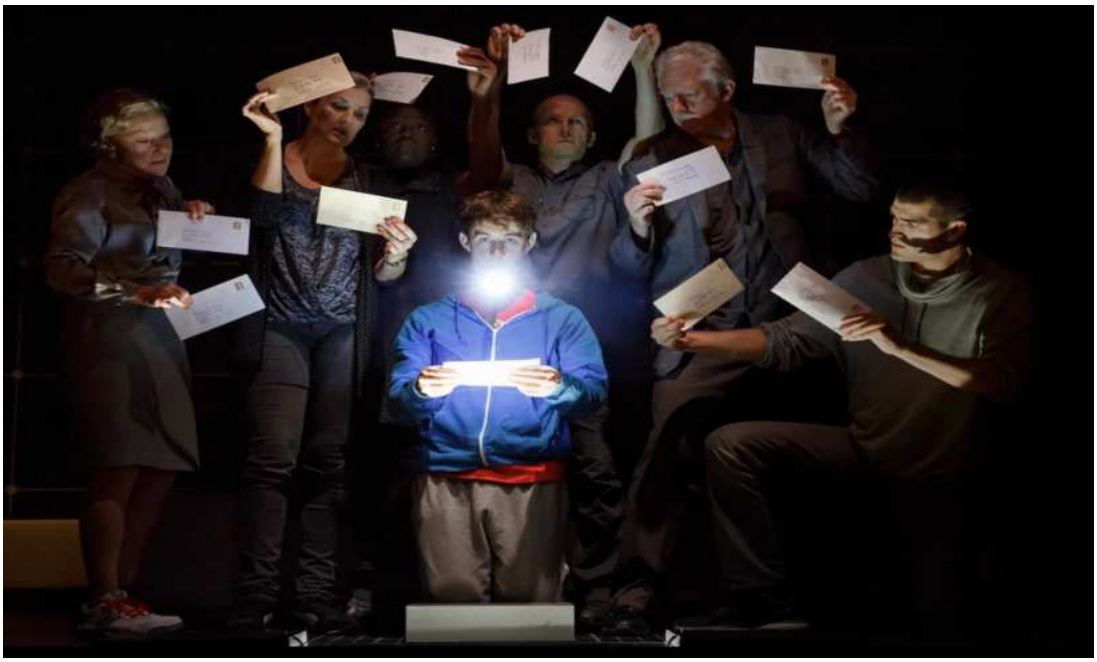
Projection Mapping: The use of projection mapping transforms the stage into a living painting. High-resolution projections dynamically change to reflect the evolving landscapes of the original artwork, creating an immersive visual experience that captures the fluidity and vitality of Wang Ximeng's masterpiece.

Modular Stage Elements: The stage features modular elements that can be moved and adjusted throughout the performance. These set pieces interact with the visual effects of the projections, allowing the physical space to transform seamlessly and enhance narrative fluidity. For instance, walls and floors can become canvases for flowing rivers or lush mountains, immersing the audience in the depicted scenes.

CASE 4: Digital Mindscapes.

"The Curious Incident of the Dog in the Night-Time"





Script Author: Simon Stephens, based on the novel by Mark Haddon

Creation Date: 2003

Script Overview: "The Curious Incident of the Dog in the Night-Time" follows the story of Christopher Boone, a 15-year-old boy with an extraordinary brain who is exceptional at math but ill-equipped to interpret everyday life. When he discovers a neighbor's dog dead, he embarks on a journey to solve the mystery, uncovering family secrets and learning about his own identity in the process.

Director: Marianne Elliott

Stage Designer: Bunny Christie

Stage Design Date: 2012

Theater/City: National Theatre, London, UK; transferred to the Gielgud Theatre in London's West End; also performed on Broadway at the Ethel Barrymore Theatre, New York, USA

Types of performances: contemporary drama

Design Concept:

The primary consideration is to depict the interplay between order and chaos. In many ways, the set design reflects Christopher's unique way of thinking and functioning in the most intriguing and unusual manners. The set predominantly consists of cubes, which the actors rearrange to represent everything from chairs to London Underground seats to spaceships!

Although Christopher is highly proficient with numbers, he often gets lost in verbal and written communication. Therefore, the set is surrounded by floating numbers and letters, symbolizing his cognitive processes. Christopher sometimes experiences anxiety and meltdowns due to sensory overload, which can be triggered by crowds, loud noises at train stations, or even a simple touch from someone.[39]

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[39] Julian Wiles. (2019, February 5). DESIGNING THE SET FOR "THE CURIOUS INCIDENT". *Charleston Stage Backstage*. https://charlestonstage.com/blog/designing-the-set-for-the-curious-incident/

During these moments, the lighting and other effects transform into a storm, mirroring the neuronal firing in the brain. This sensory overload is visualized through a chaotic display of lights and sounds, creating an immersive experience that represents the inner workings of Christopher's mind.[40]

Technical Application:

Digital Projections and LED Screens: The set features a grid-like structure that serves as both a physical and metaphorical representation of Christopher's mind. High-resolution digital projections and LED screens are integrated into the walls and floor, displaying mathematical equations, maps, and other visuals that help convey Christopher's unique perspective and thought processes.

Interactive Set Elements: The stage design includes interactive elements that respond to the actors' movements and actions. For instance, the set pieces can light up, change color, or display different graphics, enhancing the storytelling by visually representing Christopher's internal world and emotional states.

Versatile Set Design: The minimalist set is highly versatile, with modular pieces that can be quickly reconfigured to represent different locations, such as Christopher's home, school, or various urban settings. This flexibility allows for seamless transitions between scenes, maintaining the narrative flow and supporting the fast-paced nature of the story.

CASE 5: Luminous Winter Realms.

The Snow Queen

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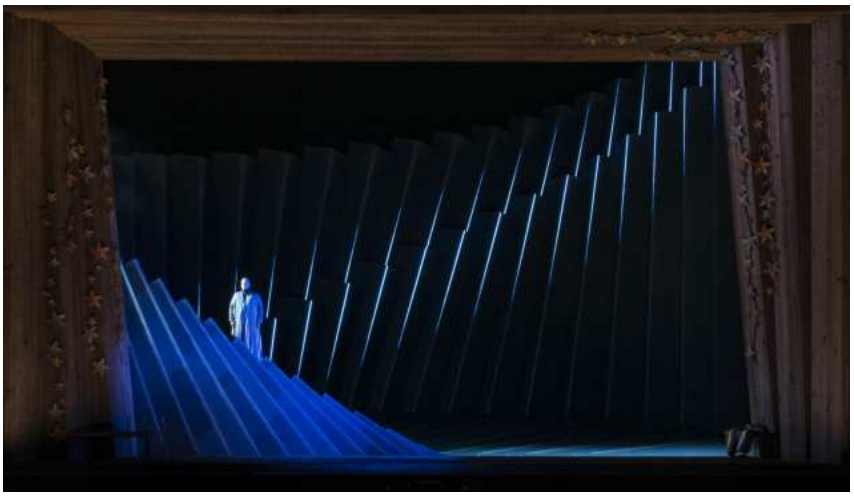
[40] https://www.amynicholson.net/blog/the-curious-incident-of-the-dog-in-the-night-time



Author of the Script: Hans Christian Andersen

Time of Creation: 1844 (Original Fairy Tale)

Director: Matthew Bourne

Script Overview: "The Snow Queen" is a timeless fairy tale by Hans Christian Andersen that follows the journey of a young girl named Gerda as she sets out to rescue her friend Kai from the clutches of the Snow Queen. The story explores themes of friendship, love, and the triumph of good over evil.

Stage Designer: Palle Steen Christensen

Stage Design Time:2019

Theater/City: Tivoli Gardens, Copenhagen, Denmark

Types of performances: ballet

Design Concept:

Christensen's stage design focuses on capturing the stark contrasts between warmth and cold, light and darkness, which are central themes in "The Snow Queen." The set features icy landscapes, glistening snow, and frosty textures, juxtaposed with the warmer, cozier elements of Gerda's journey.

Technical Application:

Palle Steen Christensen utilizes precisely calculated lines and ethereal code, employing a distinct digital approach to create an unprecedented space. Light travels along the walls, illuminating pathways and conveying the coldness of the darkness. Reflections from shards of mirrors, snow, and constellations guide the audience into a dreamy world of lights.

The use of LED lighting is crucial in setting the atmosphere and tone for each scene. LED lights can rapidly and effectively change color and intensity, creating dramatic effects that traditional lighting cannot achieve. For "The Snow Queen," LED lighting can simulate the harsh, piercing light of the Snow Queen's realm and the warm, inviting light of Gerda's world.

CASE 6: Water and Light Transmutations.

PELLÉAS ET MÉLISANDE

Script Author: Claude Debussy, based on the play by Maurice Maeterlinck

Creation Date: Premiered in 1902

Script Overview: "Pelléas et Mélisande" is an opera in five acts that tells the story of the mysterious Mélisande, her love for Pelléas, and the tragic jealousy of Golaud. Set in

a shadowy, fairy-tale kingdom, the opera explores themes of love, jealousy, and fate through its hauntingly beautiful music and symbolic narrative.

Director: Dmitri Tcherniakov

Stage Designer: Alfons Flores

Stage Design Date: 2023

Theater/City: Various international opera houses, including Gran Teatre del Liceu in Barcelona, Spain

Types of performances: opera

Design Concept:

The set presents a symbolic space detached from any specific place or time. At the center of the stage stands a gigantic parallelepiped. When illuminated from the outside, it appears as a rock; when lit from the inside, it becomes transparent, revealing claustrophobic rooms within.

This massive structure is simultaneously a castle, a rock, and a physical and mental prison for its inhabitants. It rotates around itself, which is one of the few drawbacks of the performance. All these rotating structures are placed on a shallow water pool on stage, with all characters moving through the pool. The continuous presence of water in the set design echoes the frequent references to water in the script.[41]

Aleu masterfully translates all the dark beauty of "Pelléas et Mélisande" into fantastical illusions on stage. He gives relevance to the opera's powerful symbolic world, placing characters and actions in a disturbing ambiguity that permeates this unsettling work, filled with questions but devoid of answers.

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[41] https://www.opera-online.com/en/columns/xavierpujol/a-pelleas-et-melisande-of-dark-beauty-at-liceu

Technical Application:

Projection Mapping and Visual Effects： Projection mapping is used extensively to transform the stage with vivid images and textures. This technology allows for the seamless transition between different scenes, such as the dark, foreboding forests and the intimate, claustrophobic interiors. The projections add depth and atmosphere, enhancing the opera's dreamlike quality.

Lighting： The lighting design by Gleb Filshtinsky is integral to the production, creating a moody and atmospheric environment that reflects the emotional and psychological states of the characters. Dynamic lighting changes enhance the tension and drama, highlighting key moments and guiding the audience's focus.

Water and Natural Elements： The use of water on stage adds a tactile and dynamic element to the design. Scenes involving water, such as the characters wading through streams or the reflective surfaces, are used to symbolize the fluidity and unpredictability of human emotions and relationships. This physical element interacts with the lighting and projections to create a multi-sensory experience.

Integration of Performers and Environment： The performers interact closely with the set and projections, becoming part of the visual landscape. This integration blurs the lines between the characters and their surroundings, creating a cohesive and immersive storytelling experience.

CASE 7: Suspended Reality Boxes.

Quartett

Author of the Script: Heiner Müller

Time of Creation: 1980 (Original Play)

Director: Robert Wilson

Script Overview: "Quartett" is a provocative play by Heiner Müller, based on the characters from the novel "Les Liaisons dangereuses" by Pierre Choderlos de Laclos. The play revolves around the intense and manipulative relationship between Marquise de Merteuil and Vicomte de Valmont, exploring themes of power, seduction, and the destructive nature of human desires.

Stage Designer: Alfons Flores

Stage Design Time: 2011

Theater/City: Various international opera houses, including Teatro alla Scala in Milan, Italy, and Staatsoper Unter den Linden in Berlin, Germany

Types of performances: contemporary drama

Design Concept:

Alfons Flores' set design epitomizes extremes, playing with elegant yet essential spaces and contrasts. The protagonists are trapped in a suspended, oppressive parallelepiped floating in a void, defining two fundamental and symbolic spaces:

1. Internal (IN): This is an emotional prison where Valmont and the Marquise lock themselves, seemingly unable to escape—a physical space filled with claustrophobia and frustration.

2. External (OUTSIDE): A purely mental space where hope and regret, fantasies, fears, and unexpressed desires are projected. These psychological projections are visually confirmed in evocative videos produced by Franc Aleu, surrounding the "cell."

The set features a dynamic interplay between argumentative, erotic, and fantastical images, alternating with restorative elements of nature such as the ocean, sky, and storms. These natural elements sketch out a third space—the "Outside World"—the universe and everything that surrounds us, making us feel small and helpless.

These three universes—internal, external, and the outside world—are presented on stage, interconnected and communicating with each other, finding perfect correspondence within the musical structure of the piece.

Technical Application:

The 2011 production of "Quartet," a German classic, narrates a series of misunderstandings and conflicts between two couples during a dinner party set before the French Revolution. The play delves into themes of marital fatigue and newlywed challenges, presenting strained relationships. As a well-rounded drama, it leaves little room for subversive creation and interpretation, with the script itself being very modern.

Given that the play features only two actors, the director envisioned setting up a box-like space to confine the actors within. This box, suspended in mid-air, is supported by numerous steel wires, resembling the spokes of a bicycle wheel, holding the central box in place. Measuring 4 meters by 6 meters and weighing approximately 2 tons, the box is the only tangible structure in the entire stage space. The environment transforms through projections, with the projection screen located in the back area of the box.

The projections resemble cells, continuously replicating various visual images, creating a dynamic visual dialogue that complements the theme of the play. These projections typically include abstract and symbolic images, deepening the audience's understanding of the character's inner turmoil and the overall narrative.

Flores' designs for both productions embody a minimalist style, focusing on clean lines, sparse sets, and strategic use of space to allow for greater focus on the actors and their performances.

Both highlight innovative lighting and projection techniques. In Pelléas et Melisande, lighting creates a dreamlike, ethereal atmosphere, while in Quartet, lighting heightens the psychological intensity of the narrative.

Symbolic sets and imagery are used to deepen the audience's engagement with the themes and emotions of the story.

Pelléas et Melisande is a narratively fluid, lyrical opera, while Quartet is a more fragmented and intense drama. The difference in narrative style is reflected in the set design—the visual style of Pelléas et Melisande is more fluid and continuous, while Quartet uses stark contrasts and abrupt transitions.

In visual tone, Pelléas et Melisande is more dreamy and surreal, with softer, more muted colors and fluid shapes. Evoking a sense of melancholy and tragic beauty. In contrast, Quartet adopts a darker, more rigid visual tone, with monochrome and sharp lines, emphasizing the harshness of the characters' interactions, and confronting the audience with the raw, unsettling emotions of power and seduction.

CASE 8: Elemental Shadowscapes.

The Crucible


PLAY FILM

Author of the Script: Arthur Miller

Time of Creation: 1953

Director: Lyndsey Turner

Script Overview: 《The Crucible》 is a dramatic play that explores the Salem witch trials' hysteria, reflecting themes of paranoia, integrity, and the struggle for justice in a repressive society.

Stage Designer: Es Devlin

Stage Design Time: 2023

Theater/City: National Theatre, London, UK

Types of performances: historical drama

Design Concept:

At the core of the play's set is a trapezoid embedded at an angle into the ceiling. This design allows custom hanging rods at the front of the stage to create the effect of glowing raindrops, which is the first scene the audience sees as they take their seats.

Surrounding the back of the stage are mounds of soil, initially difficult to notice without careful observation, symbolizing the distortion and instability of social and belief systems. Water symbolizes purification, judgment, and cleansing, foreshadowing the difficult trials the characters are about to endure.

The lighting effects are dynamic, representing the passage of time and shifts in emotions. The dynamic aspect of the scenes is realized through Es Devlin's design, allowing the stage to transform quickly between different settings. By moving walls and props, the stage seamlessly transitions from a home to a courtroom, from a village to a forest.

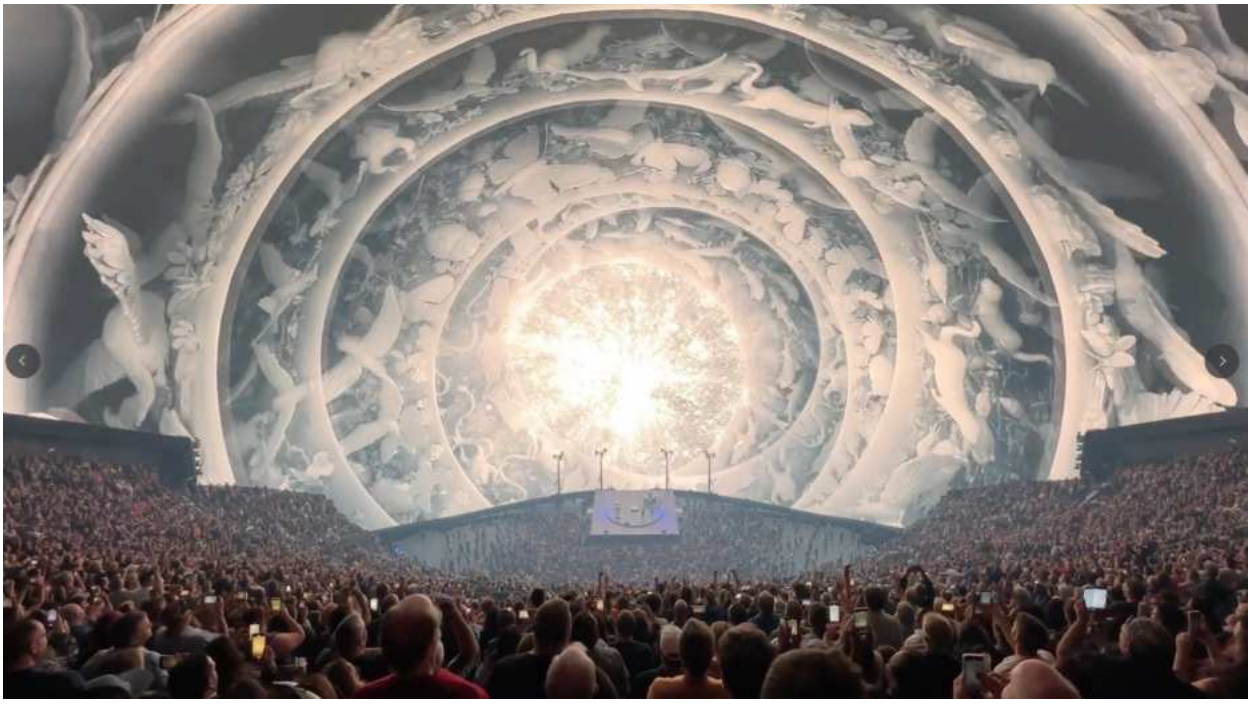
The most innovative aspect is the use of natural materials like water, wood, and soil, creating a sense of realism and historical context. This choice of materials was a nod to a contemporary trend of returning to nature, reflecting a pursuit of authenticity and simplicity.

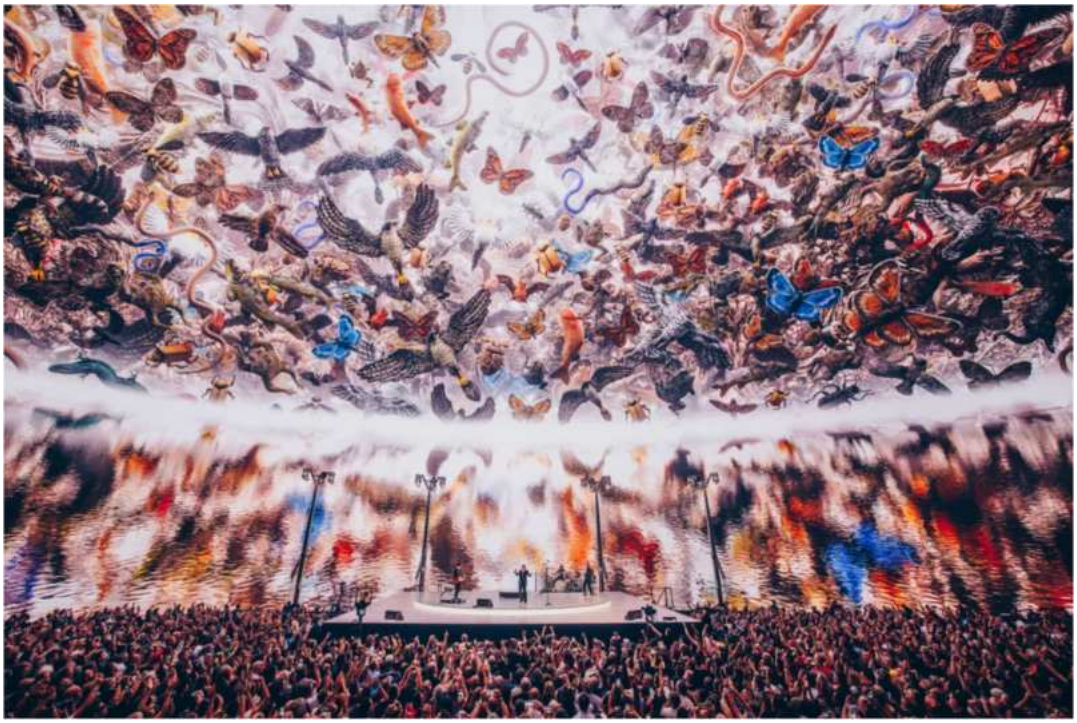
Technology and Multimedia:

Devlin's design for <The Crucible> incorporated a minimalist set with a significant focus on atmospheric effects. The use of a rain effect was a central element, creating a palpable sense of foreboding and tension. Lighting and sound design were intricately linked to the rain, enhancing the emotional impact and realism. The minimalist approach ensured that the technology did not overshadow the narrative but instead intensified the play's themes and emotional resonance.

CASE 9: Sphere of Digital Dreams.

U2's Concert in Las Vegas Sphere





Author of the Script: The concert setlist and narrative were crafted by U2, one of the most influential rock bands globally.

Time of Creation: The concert took place in 2023.

Script Overview: U2's concert featured a blend of their classic hits and new material, designed to take the audience on a musical journey through the band's storied career.

Stage Designer: Es Devlin； Willie Williams

Stage Design Time: 2023

Theater/City: MSG Sphere, Las Vegas, USA

Types of performances: concert

Design Concept：: Devlin's concept was to create an environment where the stage itself becomes an active participant in the concert, enhancing the sensory experience of the audience. For the Nevada Ark, Es Devlin meticulously selected 26 species from Nevada's 152 endangered species and created digital sculptures of them. These sculptures were then magnified and displayed inside a sphere. Devlin explained,

"When 18,000 people sing together, it creates an immense power, and these songs have been ingrained in their bones over the past 30 years. This is a powerful way to inaugurate this new piece of architectural geometry and graft it onto a specific location in Nevada.

"Every time we learn the name of a species, we make space for it in the memory palace of our minds. Every night, 18,000 people will arrive, leaving with more species names in their minds than they had before they entered the sphere."

Technology and Multimedia:

With an expansive 15,000 sq. m wraparound screen hiding nearly 160,000 speakers, Sphere has been billed as the largest LED screen in the world and even a “new medium” by its creators at MSG. Only it actually features an established genre, as it overnight became one of the biggest venues in the world for video art. (Exosphere, the name for Sphere’s exterior screen, is the perfect canvas for images of eyeballs or globes, but otherwise not as powerful.)

The design leverages the Sphere's 360-degree LED screen, creating an immersive, panoramic visual experience. The intricate patterns and dynamic visuals complement the band's performance, enhancing the audience's sensory experience.

comparison

In U2's concert, the technology is front and center, transforming the venue into a living canvas that interacts with the music. technology was utilized to create a grand, immersive spectacle, transforming the venue into a dynamic visual environment

For <The Crucible>technology serves to support and deepen the narrative without overshadowing the actors. This illustrates Devlin's ability to adapt her technological approach based on the medium, using immersive, large-scale visuals for the concert and restrained, evocative effects for the theater.

CASE 10: AI-Crafted Theatrical Visions.

Richard III, Oklahoma, and The Wizard of Oz - Stage Designs by Jason Jameson using AIGC

-----Richard III

-----Oklahoma

----The Wizard of Oz

Script Overview:

- Richard III: A historical play by William Shakespeare, focusing on the Machiavellian rise to power and the short reign of King Richard III of England.

- Oklahoma: A classic musical by Rodgers and Hammerstein, set in the early 20th century, which tells the story of a cowboy and his romance with a farm girl.

- The Wizard of Oz: Based on L. Frank Baum's children's novel, this tale follows Dorothy's adventures in the magical land of Oz as she seeks a way back home.

Stage Designer: Jason Jamerson

Stage Design Time: 2023

Types of performances: Drama

Design Concept:

When discussing the extreme use of technology, AI is indispensable. Last year, a painting created using the AI tool Midjourney, titled "Space Opera Theater," stood out in the Emerging Digital Artists competition held in Colorado, USA, winning first prize in the "Digital Art/Digitally Manipulated Photography" category.

It is well known that AI writing and AI painting technologies have become relatively mature. The digital assault launched by AIGC (Artificial Intelligence Generated Content) on traditional design is also quite formidable. International set designer Jason Jamerson has utilized Midjourney and DALL-E 2 to complete several theatrical stage designs.

AI technology typically allows designers to quickly create highly detailed and customized visual effects, significantly reducing the time and costs associated with traditional set design. This innovation permits greater flexibility and experimentation, providing designers with a powerful tool to bring their creative visions to life.

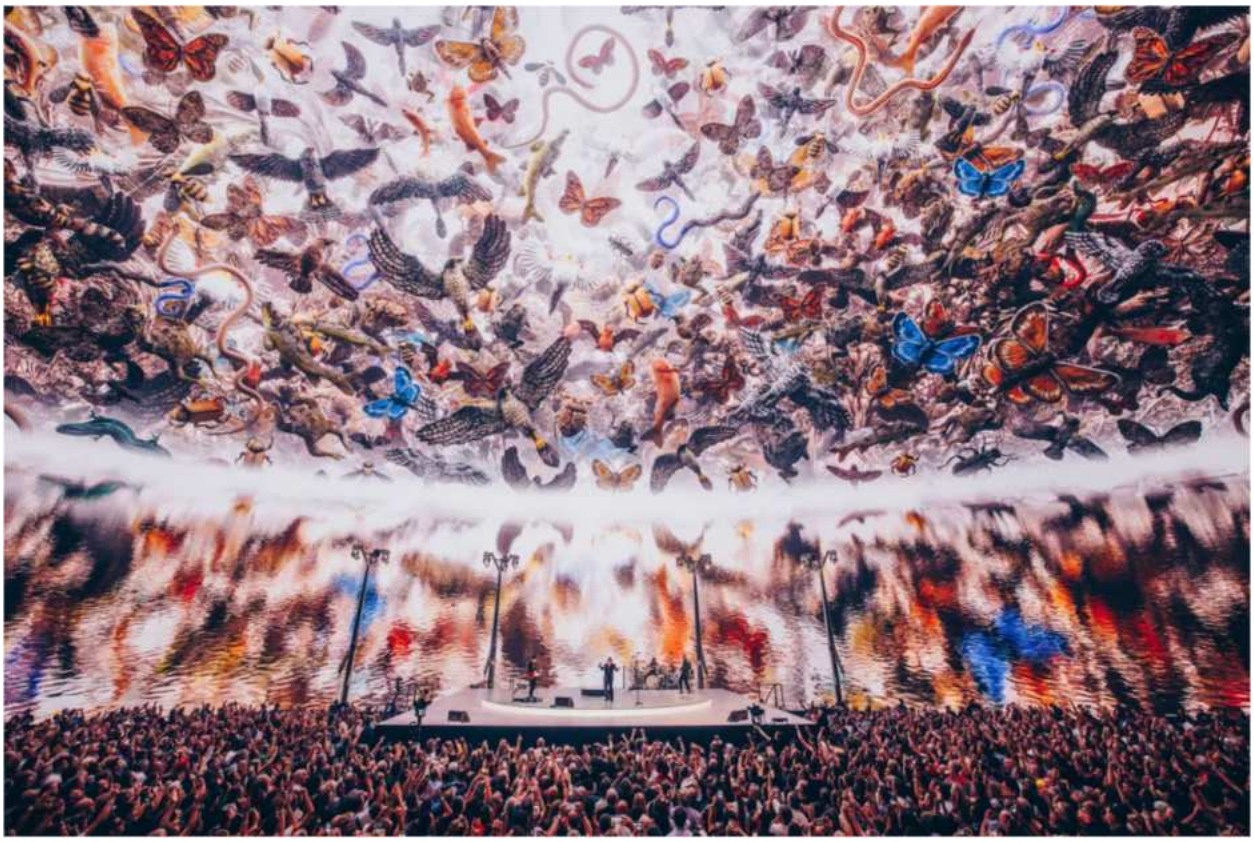
However, the integration of AI into the creative process also raises important considerations. While AI can enhance productivity and creativity, balancing technological advancement with the preservation of human artistic input remains a point of contention.

Cases Analysis

In contemporary design, modern technology frequently manifests through light and shadow, highlighting the critical role of lighting. If the set design is akin to a clay sculpture, then lighting acts as the sculptor's chisel in stage design—a fundamental element that cannot be excluded in nearly every example. With the advancement of LED lighting technology, designers have gained the flexibility to control color, brightness, and dynamic changes of light more effectively. Through programming, lighting can instantly shift colors, simulate natural light effects, or create dynamic light and shadow effects, making stage sets more vivid and expressive.

Several designers emphasize the profound connection between lighting and music in their designs. For example, designer Es Devlin stated:

"An artist is used to a certain high-hat beat or a certain drumbeat being accompanied by an accent or an expression in movement or accent in the light, so the lights are driven by the same program that drives the music. So what you will find when you are at a rock concert is that the light and the music are absolutely coordinated. They are both being driven by the same signals. And that communicates, again, to every person in the audience because the light is literally touching them; the light is carrying the music in particles over to the person."



This concept is evident in her work for U2's concert at the Las Vegas Sphere, where Es Devlin carefully selected 26 endangered species from Nevada's 152, creating digital sculptures of them. These sculptures were then magnified and displayed inside a sphere, moving slowly like a kaleidoscope at the peak of the music. The actions are synchronized with every beat of the music, gradually building the audience's emotions, amplified by the sheer visual impact of the piece. Devlin explains, "When 18,000 people sing together, it generates enormous power. These songs have been deeply ingrained in their bones over the past 30 years. It's a powerful way to unveil this new architectural geometry and graft it onto Nevada's specific location.

"Whenever we learn the name of a species, we make space for it in the memory palace of our minds. Every night, 18,000 people will come here, leaving with more species names in their minds than when they entered the sphere."[42](Jennifer Hahn, 2023)

[42] https://www.dezeen.com/2023/10/03/msg-sphere-las-vegas-es-devlin/

Another designer, David Roesner, in his article <Composing with Scenography> states:

"I often find the language of music very useful in describing the process of set design. My set designs follow rhythmic patterns and musical expressions. The standards for visual design are quite similar, especially in terms of rhythm and dynamics. In terms of lighting, the similarities with music are particularly striking. Perhaps this is because, like music, light is immaterial. I am interested in the temporal dimension of light: it can fade, expire, flicker— all-time events. Light cues have fade times and rhythms. I realize I often make sounds to describe lighting ideas in the theater like I 'sing' a light cue. But I feel regretful that the lights do not actually produce these sounds! In Stifters Dinge, I managed to make light audible by placing a mechanical shutter on a 5kW Fresnel lamp and amplifying it, so each time the light opened or closed, it produced a loud shutter sound, making people wonder whether it was the light producing the sound or the other way around."[43]

This resonates with Appia's theory of "Rhythmic Space" where he posits that light on stage has near-magical flexibility: "Light has a near-miraculous flexibility… it can create shadows, bring them to life, and spread their vibrating harmonies in space, just like music". Through this musical analogy, Appia realized the formal and rhythmic potential of light. By applying musical thinking, Appia liberated light from its mere practical and narrative/atmospheric function: light was no longer just about helping us better see actors and the scenic background or identifying locations, general ambiance, or time of day in mimicking real-life settings.[44](Birgit E. Wiens, 2019)

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[43] <Contemporary Scenography_ Practices and Aesthetics in German> -- Birgit E_ Wiens -- 2019 -- Methuen Drama

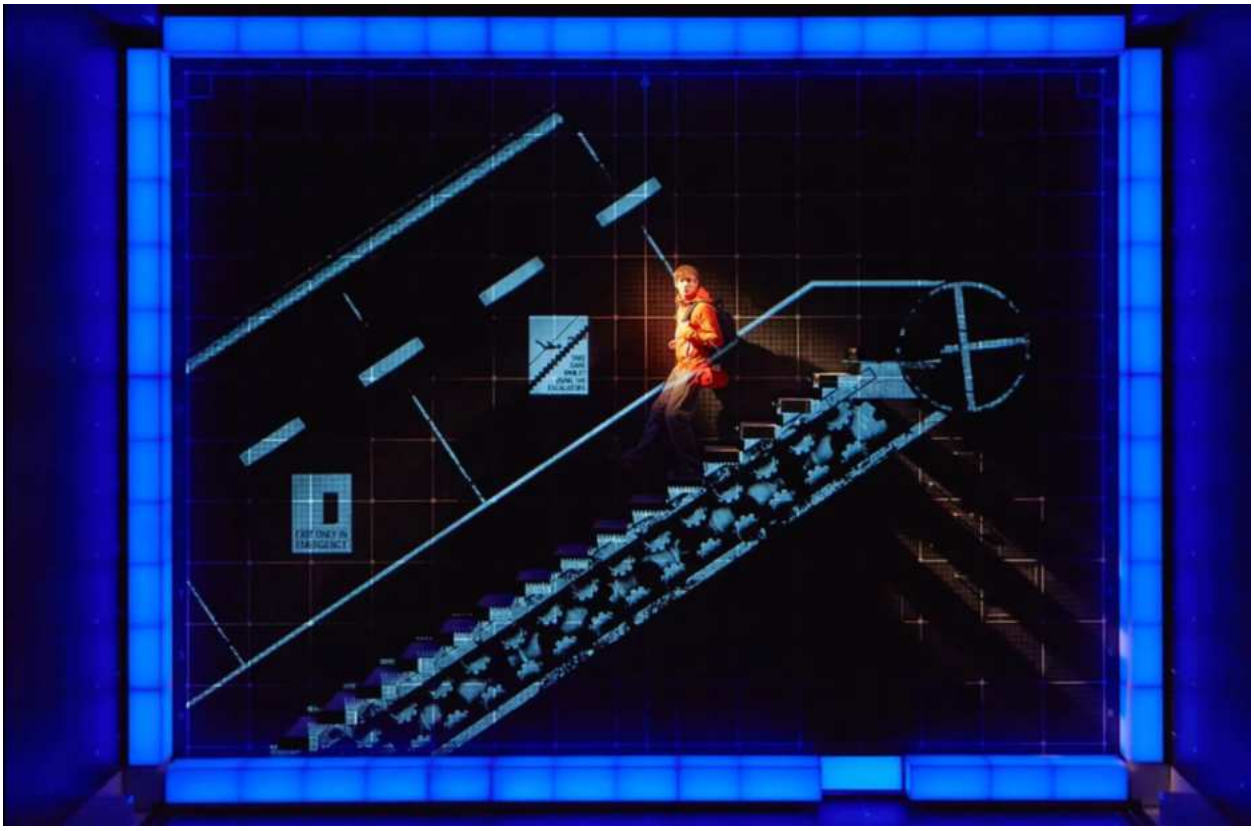
[44] <Music with images' (Bewildering) – beyond a practice of Bebilderung > David Roesner – No more décor

Beyond this, technology offers even greater possibilities for integration. In <Lakmé> the creative team D-Wok used high-resolution projections to transform the stage into a dynamic landscape. Vertical panels served as canvases for video installations, allowing them to create the effect of flowers exploding, project water screens above the flowers, and even create flower waterfalls. This made the set part of the narrative, with the flowers themselves acting as storytellers, significantly enhancing the audience's

emotional engagement.

In <The Snow Queen> Palle Steen Christensen's stage design used LED lighting and digital coding to create a visually captivating environment that reflected the story's emotional and thematic shifts. Coding was integrated into the lighting design to produce dynamic patterns and sequences that guided the audience's attention and emotions. The calculated lines and ethereal digital effects created paths of light that symbolized not only physical journeys but also emotional transformations. The digital reflections of mirrors, snowflakes, and constellations immersed the audience in a dreamlike, almost surreal experience, bridging the gap between reality and the fantasy

world of the Snow Queen.



Similarly, in <The Curious Incident of the Dog in the Night-Time> the use of LED lights, projections, and interactive set designs played a crucial role in advancing the narrative and guiding the audience through the unique world of Christopher Boone. LED screens and digital projections created a dynamic environment that reflected Christopher's mathematical mind, allowing the audience to visually see his thought process. These projections displayed mathematical equations, maps, and other visual elements, making his cognitive journey tangible. Interactive set elements responded to the actors' movements, further immersing the audience in Christopher's experience. For example, as he navigated different environments or emotional states, the set dynamically shifted, using lighting and projection to represent everything from the London Underground to the chaos of sensory overload. This not only supported the fast-paced narrative but also helped the audience understand the protagonist's inner world, making the abstract more comprehensible and emotionally impactful.

In "The Crucible" Es Devlin's stage design combined lighting effects with natural materials like water, wood, and soil. Devlin's set featured a trapezoid embedded in the ceiling, with custom hanging rods simulating glowing raindrops, creating an unforgettable visual effect that immediately set a foreboding and tense atmosphere. The rain effect was not just a visual spectacle but also a metaphor for purification, judgment, and the trials the characters were about to endure. Lighting was closely tied to this rain effect, dynamically changing to represent the passage of time and the emotional arcs of the characters. The use of natural materials like water, wood, and soil gave the production a tangible sense of realism while also symbolizing the instability and distortion of the societal and belief systems depicted in the play. The mounds of soil at the back of the stage were subtly integrated into the design, symbolizing the underlying corruption and instability of the society on trial.

In “The Crucible” lighting is a tool to enhance narrative depth, focusing on subtlety and symbolism, while in Es Devlin’s design for U2’s concert, lighting is used to create an overwhelming immersive sensory experience, fully utilizing modern technology to transform the performance space. The first is seeking to take the audience on a carefully crafted emotional journey, while U2’s concert aims to immerse the audience in a spectacular, all-encompassing visual and auditory feast.

Projection mapping is another frequently used technology on stage. Its core theoretical foundation lies in the interaction between light and space. By using computers and projection equipment, designers can precisely project digital images onto three-dimensional surfaces, rather than just flat planes. This technology allows images to be projected onto buildings, stage sets, sculptures, and even dynamic performers, creating unique visual experiences.

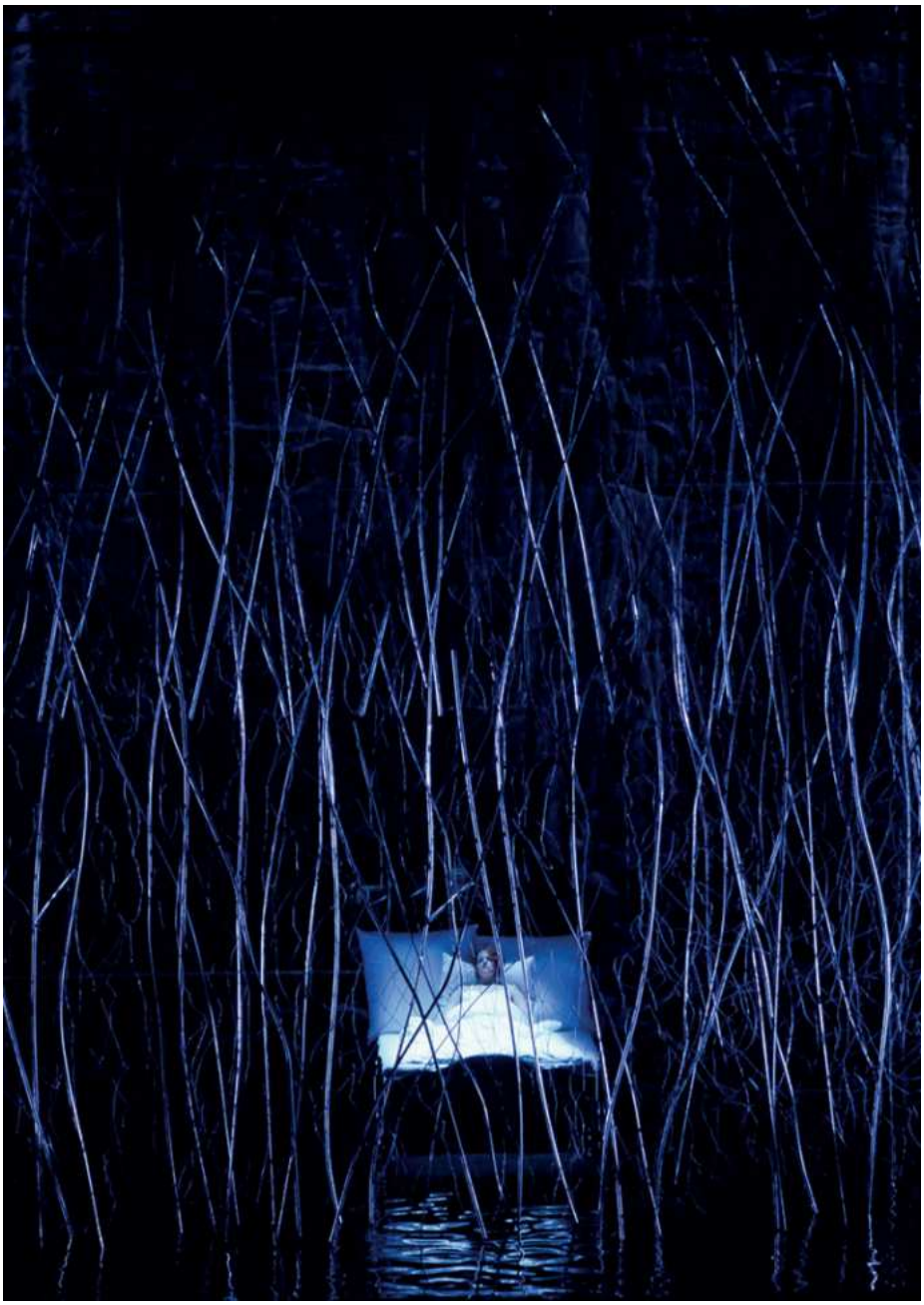
Although the term “projection mapping” is relatively new, the technology dates back to the mid-20th century. Czech stage designer Josef Svoboda first demonstrated “Lanterna Magika” at the 1958 Brussels World’s Fair. “Lanterna Magika” was a live performance where singers, dancers, and musicians performed against a backdrop of projected film footage.[45](*Projection Mapping*, n.d.)

Today, designers mostly use it to create visual illusions and immersion by altering the appearance of a surface or object to make it look like it is moving, changing shape, or material. Audiences in such environments are easily guided into an immersive experience because their visual perception is precisely controlled and directed. Additionally, it creates a dynamic combination of time and space, allowing projection content to be adjusted dynamically, and synchronized with the environment or narrative progression. This combination of time and space makes projection mapping not just a

[45] https://en.wikipedia.org/wiki/Projection_mapping

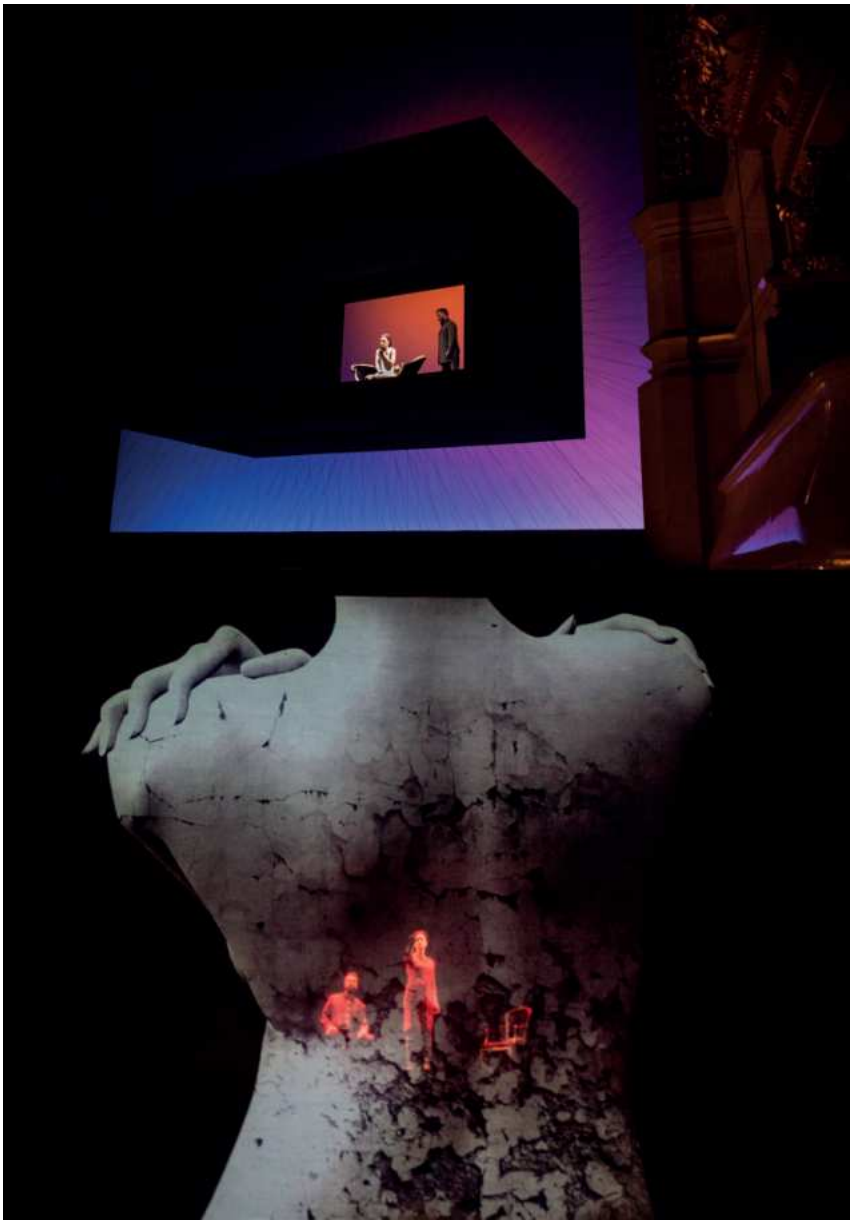
visual decoration but a storytelling tool that can change in real-time with the plot or audience interaction.

For example, Alfons Flores used this technology in two of his works: “Pelléas et Mélisande” and “Quartett.”



In “Pelléas et Mélisande” projection mapping enriches the stage design by transforming the massive parallelepiped structure at the center of the set. This technology allows for seamless transitions between different scenes, whether dark,

foreboding forests or the intimate, claustrophobic interiors of the castle. The vivid images and textures projected onto the stage add layers of meaning, enhancing the opera's dreamlike quality, and immersing the audience in the unsettling and ambiguous world of "Pelléas et Mélisande."



In "Quartett," the set features a suspended box representing an emotional and physical prison in which the characters Valmont and the Marquise de Merteuil are trapped. The lighting within this confined space is stark and oppressive, emphasizing the claustrophobia and psychological tension that permeates the drama. The harsh

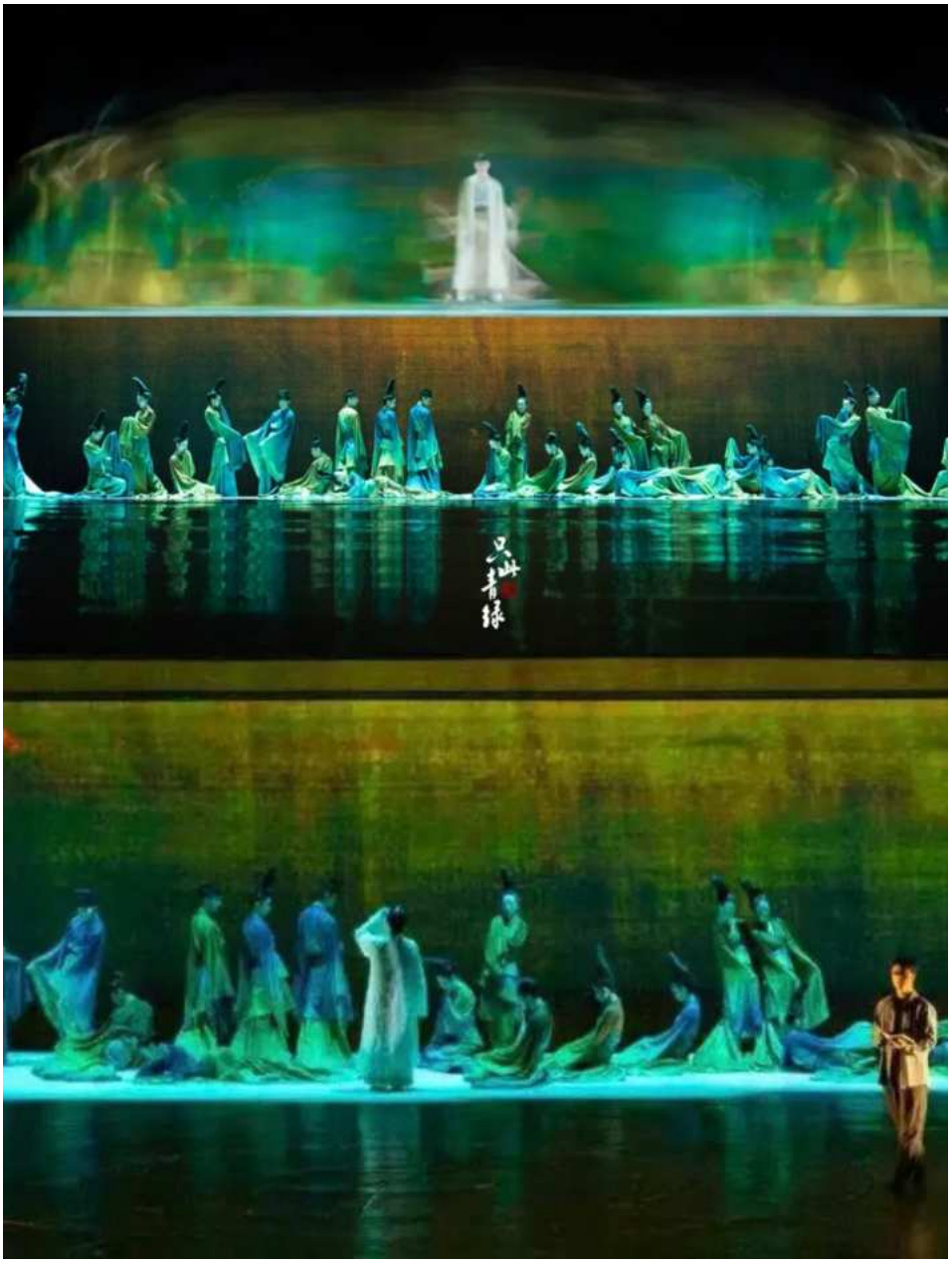
internal lighting contrasts with the surrounding darkness, highlighting the characters' sense of isolation and being trapped within their destructive desires. Projection mapping adds a dynamic layer to the storytelling by transforming the surface of the box and the surrounding void into canvases for visual metaphors. These projections, created by Franc Aleu, depict a series of evocative images reflecting the characters' inner struggles, including abstract representations of their fantasies, fears, and unspoken desires. Additionally, the projections extend beyond the box, suggesting a vast "outside world" that blends elements like the ocean, sky, and storms. These natural images contrast sharply with the artificial confines of the box, symbolizing the broader universe from which the characters are disconnected.

In both cases, innovative lighting and projection technologies are highlighted. In "Pelléas et Mélisande" lighting creates an ethereal, dreamlike atmosphere, while in "Quartett", it enhances the psychological intensity of the narrative.

This symbolic set design and imagery play a crucial role in deepening the audience's engagement with the story's themes and emotions. From the perspective of traditional Chinese art, the application of projection mapping in scene design becomes even more essential, as it can deeply interpret and enhance these implicit, poetic, expressive, and sentimental artistic qualities.

In Chinese ink painting, the concept of "虚实相生"(xū shí xiāng shēng), or the interplay of emptiness and substance, is vital. "虚实" not only refers to the relationship between the empty spaces and filled areas on a canvas but also encompasses the internal tension and harmony conveyed when expressing the work's mood and emotions. Transferring such an aesthetic to the stage, it is hard to imagine what it would look like

without the aid of projection.



In ink painting, “留白” (liú bái), or the use of empty space, is not just part of the painting but an essential component of the overall mood. Projection mapping can simulate this effect by controlling light and selecting projection areas. This design concept runs throughout the “Only This Green” design. For example, in stage design, some scenes can be presented with clear landscapes or buildings through projection mapping, while other parts are left intentionally blank (i.e., not projected) to convey the

sense of emptiness, leaving room for the audience's imagination. This combination of fullness and emptiness not only retains the ethereal quality of the image but also enhances the visual depth.

In another Chinese-style work, "Dream of the Red Chamber: Theatrical Fantasy City," projection mapping uses the alternation of emptiness and substance to represent the passage of time and the transition of space. For example, in depicting a character's memory, the background can be made hazy and blurry through projection, and as the plot returns to the present, the image gradually becomes clear and concrete. As the story progresses, projection mapping brings classical architecture, courtyards, and interior decorations vividly to life on irregular architectural surfaces, creating an ancient and dynamically changing "phantom city."

Projection mapping can overlay virtual elements (such as ethereal fog, flowing water, etc.) onto actual sets, blurring the boundaries between the real and the unreal, and enhancing the audience's immersion and sense of space.

Speaking of the ultimate use of technology, AI is indispensable. Last year, International set designer Jason Jamerson utilized “Midjourney” and “DALL-E 2” to complete several theatrical stage designs titled “Space Opera Theater” which stood out in the Emerging Digital Artists competition held in Colorado, USA, winning first prize in the “Digital Art/Digitally Manipulated Photography” category. AI writing and AI painting technologies have become relatively mature, and the digital assault launched by AIGC (Artificial Intelligence Generated Content) on traditional design is also quite formidable.

As demonstrated by Jason Jamerson's work, AI's role in stage design offers exciting possibilities for the future of theater. It allows for more elaborate, flexible, and efficient design processes while challenging designers to find new ways to integrate human creativity with technological advancements. The result is a richer, more immersive experience for the audience, and the possibilities for storytelling are expanded.

Moreover, projection mapping is likely to be increasingly combined with augmented reality (AR) and virtual reality (VR) technologies. This combination will allow for more complex and interactive visual effects, enabling audiences to simultaneously experience both virtual and real environments.

Modern technology endows lighting with unprecedented richness and powerful creativity, making it not only a visual element in stage design but also a core tool for expressing emotions and rhythm. Through deep integration with music and space, lighting transcends its traditional functional limitations, becoming an intangible medium capable of shaping, transforming, and touching the audience. This fusion of technology and art is the driving force behind contemporary stage design's continuous innovation and development. With the support of modern technology, lighting has become the “sculptor” on stage, its flexibility and creativity bringing every moment of light and shadow to life with vitality and artistic tension.

Image Credit:

Case1：https://d-wok.it/work/

Case2： https://www.christiedigital.cn/spotlight/red-mansions/

Case3 https://m.thepaper.cn/kuaibao_detail.jsp?contid=16530002&from=kuaibao

Case4： https://www.nytimes.com/2014/10/06/theater/the-curious-incident-of-the-dog-in-the-night-time-opens-on-broadway.html

Case5: https://pallesteen.dk/

Case6: https://lafura.com/en/works/pelleas-et-melisande/

Case7: https://www.peroni.com/lang_UK/scheda.php?id=53230

Case8: https://www.dezeen.com/2023/07/28/the-crucible-set-design-es-devlin-rain-installation/

https://esdevlin.com/work/the-crucible

Case9: https://edition.cnn.com/2023/10/01/entertainment/u2-sphere-las-vegas-cec/index.html

Case10: https://www.instagram.com/jasonjamerson/

05 Exploring Scenography Through VR

Virtual Reality (VR) has attracted a lot of attention in recent years in various fields such as stage design, and its potential to create visual spectacles, imaginative spaces, transformative environments, and immersive audience experiences can- not be ignored. Interestingly, the theater itself can be seen as a virtual reality, where actors and audience members work together to build shared beliefs through imagination. Often referred to as Coleridge's "suspension of disbelief," this concept transforms an empty stage into the ancient palace of Thebes or the Salem Witch Trials of 1692. VR pioneer and theater designer Mark Reaney describes the theater as a "primitive virtual reality machine," in which the audience can experience the theater as a "primitive virtual reality machine," and in which the audience can experience the theater as an immersive, virtual reality machine. VR pioneer and theater designer Mark Reaney describes the theater as "a primitive virtual reality machine" in which audiences can explore "inter-active and immersive imaginary worlds" (Reaney 1996).[46]

[46] Dixon, S. (2006). A history of virtual reality in performance. *International Journal of Performance Arts and Digital Media*, *2*(1), 23–54. https://doi.org/10.1386/padm.2.1.23/1

VR artist and critic Diane Gromala argues that the historical precedent for VR is embodied in the fantastical worlds evoked through rituals, dioramas, art, literature, and theater that evoke a common but transcendent place where humans can extend and project their agency (Gromala, 1996).

Combining these insights with Aristotle's understanding of theater through his Poetics provides a rich framework for exploring the relationship between VR and stage design. Aristotle emphasized two key principles in theatre: mimesis and catharsis.VR enhances mimesis by creating highly immersive and interactive environments that allow the audience to feel like they are part of the narrative, thus providing a more compelling and engaging imitation of reality. This immersive experience can evoke a strong emotional response, which can lead to catharsis as the viewer develops a deeper emotional and psychological connection to the character and the story. Seamless transitions and adaptive narratives in VR keep the action unified, ensuring a coherent narrative flow that keeps the viewer engaged.[47]

The creation of immersive environments has gradually shifted from tangible props and furniture to the realm of 'soft sets' - digital images, virtual spaces and the human body itself now produce the main illusory environments on stage. Paradoxically, this high-tech, futuristic medium often evokes ancient, classical, or primitive worlds, thus connecting past and future in a seamless dance of time.[48]

Since ancient times, mankind has been captivated by art and architecture that transport the viewer to alternate realities. From classical frescoes to expansive panoramas, countless examples reflect our enduring obsession and deep-seated desire to create and experience transcendent realms.

Josef Svoboda is a key figure in the integration of modern technology into theater, demonstrating by example how technological advances have revolutionized stage design. His work often involves a fusion of live action and film, creating immersive environments that reflect the psychological state of the characters and enhance the mimetic experience. Svoboda's approach is consistent with the Aristotelian principle of

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[47] Same as above

[48] Emmanouela Vogiatzaki – Krukowski & Manthos Santorineos. (2011). *illusionistic Environments—Digital space. Volume 10 • 2011 • 1.* https://doi.org/10.16995/bst.99

utilizing technology to create dynamic, constantly evolving stage environments that respond to the actions and emotions on stage. His techniques, such as dynamic scenery and projection systems, allow for deeper emotional engagement and promote catharsis (Burian, 1971).[49]

The cultural and technological context of the mid-20th century, marked by rapid technological advances and a spirit of innovation, provided fertile ground for the integration of VR into theater. This era encouraged the breaking down of traditional boundaries and embraced the principles of modernism, emphasizing functionality and abstraction.VR was well suited to this context as it offered new ways to represent reality and abstraction on stage. The socio-political tensions and technological race of the Cold War influenced artists like Svoboda to incorporate social and political commentary into their work, utilizing the stage as a platform to explore contemporary issues.

Furthermore, VR redefines the Renaissance concept of perspective by offering three key aspects: immersion in a three-dimensional world, freedom to navigate and choose a point of view, and the ability to interact with and manipulate virtual environments. It skillfully blurs the line between physical reality and digital constructs, effectively making the computer invisible as the user enters the virtual realm.[50]

Discussing the possibilities of virtual reality (VR) in stage design in conjunction with the concepts of postmodern design can further deepen its significance as a tool for extending reality. Postmodern design emphasizes metaphor, dual self-awareness, organic unity, and shifting perspectives, concepts that can be closely integrated with the use of virtual reality technology to open up new possibilities for stage design.

Postmodern design often utilizes metaphors and symbols to convey complex meanings and emotions. Virtual reality technology can enhance the audience's experience by

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[49] Burian, J. M. (1970). Josef Svoboda: Theatre Artist in an Age of Science. *Educational Theatre Journal*, *22*(2), 123. https://doi.org/10.2307/3205717

[50] Anna Alisher. (2021). *Art history dynamics of theater scenography*. https://doi.org/10.32461/2226-3209.2.2021.240004

creating highly immersive and interactive environments that utilize visual and auditory metaphors.

With VR, the audience is not only a passive observer but can become a participant and even part of the narrative. This interactivity enhances the audience's perception of their own relationship with the play, as Mark Reaney describes it, as the audience excursions into an interactive and immersive imaginary world. This experience of double self-awareness allows the audience to reflect more deeply on their own feelings and reactions, thus enhancing the emotionally cleansing effect of the play.

Combining the concepts of postmodern design with virtual reality technology greatly expands the possibilities of stage design, as VR not only realizes a high degree of metaphorical expression and dual self-awareness but also creates a more dynamic and immersive theatrical experience through organic unity and shifting perspectives. This combination not only enriches the theatrical expression but also deepens the audience's emotional engagement and psychological experience, realizing the mimetic and emotionally cleansing effects of theater as described by Aristotle. In this way, virtual reality becomes a powerful tool for extending reality in stage design, opening up new possibilities and prospects for modern theater.

Recent epidemics have had a profound impact on theaters around the world, resulting in the suspension of performances and the cancellation of programs, causing significant financial losses for both institutions and individuals. Historically, theaters have always recovered from devastation such as plagues and wars. However, the rise of digital media marks a unique shift that has changed the way audiences engage with performances. Digital platforms have eliminated the need for physical space and fostered a new kind of audience. With the closure of theaters due to the Epidemic, many people turned to platforms such as Zoom, which may have reduced the number of "qualified audience members" who appreciate the details of a play. Traditionally, attending a play requires a physical journey from one place to another, transforming the individual into an audience member. Theater space is usually the key to this transformation, and it is often a threshold.

In digital performance, this transformative journey is non-existent. Per- Performances can be viewed anywhere, anytime, which diminishes the importance of space. This shift

is not negative in itself, but rather marks
a shift in the way we experience performance. Even in immersive and site-specific theater, the role of space is crucial to the audience's experience.

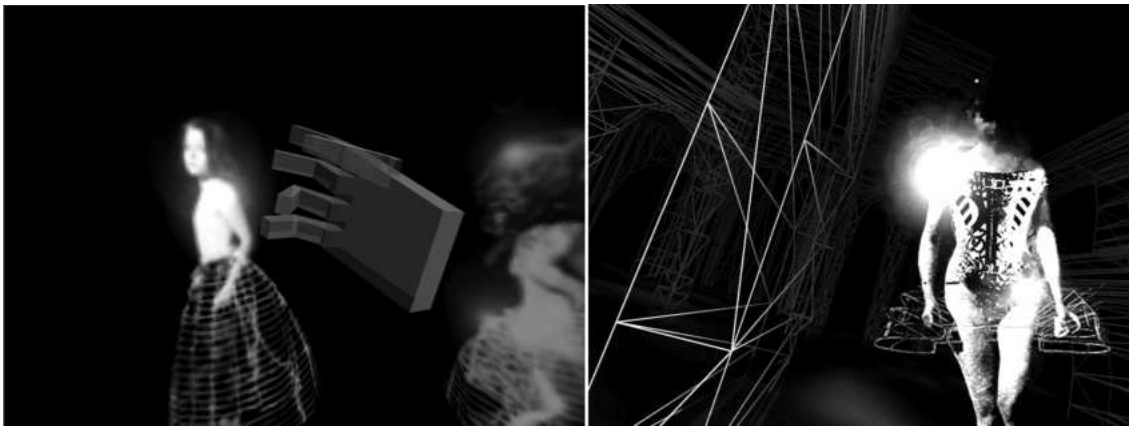
At the same time theater spaces are dynamically created and altered by the presence and movement of performers, whereas digital performances offer spatial representations without physical interaction. The live experience is crucial in theater and involves a complex spatial negotiation between the audience and the stage that is lacking in digital formats.

Arnold Aronson, a professor of theater at Columbia University, asserts that viewing a live performance requires the audience to conquer time as much as to travel through space. He likens the audience ticket to a passport that facilitates this transformation, emphasizing the spatial journey inherent in live performance. In digital performance, the absence of physical presence is apparent. Aronson argues that "space is not a place; space is where the practice takes place," emphasizing that space is not merely a passive container, but an energetic, dynamic entity that expands and contracts in response to tension an essential component of performance.

Finally, reflecting on Gertrude Stein's idea of "there is no there there," we must consider how our identities and connections to place evolve over time. As we adopt to digital and virtual spaces, we must consider whether a return to traditional theater is still possible. Will we still recognize and cherish these spaces? Or have they been irreversibly transformed in our collective consciousness? [51]

Archeology of a Mother Tongue

[51] Arnold, A. (2021, March 30). *Staging the Future Keynote: Where Are You Now?* Staging the Future featured as part of UAL's Research Season 2021. https://www.youtube.com/watch?v=Lpv_S_MEXRo



The immersive interactive narrative project at The Banff Centre for the Arts, developed in collaboration with Michael Mackenzie, serves as a compelling example of how virtual reality (VR) can be utilized to expand the possibilities of stage design. This pioneering work blends interactive computer graphics, laser disk video, and slides with an immersive soundscape, culminating in an approximately forty-minute- ute experience that envelops the viewer in a richly detailed narrative world.

Participants navigate the VR environment using a small plastic camera, which allows them to "look" around the virtual spaces, and a glove that facilitates interaction by enabling them to start and stop actions and touch objects within the scene. The experience begins with a dream sequence, where the viewer assumes the perspective of the Coroner, one of the two primary characters. In this dream, the Coroner recalls a forgotten memory of being adopted as a child from the city she is now returning to, in order to investigate the murder

of another child. This segment is set in a virtual space inspired by Piranesi's prison drawings, evoking a surreal and labyrinthine environment that the viewer explores by touching animated figures, each touch guiding them along a narrative path within the architecture.

The second environment represents a human ribcage, functioning as the transport plane that carries the Coroner to the city. This space

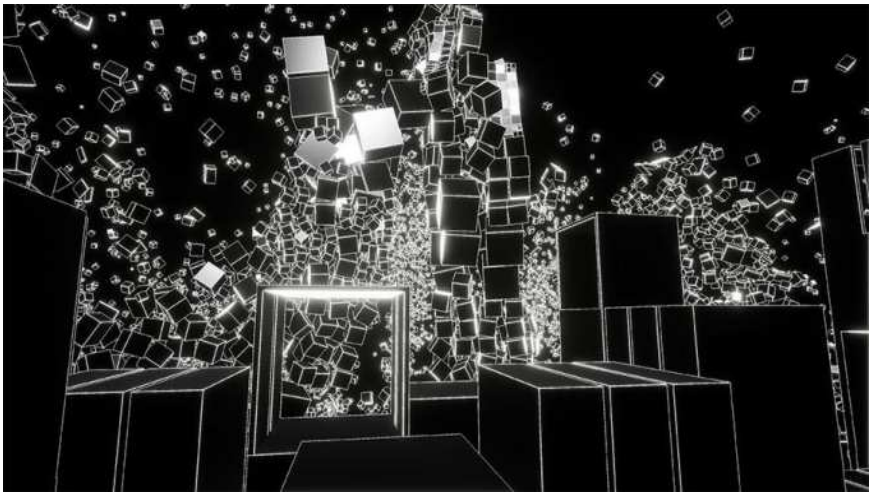
is interactive in a unique way: as the viewer orients their virtual body within it, they collide with invisible planes that morph into cloud banks. These collisions trigger narrative segments and fragmented memories related to the murdered child, who is a violinist. The auditory and visual cues in this environment create a haunting, ethereal atmosphere that deepens the narrative experience.

The third environment is a copper wire hand, symbolizing a short-term memory construct of the Pathologist, the other main character, who is paralyzed by his overwhelming recollections and struggles to engage with the present. The hand contains various objects, each representing different memories. Some of these are forensic details from the child's autopsy, providing insights into her life and death in the city. By touching these objects, they expand, allowing the viewer to enter and navigate through them, while listening to corresponding narrative sections. The skull with a wireframe brain inside represents the Pathologist's long-term memory, adding another layer of depth to the story.

This project showcases VR's ability to transform traditional stage design into a multi-sensory, interactive experience. By integrating tactile interaction and spatial navigation, it creates a dynamic and participatory form of storytelling that engages viewers in ways that are impossible in conventional stage productions. This fusion of technology and narrative demonstrates VR's potential to redefine the boundaries of stage design, offering immersive experiences that are as emotionally resonant as they are visually and auditorily captivating.[52]

[52] Anna Alisher. (2021). *Art history dynamics of theater scenography*. https://doi.org/10.32461/2226-3209.2.2021.240004

Current, Rising



"Current, Rising," an innovative project by the Royal Opera House Au- audience Lab in collaboration with technology developers Figment Productions and the StoryFutures academy at Royal Holloway, University of London, exemplifies the transformative potential of virtual reality (VR) in stage design. Funded by UK Research and Innovation and produced by Annette Mees, this VR opera aims to extend traditional opera into a fully immersive, aesthetically rich, and dramatically compelling environment. Designed for up to four participants at a time, Mees describes the experience as a "threshold

sequence." Using Unreal Engine, developed by Epic Games, "Current, Rising" integrates classical narrative structures and dramatic constructs with limited interactive user options to enhance the immersive experience.

Inspired by Ariel's liberation at the end of Shakespeare's "The Tempest," "Current, Rising" transports viewers into a dreamlike universe.
It begins with projections of associative text and culminates in a cityscape rising from water and exploding into fragments. Initially slated to premiere in December 2020, the project was delayed due to the pandemic. Its physical staging was developed on the Royal Opera House's second stage, the Linbury Theatre, incorporating VR headsets and backpack computers hung on the walls of an ambient blue-lit entry room, where participants don the equipment before entering the first of several virtual worlds.

Director Netia Jones articulates the project's goal: "Through 'Current, Rising,' we have been exploring VR's potential to expand the concept of opera, both in the creative process and in the audience experience. Here, the audience is the protagonist, embedded within the piece, making their physical experience an integral part of the work." Combining VR with multisensory elements such as wind, haptic feedback, and sand, "Current, Rising" insists on artistic aesthetics and transcendent thinking, surpassing the typical technological dominance over the creative team's vision.[53]

The collaborative nature of the work is emphasized by Jones, Mees, and composer Samantha Fernando, who developed the piece through numerous international Zoom meetings. They meticulously discussed every aspect of the opera, including set construction, virtual experience, lighting, sound, and movement. The model features of "Current, Rising" emerge from a virtual model developed through layers of possibility and constructed as both digital and physical simulations. Only four viewers at a time can access the VR environment through the Linbury Theatre.

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[53] Thea Brejzek. (2021, March 30). *Staging the Future: Reality and the Virtual Model*. UAL's Research Season 2021. https://www.youtube.com/watch?v=gscnVTGJ2wU

Upon entering the physical stage, viewers encounter an abstract set built on the stage. A white cube, engraved with the opera's title, serves as the initial physical transition into the virtual realm. Once on stage, viewers become actors in the VR opera, guided through the entrance into the cube and further into the dressing room, where they equip the VR headset and backpack computer. In this costume, audience members enter the first text-based world, named the "Insomnia Room," composed of literary quotations from "The Tempest" and documentary information on weather, climate change, and society. These quotations, displayed in varying black and white fonts, immerse viewers in a semantic cloud.

From the text room, participants move from the Euclidean geometry of the white cube to a cosmic atmospheric world, transition- ing from day to night and back. They traverse a river of color and shape toward an unstable yet beautiful horizon. A city structure rises from the river, eventually exploding, closing the metaphorical arc between creation and destruction. Throughout the 15-minute experience, the world unfolds gradually, immersing the audience
in a linear structure akin to Aristotle's classical drama, introducing conflict, rising action, resolution, and catharsis. Mees explains that the journey of the four-person audience is planned linearly, leading the group from the material entrance into the auditorium, onto the stage, into the physical set, then into the virtual world, and back to the material world, passing through the cube, across the stage, and out of the theater to the street.

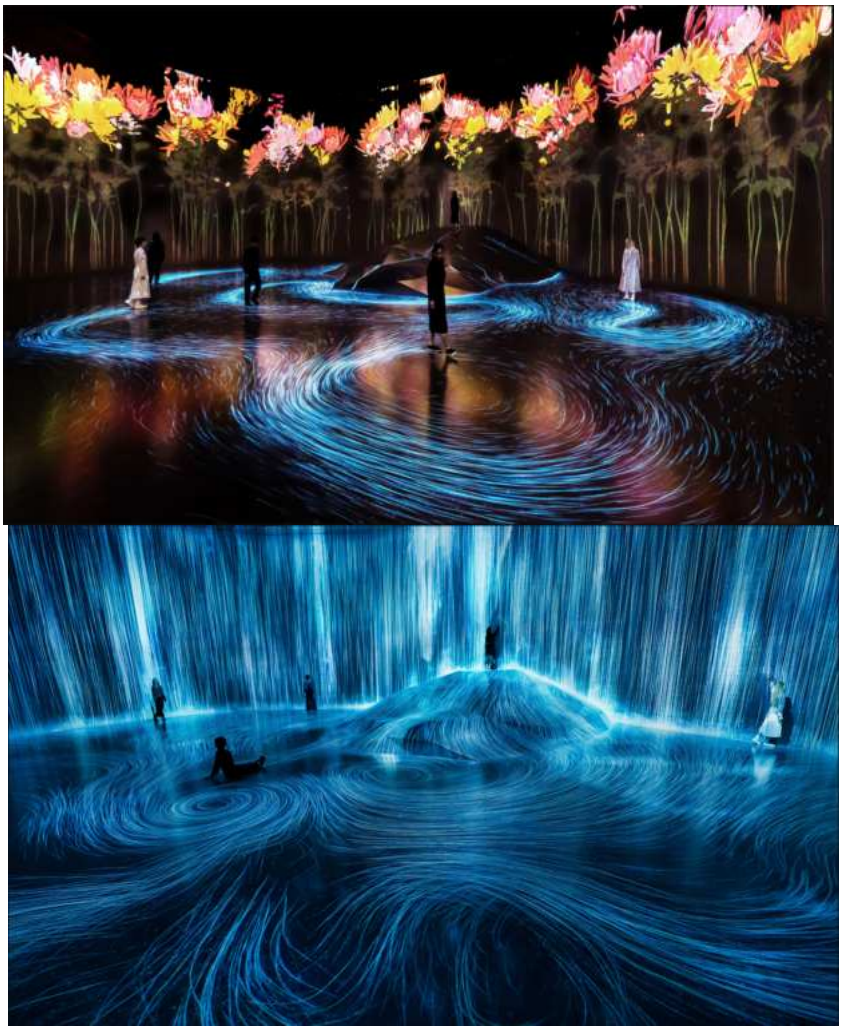
Contrasting with the augmented reality opera projects like "The Magic Flute" by Queensland Opera, which blur the lines between virtual and real worlds, "Current, Rising" adheres to traditional narrative and dramatic structures, distinctly separating the two realms. Both projects, however, achieve high levels of immersion with virtual models at their core. Whether in the inhabited space models of "The Magic Flute" or the uninhabited cosmic worlds of "Current, Rising," the experiences rely on audience activity to fulfill the intended experience.

The world creation in “Current, Rising” is a collaborative project that is both performative and cognitive, generating knowledge. Philosopher Nelson Goodman asserts that world creation always involves “remaking” existing worlds or elements. Goodman’s view of art as a way of discovering, creating, and expanding knowledge ties world creation directly

to epistemology and metaphysics. This project, through its virtual and augmented reality artworks and performances, embodies construction, reconstruction, invention, and assembly of facts and fiction within a non-verbal symbolic representation system.

By examining recent augmented reality and virtual reality projects, it is evident that virtual worlds are strategies for constructing places independent of reality yet possessing their own unique reality or authenticity. Philosopher Sven-Olov Wallenstein and visual artist Koo Jeong A, discussing Koo’s recent augmented reality work, confirm that the virtual does not render physical locations irrelevant but requires them. A virtual location inherently contains countless further or alternative positions, presenting an unstable and rhizomatic rather than a stable and linear entity. Any single virtual model should be understood as one among innumerable unimaginable worlds, perpetually in fluid motion. Thus, the process of world-building through virtual models is never complete and always marked by potential. From this perspective, the future of stage performance is already forming, shaped by the innovative use of VR and immersive technologies.

TeamLab Borderless



teamLab Borderless is a dynamic digital art museum where interactive artworks flow seamlessly across a borderless space, encouraging visitors to explore, discover, and connect in a continuous, immersive environment.

Virtual reality (VR) is revolutionizing stage design by offering unparalleled capabilities for world-building and immersive storytelling. The current project delves into the unique lineage and properties of theater and architectural models, with a particular

focus on virtual models. It aims to explore two interrelated and hypothetical research strands: the first investigates the distinctive world-building capabilities of virtual models, while the second examines their performative and cognitive qualities. Both strands require positioning physical and virtual models to equally express interconnectedness and distinct elements, necessitating a theoretical grounding of models in reality.

To illustrate these concepts, this paper examines two recent case studies that explore the relationship between virtual models and reality, focusing on their world-building or cosmological abilities. One such case is the immersive project "teamLab Borderless," showcased by the Japanese art collective teamLab at the Mori Building Digital Art Museum in Tokyo in 2019. This project, developed before the COVID-19 pandemic, exemplifies the potential of VR, augmented reality (AR), and mixed reality (MR) to create expansive and engaging environments.

Spanning 10,000 square meters, "teamLab Borderless" features over 50 interactive artworks divided into five interconnected sections,

making it one of the largest digital environments globally. The space is driven by gesture and mobile device interactions, allowing visitors to navigate and engage with the artworks seamlessly. The experience is designed without visitor limits, resulting in varied experiences where individuals can explore alone or as part of a larger group traversing the vast space.

"teamLab Borderless" serves as both a collage of media art history, drawing inspiration from pioneering works in the genre, and as a paradigm of VR, AR, and MR's ability to construct immersive worlds. It successfully engages millions of viewers in a series of immersive environments, where the temporal and spatial complexities reflect the infinite nature implied in its title. The exhibition immerses audiences in a visually and experientially compelling multisensory realm, demonstrating the potential for technology to enhance immersive experiences while becoming increasingly invisible.

The impact of "teamLab Borderless" on stage design is profound. It showcases how VR can extend the boundaries of traditional stage design by creating dynamic, participatory environments that engage audiences in novel ways. The seamless integration of interactive elements within a vast, borderless space offers a glimpse into the future of stage design, where physical and virtual realities intertwine to create rich, immersive narratives. By enabling viewers to actively participate in the storytelling process, VR transforms the passive experience of traditional theater into an active, explorative journey, redefining the relationship between audience and performance.[54]

Image Credit:

Archeology of a Mother Tongue: https://digitalartarchive.at/database/work/658/

Current, Rising:https://www.samanthafernando.com/current-rising

TeamLab Borderless:https://www.teamlab.art/e/tokyo/

[54] Thea Brejzek. (2021, March 30). *Staging the Future: Reality and the Virtual Model*. UAL's Research Season 2021. https://www.youtube.com/watch?v=gscnVTGJ2wU

06 Conclusion

As we conclude our exploration of the evolution and transformation of stage design in the digital age, it is clear that this field has undergone significant shifts in both practical and theoretical understanding.

Stage design has evolved from the functional structures of the skene in ancient Greece to today's complex, interdisciplinary designs, highlighting its dynamic nature. Pioneers like Adolphe Appia and Edward Gordon Craig redefined stage decoration, emphasizing its indispensable role in the life of the theater. Influenced by figures like Richard Wagner and Robert Edmond Jones, modern stage design strives to align with the core of the drama, creating a seamless integration between action and environment.

The integration of digital technologies such as VR, AR, and projection mapping has not only expanded the creative possibilities of stage design but also fundamentally altered the relationship between the audience, performers, and the performance space due to its interactivity and dynamism.

Historically, stage design has shifted from static and symbolic representations of space to more dynamic and immersive environments that engage multiple senses. This evolution reflects broader cultural, technological, and artistic trends where the boundaries between reality and the virtual, the tangible and the intangible, are increasingly blurred. In the digital age, stage design has transcended the traditional stage, moving towards the creation of spaces that generate a series of actions and observations—effectively a combination of behaviors and observations—and trigger events and performance processes. These actions and processes, when triggered and

enacted, contribute to the dynamic nature of the space, adopting new forms of interactive and participatory storytelling.[55]

The combination of digital tools has transformed stage design into a multidisciplinary practice, drawing on the expertise of architects, visual artists, computer scientists, and performers. Technologies such as VR and AR allow stage designers to create spaces unconstrained by physical limitations, enabling experiences that can be personalized and adjusted in real-time. These technologies also present new challenges, such as the potential over-reliance on digital effects, leading to a loss of the tactile experience traditionally provided by physical sets. Additionally, the question posed by Arnold Aronson arises: in the context of digital performance, when "there is no there there," can we still return to traditional theater, or have we lost the ability to recognize and appreciate these spaces?[56]

As scenography expands its context of use, and the tools become increasingly operational and varied, the possibilities are greatly enhanced. Beyond the digitization of stage design and the creation of immersive dynamic environments on stage, terms like "expanded scenography" have become common in the English-speaking world. This spatial language may interact with political and social cognition due to its narrative and persuasive nature. It remains a powerful tool for narrating and shaping human experiences, reflecting the ever-changing world we inhabit.

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[55] *Birgit E. Wiens. (2019). Contemporary Scenography Practices and Aesthetics in German Theatre,Arts and Design. BLOOMSBURY, METHUEN DRAMA and the Methuen Drama logo are trademarks of Bloomsbury Publishing Plc.*

[56] *Arnold, A. (2021, March 30). Staging the Future Keynote: Where Are You Now? Staging the Future featured as part of UAL's Research Season 2021. https://www.youtube.com/watch?v=Lpv_S_MEXRo*

The transformation of stage design in the digital age indicates a broader shift in how we perceive and interact with art and performance. New aesthetic styles and visual languages, such as abstraction, futurism, and interactivity, are emerging.

The digitalization of space and the creation of immersive environments impact areas beyond theater, influencing fields like virtual reality, gaming, and interactive media. As stage design continues to evolve, it will likely play a key role in shaping the future of these industries, providing audiences with new ways to engage with stories and environments.

Looking ahead, practitioners in the field of stage design must continue to explore the balance between digital innovation and traditional theatrical practices. Future research could delve deeper into the psychological and emotional impacts of immersive stage design experiences, particularly how they affect audience engagement and perception. Additionally, the ongoing dialogue between technicians and artists is crucial to ensuring that digital tools are used to enhance, rather than overshadow, the core elements of storytelling. The emergence of AI design also introduces a new identity for designers.

The development of stage design in the digital age represents a significant convergence of tradition and innovation. As we continue to explore the possibilities offered by new technologies, it is essential to remember the fundamental principles of stage design—creating spaces that not only serve the narrative but also resonate emotionally and intellectually with the audience. The future of stage design lies in its ability to adapt, innovate, and continue to push the boundaries of what is possible both on and beyond the stage.

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