

Dance with Musical Architecture:

Eurhythm in Gottfried Semper's works

Golnar Ahmadi

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Paul Emmons

Marcia Feuerstein

Matthew Mindrup

Jodi La Coe

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ABSTRACT

A musician and an architect, Richard Wagner and Gottfried Semper, two German artists, influenced the theory of art in the nineteenth century. Wagner met Semper in a music shop in Germany later they participated in various discussions regarding the history and theories of art and they both held their own perspectives. Wagner developed the theory of *Gesamtkunstwerk*, based on the integration of music, dance, and poetry, while Semper worked on the integration of music and architecture based on the common character of proportion and scale. This dissertation traces the evolution of this theory in nineteenth century Germany, introducing each person's perspective while summarizing the synthesis of the notion of the arts at the end, aiming to develop a general perception of its function in art.

In addition, Semper expanded the notion of mathematics in art by exploring and bringing the example of natural forms and patterns. For him, mathematics had been categorized into three aspects of Symmetry, Proportionality, and Movement. In addition, movement and direction for him were the beginning of the exploration of Vitruvius's idea of eurhythm. Semper brought the example of the human body as a reference for measuring and scaling the architectural drawings. This research focuses on three crucial questions and the discovery of Semper's work, the second Dresden Theater. First, it investigates the connection between Semper's architectural drawing and musical notation. Second, it scrutinizes the attitude toward the integration of arts among artists and philosophers in nineteenth century Germany. Third, it explores the role played by "rhythm" between music, architecture, and dance.

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GENERAL AUDIENCE ABSTRACT

A musician and an architect, Richard Wagner and Gottfried Semper, two German artists, influenced the theory of art in the nineteenth century. Wagner met Semper in a music shop in Germany and later they participated in various discussions regarding the history and theories of art and they both held their own perspectives. Wagner developed the theory of total work of art, based on the integration of music, dance, and poetry, while Semper worked on the integration of music and architecture based on the common character of proportion and scale. This dissertation traced the evolution of this theory in nineteenth century Germany while summarizing Wagner and Semper's perspectives.

In addition, Semper expanded the notion of mathematics in art by exploring and bringing the example of natural forms and patterns. For him, mathematics had been categorized into three aspects of Symmetry, Proportionality, and Movement. In addition, movement and direction for him were the beginning of the exploration of Vitruvius's idea of the harmony of proportion. Semper brought the example of the human body as a reference for measuring and scaling the architectural drawings.

This research focuses on three crucial questions and the discovery of Semper's work, the second Dresden Theater. First, it investigates the connection between Semper's architectural drawing and musical notation. Second, it scrutinizes the attitude toward the integration of arts among artists and philosophers in nineteenth century Germany. Third, it explores the role played by "rhythm" between music, architecture, and dance.

DEDICATIONS

I dedicate my research to my parents, Forogh and Mohsen, who gave me two wings to fly, and my brother, Arjang, who showed me the magic of smiling in life.

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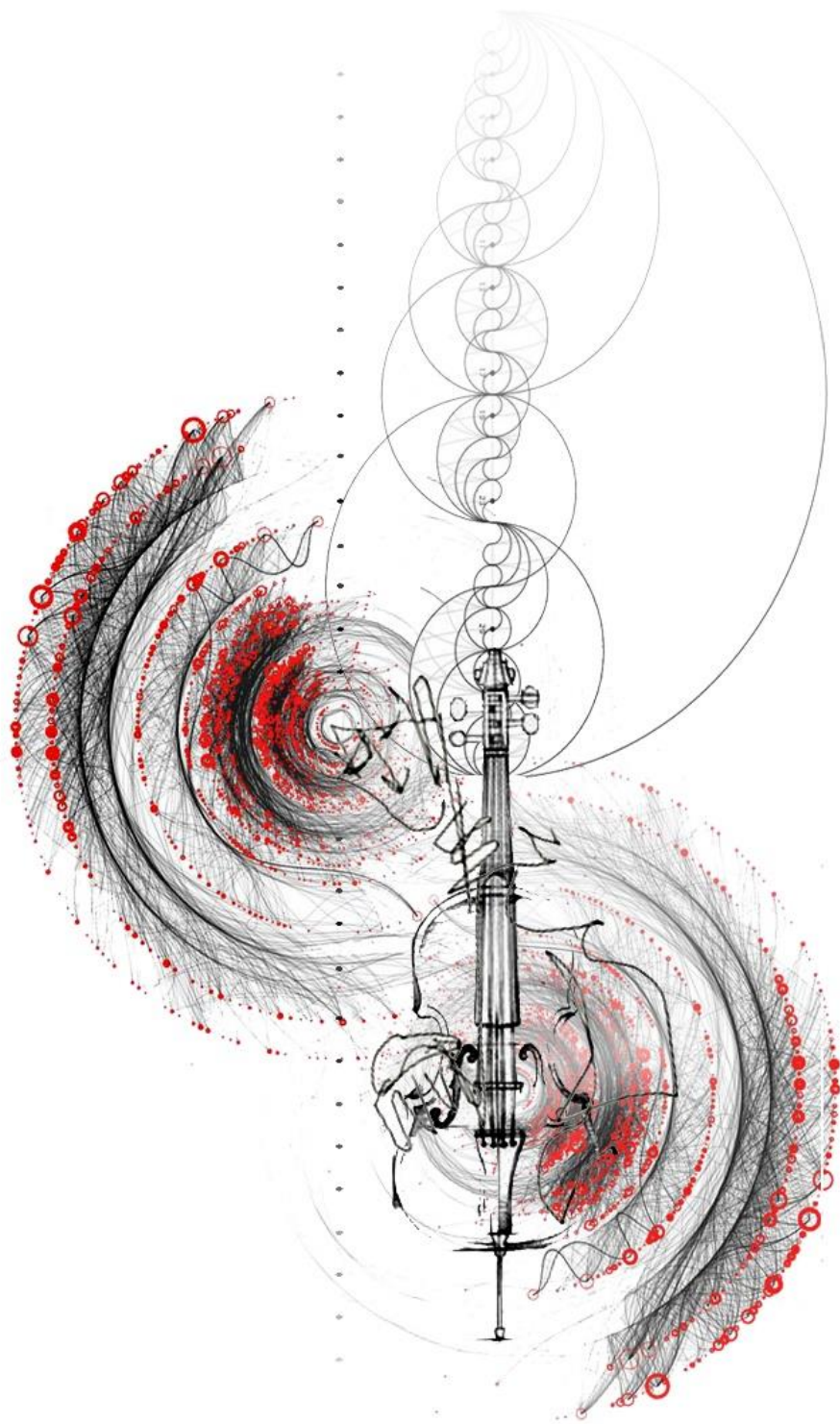


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First Movement:

ALLEGRO



Figure 1: Score of *Siegfried Idyll* (1870), Richard Wagner.

Source: Akg-images.com

The first movement of a symphony that has a fast tempo at a brisk and lively pace with a cheerful atmosphere.

1.0 Introduction

The relationship between architecture and other arts was an intensely discussed topic among artists across time, especially the conversation between architecture and music. The assumption and nature of this correlation were raised as questions for this researcher while studying Gottfried Semper's plan for the second Dresden opera house.¹ The architectural scale bar on the bottom of the drawing shows an unusual graphic scale that looks like a musical staff and musical notes moving and playing a musical rhythm.

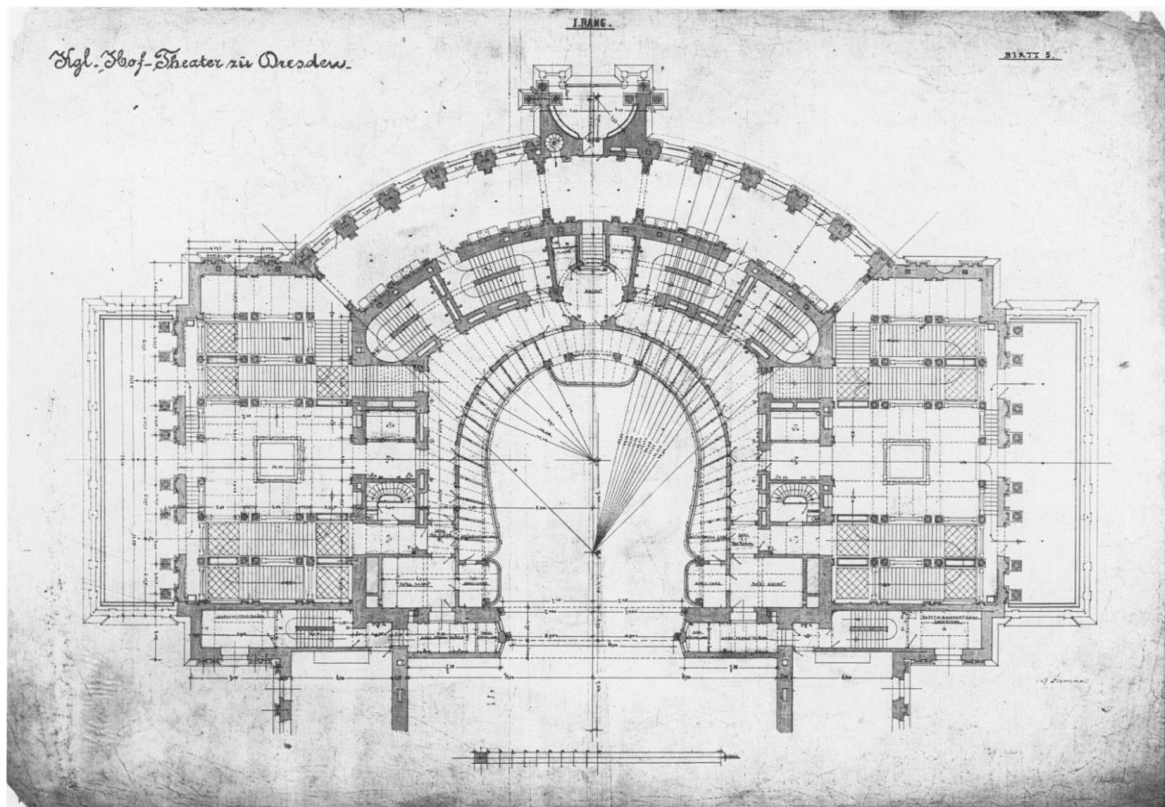


Figure 1: Second *Hoftheater*, Opera House, First floor
Source: gta Archives / ETH Zurich, Gottfried Semper

¹ Mallgrave, Harry Francis. *Modern architectural theory: A historical survey, 1673–1968*. Cambridge University Press, 2009, p. 137-139.

Gottfried Semper (1803-1879) built the first Dresden opera house in 1841. After devastating fire, it was rebuilt in 1878 and referred to as the Semper Opera.

This observation motivated the investigation of three questions. First: what, if any, was the connection between Semper's architectural drawing and musical notation? Secondly and more broadly, since this building was designed and built in nineteenth century Germany, what was the attitude toward the integration of arts among artists, philosophers, and architects, especially those in Semper's orbit, at that time in Germany? The last but not the least question asks: if there was a connection between architecture and the scalar musical staff in this building, what is the crucial role played by "rhythm" between these two arts?

To present the investigation's resulting answers to these questions, this dissertation has been organized into three movements, as a metaphor for three movements in a symphony. The first movement establishes that in the second half of the nineteenth century in Germany, the idea of the integration of arts caused a significant impact on the philosophy of art. German composer Richard Wagner was a pioneer of the music revolution and identified the significant issue of the modern age as the lack of unity in the expression of the arts.² The artist and audience are considered as two separate perceivers in the performance. He proposed the idea of the synthesis of the arts, especially music, poetry and dance.

Gottfried Semper (1803-1879), before designing a number of significant buildings in Germany and Switzerland, attended *Gelehrtenschule des Johanneum* in Hamburg which mostly focused on teaching history and mathematics. As a successful student, upon entering Göttingen University, he started studying mathematics, but a few months later changed his field of study and entered architecture in 1825 at the University of München. One year later, he traveled to Paris in order to work for and study with Franz Christian Gau, who was a naturalized French citizen from Germany practicing as an architect and archeologist.³

² Prange, Martine. "Nietzsche, Wagner, Europe." In *Nietzsche, Wagner, Europe*. de Gruyter, 2013, p. 52-60.

Richard Wagner (1813-1883) is very well known for his revolutionary operas that are based upon his expanded the notion of *Gesamtkunstwerk* or unity of the arts.

³ Harry Mallgrave in Gottfried Semper. *Style in the technical and tectonic arts, or, Practical aesthetics*. Getty Publications, 2004, p. 4-6.

Semper's interest in the history of architecture and design in antiquity led him between 1830 and 1833, to travel to Italy and Greece in order to visit ancient sites to do research on polychrome on architectural and cultural styles, motifs, and patterns of ancient Greece. During his four months of research at the Athenian Acropolis, he found evidence to support his thesis that the ancient temples were colorfully painted. After researching, studying, and documenting ancient architecture, he returned to Germany and shortly thereafter obtained a position as the Professor of Architecture at the *Königlichen Akademie der bildenden Künste* (Academy of Fine Arts) in Dresden.⁴

At the same time, Semper actively practiced architecture, receiving many important commissions through his professorship at the King's school. Perhaps most significantly, he designed and built the new Dresden Opera House. It was completed in 1841 with many enthusiastic reviews, but tragically burnt down in a devastating fire in 1869. Immediately, the citizens of Dresden demanded that Semper design and build a new Opera House. Semper designed the second building in 1878, but its construction was supervised by his son Manfred, who was also an architect.⁵

Semper met Richard Wagner for the first time in a music shop when he wanted to buy one of Wagner's works and later, in the May 1849 uprising against Frederick Augustus II King of Saxony, they both took leading roles. Amid a time of revolution across Europe, they supported people's rights as social nationalists and accompanied each other in constructing barricades in the streets of Dresden. After the failure of the revolution, the outraged King, who appointed Semper to his professorship and selected him to design the Opera, vowed to hang Semper in his own Opera building. Wagner and Semper were forced to flee for their lives. Semper first escaped to Zurich, where Wagner later settled after having first arrived in Paris.

⁴ Ibid.

⁵ Mallgrave, Harry Francis. *Gottfried Semper: architect of the nineteenth century*. Yale University Press, 1996, p. 330-346.

Wagner expanded the notion of *Gesamtkunstwerk* in his essays and writings as a response to what he judged to be the lack of unity in the expression of the arts, Semper categorized the arts into three groups: cosmic, microcosmic and cosmic-microcosmic. The first, cosmic arts, includes music, tectonics, and dance. The second group, microcosmic arts, includes song, sculpture, and movement of the human body.⁶ Examining the first two categories, shows that dance in the first category includes rhythm of the entire body, while movement of the human body in the second category includes rhythm of each body member like the face or hands. Furthermore, he described the third group as cosmic-microcosmic arts that includes painting, poetry, and drama.⁷ Semper in his book *Style* also wrote about symmetry (cosmic), proportionality (microcosmic), and direction (unity of movement) to expand this notion that in cosmic arts like music, architecture, and dance, symmetry is a crucial principle. And in song, sculpture and mime as microcosmic arts, proportionality is a significant one.⁸

He also pointed out the relationship between inner and outer bonds of arts, such as painting to architecture, poetry to music, and drama to dance. For Semper and Wagner, the ancient Greek arts were the embodiment of complete works of art that directly stem from their cultural context. As examples of the interlacing of rhythmic motifs across arts, Semper suggested an Assyrian stone

⁶ Mallgrave, Harry Francis. *Modern architectural theory: A historical survey, 1673–1968*. Cambridge University Press, 2009, p. 271.

Mallgrave, Harry Francis. *Gottfried Semper: architect of the nineteenth century*. Yale University Press, 1996, p 348.

Mallgrave in his book defined “Meloplastic” as movement of the human body and in the page 348, he explained it as mime.

Mime, referring to both a performance and a method of acting especially in the theatre, is defined as the use of movements of the hands or body and facial expressions to tell a story or to act something without speaking. www.oxfordlearnersdictionaries.com. Last accessed June 4, 2022.

⁷ Ibid, p. 276.

⁸ Semper, Gottfried. *Style in the technical and tectonic arts, or, Practical aesthetics*. Getty Publications, 2004, p. 90.

panel decorated with carpet patterns, Greek snake ornaments, Delphian sacrificial taeniae⁹, and rhythmical dance indicates how rhythm comes from nature and accompanies the arts to achieve unity of purpose.¹⁰

This first movement of the dissertation will attempt to explain the notion of *Gesamtkunstwerk* in the nineteenth century in Germany, and the impact of this idea on architecture, music, and dance. In addition, it suggests how the hidden rhythm in the arts could be in harmony with natural laws and synthesize the arts as a whole.

1.1 Gesamtkunstwerk

The notion of *Gesamtkunstwerk* was a crucial revolution in nineteenth-century philosophy and aesthetics. The German word *Gesamtkunstwerk* usually translates into English as 'ideal artwork' or 'total work of art.' A German philosopher and theologian, Karl Friedrich Euseius Trahndorff (1782-1863), coined the term *Gesamtkunstwerk* for the first time in 1827.¹¹ Later, while Wagner conceived of himself as an author and composer, he developed this term in his musical works and essays in which he brought as an interconnected whole towards an immaterial and spiritual oneness.¹²

Wagner explained his notion of *Gesamtkunstwerk* through ancient Greek tragedy, as it united the "separate arts" — poetry, dance, and music. He used a German word *Gemeinsame*, which

⁹ In ancient Greek, taeniae are bands or ribbons worn around a person's head. Lexico.com, online Oxford dictionary. Last accessed 6/4/2022.

¹⁰ Semper, Gottfried. *Style in the technical and tectonic arts*, p. 82.

¹¹ Rubin, James H, ed. *Rival Sisters, Art and Music at the Birth of Modernism, 1815-1915*. Routledge, 2017, p 49.

¹² Wagner explained in his diary, *Mein Leben*, that his father was disappointed of his talent in music. Richard, Wagner, *Opera and Drama*, Translated by Edwin Evans Senr., Vol I, London, 1913, p. 117.

means "communal," to show how *Gesamtkunstwerk* works as a communication medium between the artist and the audience. It could be interpreted that *Gesamtkunstwerk* implies not only synthesizing the arts but also bringing together the artwork with the total sense experience of the audience. This idea of the unity of arts plays a mediating role between artist and audience, Wagner explained that in modern society and within any type of art, there is no relationship between society and art. He admired the aesthetic organization of ancient Greek society because it is a significant instance of harmony between the artist and the audience, theatre, and everyday reality.

Richard Wagner, in his essay, "The Artwork of the Future"¹³ described nineteenth-century society as lacking consistency between its inner beliefs including the senses, and its outer facing or appearance and manifestations.¹⁴ "The drama accordingly goes from the inner subject-matter to its exterior incidentals; the romance from exterior surroundings to proceed into the inner subject-matter."¹⁵ He believed that human nature consists of two significant sides, an inner and an outer. Two senses are engaged for perception: vision appeals to whatever we see as a physical perception and hearing appeals to the inner soul.¹⁶ Moreover, he expanded the notion that the inner sense and perception ought to be in harmony with outer expression and presentation, which is incongruous in the modern era. As an example, he pointed out that dance is the direct all-embracing utterance of the inner man. The rhythm of sound and tone of poetry are presented in bodily form as a dance expression.¹⁷ Regarding the integration of architecture into the performing arts through harmonic rhythm, Wagner added that:

¹³ *Das Kunstwerk der Zukunft* (Leipzig, 1849).

Richard Wagner, trans. Emma Warner, *The Artwork of the Future*, London, 2013

¹⁴ Richard, Wagner, *Opera and Drama*, Translated by Edwin Evans Senr., Vol I, London, 1913, p. 269.

¹⁵ *Ibid*, 345.

¹⁶ Wagner, Richard. *The Art-Work of the Future and Other Works*. U of Nebraska Press, 1993, p. 91.

¹⁷ *Ibid*, p. 104.

"[The Athenian saw the God Apollo]... through the ideal expression of art; when the voices, ringing full, sounded forth the choral song, singing the deeds of the god, the while they gave to the dancers the mastering measure that meted out the rhythm of the dance, which dance itself, in graceful movements, told the story of those deeds; and when above the harmony of well-ordered columns he wove the noble roof heaped one upon the other the broad crescents of the amphitheater, and planned the scenic trappings of the stage."¹⁸

He proposed in the same essay that ancient Greek society was marked by a great correlation between its inner spirit and its outward cultural productions. Ancient Greece represented a world of beauty, harmony, balance and unity with nature as an inspiration to Germans living in the mid-nineteenth century.¹⁹ As Goethe claimed that "let each man be a Greek in his own way, but let him be one nonetheless,"²⁰ Wagner aimed to breathe the soul of ancient Greece drama into the soul of modern opera.²¹ In his view, "the Greek concept *mousiké* originally embraced the inseparable unity and mutual relationship of language, expression, gesture or embodiment (dance), and sounding phenomena."²² The inner beliefs including culture and tradition were embodied as a gesture with the outer forms. From his point of view, harmony is a balance between

¹⁸ Ibid, p. 33.

¹⁹ Geary, Jason. *The Politics of Appropriation: German Romantic Music and the Ancient Greek Legacy*. Oxford University Press, 2014, p. 11.

²⁰ Johann Wolfgang Goethe (1749-1832) was a German poet, novelist, playwright and scientist. Quoted in *Die schönsten Aufsätze Goethes*, ed. Horst Oppel Recklinghausen: Bitter, 1948, p. 493. "...Jeder sei auf seine Art ein Grieche! Aber er sei's."

²¹ Geary, Jason. *The Politics of Appropriation: German Romantic Music and the Ancient Greek Legacy*, p. 225.

²² Sorgner, Stefan Lorenz, and Oliver Fürbeth, eds. *Music in German philosophy: an introduction*. University of Chicago Press, 2010, p. 15.

what goes from the inner subject matter to its exterior surroundings like Drama. Outer manifestation should be taken from inner belief.²³

Wagner admired ancient Greek tragedy and mythology. He declared that the greatest and highest form of art is antique Greek drama, which revealed the Grecian spirit in its art form. The Greek drama demonstrated the unity of society and arts, as well as the unity of the audiences and artists by expressing the public conscience. He compared the public art of modern Europe with the public art of Greece, in order to show the difference in interactions between artists and audiences.²⁴

Wagner described the present state of opera in his time as consisting of a series of separate and unrelated tunes, chords, arias, and duets. To open a window toward the future of music, his mission was to reunite the art forms which had been separated for so long. He embodied the notion of Gesamtkunstwerk in the musical-dramatic idea, which deeply engaged poetry in music and body movement. In 1876, he manifested his concept in *Der Ring des Nibelungen* (*The Ring of the Nibelungen*), a cycle of four epic, music, and dramatic movements.²⁵

Gesamtkunstwerk (*Gesamt+kunst+werk*) is formed from three words. The word *Gesamt* is the past participle form of the verb *Sammeln* and derived from the archaic verb *Samenen*, which means to assemble, gather, aggregate and collect. The second word, *Kunst*, stands for "art" and originally points to knowledge, ability, and skill. This is the abstract noun form of *Kennen*, "to know"

²³ Richard, Wagner, *Opera and Drama*, p. 303.

²⁴ Wagner, Richard. *Richard Wagner's Prose Works: The art-work of the future*. Vol. 1. K. Paul, Trench, Trübner, 1895, p. 47.

²⁵ Wagner, Richard, Julius Erich KLOSS, and Hans Weber. *Richard Wagner über den Ring des Nibelungen. Aussprüche des Meisters über sein Werk in Schriften und Briefen. Begonnen von Erich Kloss. Fortgesetzt und mit Anmerkungen versehen von Hans Weber*, 1913, p. 45.

"Der Ring; des Nibelungen, ein Bühnenfestspiel, aufzuführen in 3 Tagen und einem Vorabende. Vorabend: das Rheingold. Erster Tag: die Walküre. Zweiter Tag: – der junge Siegfried. Dritter Tag: - Siegfried Tod und der Vorabend ist handlungsreiches Drama.

The Ring of the Nibelung is an epic music drama including four parts in German language composed by Richard Wagner. Three parts tell the story of days and the last part tells the story of evening.

and *Können*, "how to be able." The third word, *Werk*, is the noun form of *Werken*, which implies a productive act done or performed by someone.

Gesamtkunstwerk thus represents the multi-sensorial phenomenon and multi-dimensional cultural expression through synthesizing art and life into a harmonious unity. It represents a harmonization and synchronization among parts. In the romantic era, the examination of each art individually and the nature of all arts as a whole led philosophers and artists to define the boundlessness of a total work of arts.²⁶ Assuming that the total artwork aspires to reunification of individual arts, the ultimate goal would be to present an enthralling totality. "The *Gesamtkunstwerk* thus can present itself simultaneously as a whole and a fragment, as a closed and an open totality."²⁷ Moreover, Friedrich Schlegel, a German poet and philosopher in the nineteenth century, believed that "...in poetry too, every whole can be a part and every part really a whole."²⁸ Schlegel was aware of contemporary debates on music and its own aesthetic. He also studied classical Greek culture, and in his book, *Eigentlich die Kunst dieses Jahrhunderts*, he argued that articulate the impact of music on philosophy.²⁹ Schlegel's notions of universal poetry prefigured Wagner's later achievement.³⁰

Based on Wagner's definition, *Gesamtkunstwerk* consists of individual arts as fragments that may include smaller pieces in themselves in their own right. Later in the essay, "The Art Work of The Future," Wagner held that in a poem fragments become smaller, breaking down into vowels,

²⁶ Follett, Danielle. *The Aesthetics of the Total Artwork: On Borders and Fragments*. 2011, p. 8.

²⁷ Ibid, p. 9.

²⁸ Schlegel, Friedrich. "Lucinde and the Fragments." *Trans. Peter Firchow*. Minneapolis: University of Minnesota Press, 1971, p. 144.

²⁹ Schlegel, Friedrich, and Ernst Behler. "Kritische Friedrich Schlegel Ausgabe [KFSA]." Ed. Ernst Behler et al. Munich, Paderborn, Vienna: Ferdinand Schöningh 1958, p. 16.

³⁰ Abrams, Meyer Howard. *The mirror and the lamp: Romantic theory and the critical tradition*. Vol. 360. New York: Oxford University Press, 1971, p. 88-94.

syllables, words, and phrases.³¹ He also expanded this idea into other arts, namely, music. In music notation, a bar is a segment of time corresponding to specific beats of musical notes, and each piece of music consists of some bars, while each bar includes various musical notes and values. Based on this explanation, it could be interpreted that a whole includes some fragments that each fragment includes smaller fragments. For instance, a total work of art in the first level of fragments includes poetry and music and in the second level of fragments includes vowels, syllables, words, as well as time, musical notes and musical scales.

Many Wagnerians have discussed *Gesamtkunstwerk* as a response to the problem of the modern age, which was lacking unity, and as an attempt to allow an authentic style to emerge. The ultimate goal of this idea was to express the feeling of being part of real life, of being alive, and the unity of the disintegrated arts. Wagner explained that when the barrier has fallen between the arts, there is no more border, no boundary, and no art; rather, a universal, undivided, and unified Art would emerge³²

Wagner revolutionized thought about nineteenth-century music and philosophy through the term *Gesamtkunstwerk* and metamorphosed classical operas into "music dramas." In this form, the artist was at once a poet and a musician who involved himself in his musical composition. Wagner, in his essay "The Artwork of the Future," described the ideal identity of music, poetry, and dance as a singular coherent whole in drama.³³

In its highest ambition as a total work of art, the Wagnerian opera not only emphasized the subjective expression and reflection of an artist's viewpoint, but also the objective perception through wholeness. The opera was a performance on the stage that on one hand included poetry, dance and music from objective perception and on the other hand conveyed the subjective expression between artist and audience. Moreover, in his essay, he explained the word

³¹ Wagner, Richard. *Richard Wagner's Prose Works: The art-work of the future*. Vol. 1. K. Paul, Trench, Trübner, 1895, p. 121.

³² Wagner, Richard. *Richard Wagner's prose works*. Vol. 1. Kegan Paul, Trench, Trübner, 1892, p. 98.

³³ Wagner, Richard. *Das Kunstwerk der Zukunft*. Wigand, 1850, p. 194-195.

“whole” to present the perfect form of the arts such as in music/drama. “Thus, in drama the art of dance reaches its highest feeling and its fullest fullness, where it moves, where it subordinates itself; always and everywhere it itself. Because it is at the same time whole; what it is, what it can be and what it should be.”³⁴

The unity of various arts and synthesis of those arts does not mean mingling their qualities and characters; rather, the differences bring up productive chaos. The unity genuinely takes place when we arrive at a new identity by synthesizing the arts and the productive chaos means that this new identity consists of some individual and separate identities coming from a new context that harmonizes the performers in a way that can present a new identity to the audience. The unity embodied in the new identity and in the context of common characters equals the subjective and objective identity. The individual characteristics of the different arts will be reunited with a new identity that is in harmony with nature.

The dialogue between the arts expresses the spiritual and immaterial absolute of a whole. For more explanation, it should be mentioned that while each art expresses its spiritual absolute, *Gesamtkunstwerk* expresses the new spiritual absolute as a whole. Wagner also clarified that the arts of dance, of tone, and of poetry are primeval arts, and “by their nature they are inseparable without disbanding the stately minuet of art... [Arts] mutually bound up in each other's life, of body and of spirit.”³⁵ According to this statement, body/life and life/spirit have been surrounding the subjective, as a feeling and objective as a performance of the integrated arts.

³⁴ Ibid, p. 74.

Translation by author.

“So erreicht im Drama die Tanzkunst ihre höchste Höhe und ihre vollste Fülle, entzückend wo sie anordnet, ergreifend wo sie sich unterordnet; immer und überall sie selbst, weil immer unwillkürlich und deshalb nothwendig unentbehrlich: nur da, wo eine Kunstart nothwendig, unentbehrlich ist, ist sie zugleich ganz; das, was sie ist, sein kann und sein soll.”

³⁵ Wagner, Richard, *Richard Wagner's prose works*, p. 95.

Based on his explanation, dance does not refer to ballet or another type, rather the grace of gesture and motion of the body.

Wagner, in his essay, expounded that the musician in traditional opera has not attempted to create a singular form for the whole artwork; instead, several vocal pieces had a separate identity, and it had been connected to the other musical pieces through the outward structure of opera.³⁶ Furthermore, he used a variation of the word *Gefühl* to point out how ancient Greek drama conveyed feeling and sensation.³⁷ The German word *Gefühl* means feeling and it could be interpreted that Wagner used the variation of this word to show our daily life has been dependent on perception of feelings. Although he did not mention directly the German word *Lebensgefühl*, it could be interpreted that he wanted to explain the quality of Greek drama and their life by using the word *Gefühl*. For him, the intercommunication of this emotion in the arts takes place through an invisible and undeniable movement and rhythm. In the ancient Greek drama, the rhythm in music coordinated the rhythm in song (poetry) and body movement (dance) on the stage.

Wagner emphasized that the inner and outer expression of dance—the gesture and motion of the body—have been harmonized by the law of rhythm; it is the soul of movements by which the dancer attempts to convey his or her own soul and (e)motions to others.³⁸ If these motions impart the rhythm hidden in the music, then two arts are joined as a new unity with a new identity based on mutual rhythm. For this reason, the manifestation of artwork in Wagner's music has been based on harmonized dance. The role of the rhythm in the expression of art is undeniable. Through rhythm, motions turn into a dance, words become poetry, and musical notes become a piece of

³⁶ Wagner, Richard, *Opera and Drama*, Translated by Edwin Evans Senr., Vol I, London, 1913.

He wrote this three-part essay in 1851. In the first part, he criticized the contemporary opera, in the second part, he elaborated the role of poetry in music drama and in the last part, he developed the concept of ideal music drama as a unity of individual arts.

³⁷ Author translated *Gefühl* as feeling. Wagner used *Gefühlsvermögen* (ability of feeling perception), *Gefühlsinhalt* (emotional-content), *Gefühlswegweisen* (feeling signs), and *Gefühlsausdruck* (feeling expression). He pointed out how the feeling perception and expression is significant in the synthesis of arts as a whole artwork. *Lebensgefühl* means the feeling of life and being alive.

³⁸ Wagner, Richard, *Richard Wagner's prose works*, p. 101.

music. In short, through rhythm, emotion is transformed into artful motion. Wagner concluded that "rhythm is the measure of the movements by which emotion mirrors forth itself."³⁹ Wagner claimed that "The ocean binds and separates the land: so does music bind and separate the two opposite poles of human art, the arts of dance and poetry."⁴⁰ According to Wagner's explanation in this passage, *Gesamtkunstwerk* is a concept in which some individual arts would be integrated into a meaningful purpose. He explained that in drama, audiences use their visual and aural faculties simultaneously. In *The Judicious Eye: Architecture Against the Other Arts*, Joseph Rykwert scrutinized Wagner's treatise regarding this term which categorized the work of art in subjective perception and inner aspect in two senses. First and foremost is the social sense, since it should connect to the whole of society and appeal to the culture of a group of people. Second in the personal sense, since it should speak to all the senses and make a connection between music, poetry, and dance.⁴¹

Wagner examined nineteenth-century European countries such as France, Austria, and Italy throughout his essay, "The Artwork of the Future," and named their art as modern art. He also contrasted Greek theater with modern theater, preferring what he found by the ancients. Within the boundaries of the Grecian amphitheater, the whole populace was able to witness the drama; however, in modern European theatres, the audiences were only from affluent classes.⁴² He also added that Greek education from his earliest youth, taught artists to find artistic enjoyment in the body as in the spirit; on the contrary, modern European education forced artists to seek the subjects of artistic amusement outside of themselves. The Greek performance had its own actor, singer, and dancer (the unity of arts) in which they shared the highest pleasure in the work of art

³⁹ Ibid, p. 101.

⁴⁰ Ibid, p. 110.

⁴¹ Rykwert, Joseph. *The judicious eye: Architecture against the other arts*. Reaktion Books, 2008, p. 139.

⁴² Wagner, Richard, *Richard Wagner's prose works*, p. 47.

by revealing the beauty of Greek myths; in contrast, modern Europe has undefined performers who are obliged to do their labors with no pleasure.⁴³

The whole history of ancient education originated around the whole of Greek education that began with a book, Homer's *Iliad* devoted to celebrating the deeds of heroes.⁴⁴ It was a tradition that "at the very beginning of Greek civilization, we see a clearly defined type of education that the young nobleman received through the percept and practice of an older man to whom he had been entrusted for his training."⁴⁵ It could be explained that the knowledge of writing and literature had been taught by a wise man who had more experience "in sport, knightly games, in music, singing, dancing, playing lyre, oratory as well as in good manners."⁴⁶

For Wagner, the Greek drama was a symbol of an eternity in a great performance. A tragedy is a form of drama, in which the main character of the play was brought to suffer the extreme sequences of tragic incidents.⁴⁷ "Under the Roman emperors, tragedy was dead."⁴⁸ In the essay, "The Artwork of the Future," Wagner explained that with the downfall of tragedy, the drama is separated into its components. Each aspect of art, such as rhetoric, sculpture, painting, and music, went its own way.⁴⁹ "As the spirit of Community split itself along a thousand lines of egoistic cleavage, so was the great united work of tragedy disintegrated into its individual factors."⁵⁰ According to Wagner, musical theater can play a mediating role between individual arts to shape

⁴³ Ibid, p. 48.

⁴⁴ Marrou, Henri Irénée, *A history of education in antiquity*. University of Wisconsin Press, 1982, p. xv. *Iliad* is an ancient Greek epic that has been attributed to Homer who was an ancient Greek author. It was written in the 8th century BC. *Iliad* and *Odyssey* are two epic poems that influenced on ancient Greek culture and education.

⁴⁵ Ibid, p. 28.

⁴⁶ Ibid, p. 28.

⁴⁷ Barnett, Lionel David. *The Greek Drama*. JM Dent & Company, 1912, p. 86-100

⁴⁸ Ibid, p. 87.

⁴⁹ Wagner, Richard, *Richard Wagner's prose works*, p. 48.

⁵⁰ Ibid, p. 35.

them as a whole, as this demonstrates the ideal total work of art as well as the ideal community. Eyes, ears, and the other sensory organs are engaged by unifying the sensations.

It could be interpreted that for Wagner, humanity's foremost purpose is the artistic aim manifested in Drama. The architect plays a crucial role in presenting the highest artistic aim in creating the theater that frames the drama. In a theatrical edifice—indeed in any architecture—scale and measure should be examined to the smallest detail, because optic and acoustic perception of artwork depends on proportion in musical notes and in architectural elements. Wagner believed that the sense of dramatic action can be perceived by the ears and eyes of the audience with “union of beauty and fitness in the proportions.”⁵¹ By pointing to the *Gemeinsam* artwork on a theater stage, it could be concluded that the context of *Gesamtkunstwerk* in a theatrical edifice is based on the integration of music, dance, and poetry on one hand and the integration of architecture and mathematical rhythm on the other hand. Wagner in his essay, “The Artwork of the Future,” described that the stage of a theatre is prepared by the architect and the painter, as the painter plays with colors and lights. *Gesamtkunstwerk* in a theater has a static side in which architecture, painting, and sculpting have been synthesized.⁵² It could be said that for him, the dramatic arts are in movement with rhythm while the visual arts are static, but can nonetheless also be synthesized into their own proportionate whole.

Structurally, Wagnerian music drama presented a different kind of experience compared to the traditional and classical forms of opera. Wagner's achievement inspired many of his contemporaries to look for more associations with the arts.

In his essay, “The Artwork of the Future,” Wagner delineated each art based on its context, alongside other arts. In terms of architecture, he initiated the discussion claiming that humanity extends their longing for artistic portrayal to the objects of surroundings and Nature. The architect/artist knows how to utilize, imply and reference the proportion in Nature and represent

⁵¹ Ibid, p185.

⁵² Ibid, p. 189.

it artistically in architecture in a worthy manner. He used the example where Nature became a milk-cow and Architecture a milking-pail.⁵³

As an example of religious architecture, he mentioned the oldest Hellenic races who portrayed their gods based on the natural form of objects embodied in human shapes and forms.

The religious need for the objectification of invisible, adored, or dreaded godlike powers, was answered by the oldest Sculptural art through the shaping of natural substances to imitate the human form; just as Architecture answered an immediate human need by the fitting and framing of natural 'stuff' into what we may call a condensation of Nature's features to suit the special aim.⁵⁴

It could be perceived that for him, architecture is driven by Nature and natural laws in order to respond to human needs. Nature contains an unlimited source of ideas for an architect that he can reflect on his creation. He also brought Architecture alongside Sculpture and demonstrated that transforming from sculpture into architecture appears out of immobility into motion, out of monumental into temporal.⁵⁵ For him, architecture does have a higher purpose as part of *Gesamtkunstwerk*, since it tells the story of movement while it does not move.

The second question of this research examined the history of art in Germany during the nineteenth century. Based on what has been discussed in this section, it could be concluded that Richard Wagner believed in the integration of arts, the influence of arts on each of the individual arts and on the audience as well.

⁵³ Ibid, p. 160-161.

⁵⁴ Ibid, p. 163.

⁵⁵ Ibid, p. 163.

1.2 Synesthesia⁵⁶

A few years after Wagner developed the notion of *Gesamtkunstwerk* in his essays, English scientific researcher Francis Galton drew upon the concept of synesthesia to write about mental imagery.⁵⁷ He extended the analysis of "number forms" to describe the inter-modal sensory perception of synesthesia, describing visual memory and its relationship with perceptual processing and encoding.⁵⁸ It included the representation of numbers with shapes, numbers with color, and color with sound.⁵⁹ It was the beginning of inquiry into synesthesia as contributing to *Gesamtkunstwerk* by Galton. In the mid-nineteenth century, the perceptual condition of synesthesia influenced an art movement seeking sensory fusion, which opened a new horizon for investigations towards sensory perceptions.

The first description of synesthesia by Galton was as a neurological and congenital brain defect. George Tobias Sachs was an early investigator into synesthesia, initiating case studies in the early eighteenth century; and his efforts were developed by German poet and philosopher, Johann Gottfried Herder in the early nineteenth century.⁶⁰ In his treatise, Herder wrote:

I am familiar with more than one example in which people, perhaps due to an impression from childhood, by nature could not but through a sudden onset immediately associate

⁵⁶ The term Synesthesia comes from two Greek words. (Syn= together and aesthesia= sensation)

⁵⁷ Jewanski, Jörg, Julia Simner, Sean A. Day, Nicolas Rothen, and Jamie Ward. "The "golden age" of synesthesia inquiry in the late nineteenth century (1876–1895)." *Journal of the History of the Neurosciences* 29, no. 2, 2020,: 175-202.

⁵⁸ Francis Galton was an English sociologist, statistician and psychologist, who discussed synesthesia in the nineteenth century and expanded this notion over the European region.

Burbridge, David. "Galton's 100: an exploration of Francis Galton's imagery studies." *The British Journal for the History of Science* 27, no. 4, 1994, p. 443-463.

⁵⁹ *The judicious eye*, p. 170.

⁶⁰ George Tobias (1786-1814) published a medical dissertation regarding a phenomenon involving colors for music and perceptual interpretation including numbers, days and letters. Moreover, Herder in the nineteenth century mentioned *Dunkel Gefühl* as an obscure feeling and integration of sensations as a phenomenon.

with this sound that color, with this phenomenon that quite different, obscure feeling, which in the light of leisurely reason's comparison has no relation with it at all—for who can compare sound and color, phenomenon and feeling?⁶¹

Synesthesia is a phenomenon related to a condition in which one sensory modality brings up simultaneously an experience of another sensory modality with different qualities in perception. For instance, the sight of shapes evokes different colors or different colors evoke specific music pitches simultaneously. In this condition, sense perception is being converted into another sense by hearing the colors, seeing the sounds, or tasting the shapes. People use synesthesia as a way of unifying the senses in daily communications most clearly through metaphoric speech such as “cold” color, “hot” debate, “sweet” person and “sharp” taste. But true synesthesia goes far beyond metaphor and is an actual experience. For most musicians, painters, and other artists who are synesthetes, there is no questioning how their senses blend, rather, they simply possess synesthesia. More recently, researchers propose that all people are born synaesthetes but most people lose the ability in early childhood.⁶² “The newborn does not keep sensations separate from one another, but rather mixes sights, sounds, feelings, and smells into a sensual bouillabaisse in which sights have sounds, feelings have tastes.”⁶³

Beyond medical synesthesia, artists invoked it in a metaphorical sense as well. Literally, “synesthesia” consists of two words, meaning to perceive (esthesia) together (syn).⁶⁴ In 1881, the Swiss academic scientists Eugen Bleuer and Karl Bernhard Lehmann discovered six different kinds of synesthesia which are mostly based on color and sound perceptions. They expanded the notion of *Vorstellung* (perception) to the auditory, gustatory, tactile, visual, and olfactory.

⁶¹ Herder J. G. 2002. [Translation of Herder 1772]. English translation and edited by M. Forster: *Herder: Philosophical writings*. Cambridge: Cambridge University Press, p. 94-95.

⁶² Maurer, Daphne, and Catherine J. Mondloch. “Neonatal synesthesia: A reevaluation.” *Synesthesia: Perspectives from cognitive neuroscience*, 2005, p. 193-213.

⁶³ Ibid, p. 193.

⁶⁴ Van Campen, Cretien. *The hidden sense: Synesthesia in art and science*. Mit Press, 2010. p. 2.

1. Light, color, and form perception through hearing and sound,
2. Sound perception through seeing lights,
3. Color perception through taste,
4. Color perception through smell,
5. Color perception through touch,
6. Color perception through seeing the form of shapes.⁶⁵

Lawrence E Marks, in his book, described his theory of synesthesia has been expanded to two main categories; an abstract *emotional* or an abstract *perceptual* sensation, which can be defined under the rubric of cognitive mediation.⁶⁶ The emotional aspect and its stimulus have a common reflection in background experience and the perceiver's memory. In the second half of the nineteenth century, it was argued by Marks that fundamentally, synesthesia is *perceptual* in its nature, since it is surrounded by the acquired knowledge and awareness of the environment and milieu.

In addition, Marks explained that we are indirectly aware of the world around us through all senses and not via a specific sensory organ. We can see the sizes and shapes of bodies, hear the motions of bodies from one place to another, even if this motion is slow, fast, or at rest. Here, non-motion, heard as the absence of noise, becomes as significant as the pauses between notes in a piece of music. All sensory organs are involved in the perceptual aspect of synesthesia. This perception

⁶⁵ Bleuler, Eugen, and Karl Lehmann. *Zwangsmässige lichtempfindungen durch Schall und Verwandte erscheinungen auf dem Gebiete der andern sinnesempfindungen*. Fues's Verlag (R. Reiland), 1881, p. 4-5. *Geschmacksphotismen* (Taste), *Lichtsphotismen* (Light, seeing), *Geruchsphotismen* (Olfactory), *Schallphotismen* (Sound, hearing), and *Taktil* (Tactile).

⁶⁶ Marks, Lawrence E., Robin J. Hammeal, Marc H. Bornstein, and Linda B. Smith. "Perceiving similarity and comprehending metaphor." *Monographs of the Society for Research in Child Development*, 1987, p. 1-100. Marks was a professor Emeritus of Epidemiology and Public Health and Psychology at Yale school. He has devoted most of his scientific career and research to human sensory and perceptual processes, as well as integration and interaction of sensory with cognitive processes.

comes from the outside world, involves memory and imagination of our body, and represents a unity of different qualities in one picture.⁶⁷

Furthermore, Markes claimed that the semantic and perceptual differentiation in synesthesia could be considered as three categories of quality/evaluation, potency, and motion/activity. The first and foremost aspect to point out is the quality aspect in which a stimulus leads toward the evaluation of two opposite sides or a situation in the middle, such as good/bad, warm/cold, or happiness/sadness. The second factor is the potency factor in which our acquired awareness and knowledge perceives and visualizes synesthesially based on shape, size, color, weight, and so forth. The last crucial factor is the motion and activity aspect of synesthesia, which involves time. In this aspect, time perception has been integrated with movement perception. For instance, synesthesia represents the red color as a fast tempo, or from another perspective, it reveals the sound of an upper pitch, and the blue color also reveals the lower pitch as if on a piano in the mind⁶⁸

Wassily Kandinsky who claimed to be a synesthete, described in *On the Spiritual in Art*, that each art has its own method of communicating and it is complete in itself.⁶⁹ It is crucial to take the matter into account that the final goal of all arts is the spiritual action which awakens the distinct senses with the intention to refine the soul. Kandinsky used the word soul and pointed out that each word contains two meanings. He believed that the first meaning is direct, and afterwards comes the indirect meaning. This art conveys the feeling into the innermost soul; such as literature

⁶⁷ Cytowic, Richard E. *Synesthesia: A union of the senses*. MIT press, 2002, p. 71-75.

⁶⁸ Ibid, p. 71-75.

⁶⁹ Kandinsky, Wassily. *Kandinsky, complete writings on art*. Edited by Kenneth Clement Lindsay, and Peter Vergo. Vol. 1. Boston: GK Hall, 1982, p. 135.

Wassily Kandinsky (1866-1944) was a Russian painter and art theorist who began painting studies in Munich academy Germany at the age of 30. He clarified the notion of painting embodied in composing music and color embodied in musical note.

and poetry. He also added that Wagner's music emphasized heroic characters beyond theatrical expedients. Poetry and music in his music expressed spiritual atmosphere.⁷⁰

Kandinsky himself reports that when hearing a performance of Wagner's *Lohengrin*, he had a fantastic vision of colors and lines. The most common aspect of synesthesia is a correlation between music and color known as chromesthesia – the condition that automatically evokes an experience and perception of color when sounds are heard.⁷¹

Furthermore, it is a strongly held belief among contemporary musicians and composers that a specific pitch on their instruments or specific key in their music can reveal the emotional color that they want to convey. Two synesthetes upon hearing the same musical tone, might perceive different colors that correspond to that specific sound. For instance, one person might experience and visualize the color red when hearing the musical note middle C, while another visualizes the same note as blue.⁷²

Most human beings unconsciously experience the emotional reaction to color-sound perceptions. Blue notes indicate the sad mood and a colder and darker atmosphere, corresponding to the *minor* pitch. Furthermore, yellow or orange notes indicate the happy mood and warm atmosphere, corresponding to the *major* pitch in a piece of music.⁷³ In western music, both minor and major pitches make a harmony between sounds, atmospheres, and feelings based on specific notes and rhythms.

⁷⁰ Ibid, p. 29.

⁷¹ *Synesthesia: A union of the senses*, p. 52.

⁷² The musical notes can represent the pitch and duration of sound in musical composition and they are named by the first seven letters of alphabets; A, B, C, D, E, F and G. These seven musical notes are a musical alphabet and those get repeated one after each other. From one C to next C, we call it one octave and different musical instruments have limited octaves. For example, some type of pianos have seven octaves and three keys which means totally 52 keys and violin does extend the range of four octaves.

⁷³ Yim, Gary King-Yee. *Two Studies on Assessing Emotional Responses to Music and Mode: The Effect of Lowered Pitch on Sadness Judgments, and the Affective Priming Paradigm as an Implicit Measure*. The Ohio State University, 2014.

Beyond medical synesthesia, the idea of one perceptual mode overlapping with another in a broader sense has had an important presence in thinking about the arts. Moreover, during the nineteenth century architects discussed the term "color music" based on visionary colored lights and musical perception, which represented the art of the future.

Claude Fayette Bragdon, an American architect, explained synesthesia and multi-sensorial perception of color/music in his book *Architecture and Democracy*.⁷⁴

If we are to have color symphonies, the best is not likely to be those based on a literal translation of some musical masterpiece into color according to this or any theory, but those created by persons who are emotionally reactive to this medium, able to imagine in color and to treat it imaginatively.⁷⁵

Bragdon also pointed out in the relationship between architecture and music that the tones of different pitches and duration follows laws of harmony as architecture makes this harmony by simple proportions as well as music.⁷⁶ The idea of "color music" was the fundamental and crucial context of aesthetic theory not only in the realm of music, but also in forms of creative expressions in any art. Other arts, such as poetry and painting, were said to aspire to the presence of music. The American painter, James McNeil Whistler, in his book *The Gentle Art of Making Enemies*, talked about the abstraction of the idea music in its indirect appeal in painting and poetry and proclaimed that the sense of color music was the extreme abstract perception in the visual arts.⁷⁷ He retitled some of his painting works using terms such as "symphony" to show that there is a

⁷⁴ Bragdon (1866-1946) was a writer, architect and stage designer who proposed and created performances of color music, song and light. Eugenia Ellis and Victoria Reithmayer, *Claude Bragdon and the Beautiful Necessity*, University of Rochester Press, 2010.

⁷⁵ Bragdon, Claude Fayette. *Architecture and Democracy*. Binker North, 1918, p. 139.

⁷⁶ Bragdon, Claude Fayette. *The beautiful necessity: seven essays on theosophy and architecture*. AA Knopf, 1922, p. 102.

⁷⁷ Whistler, James McNeill. *The gentle art of making enemies*. Courier Corporation, 1967.

correlation between musical notes and the tonality of colors on his canvas.⁷⁸ His aesthetic theories and theory of musical analogy influenced American painters as well. For him, there existed a music of colors similar to the existence of the music of sound, and he emphasized color compositions in his painting parallel with sound compositions.⁷⁹

According to what has been discussed above, the idea of "Synesthesia" and "Music-color" in the nineteenth century caused an impassioned movement widely among artists on how to use the musical analogy in the fine arts to take a variety of forms. The first and the foremost impact was on the titling of works in painting or poetry and the second was the direct aspiration of musical compositions.⁸⁰

1.3 Music in the Nineteenth Century and its ancient origins

The third question of this research investigated the connection between architecture and music and the role "rhythm" played in these two arts. It could be mentioned that Western music has its theoretical origins in the 6th century BCE, with Pythagoras's discovery of a mathematical basis for musical harmony.⁸¹ He transferred the musical proportion to the cosmos and described the

⁷⁸ Whistler was an American painter (1834-1903) who studied art in France and moved to London, England. He was one of the pioneers in expanding the idea of correlation between music and painting. He used the title of "Nocturne", "Symphony", "Arrangement", and "Harmony" for his paintings to emphasize the perception of music as poetry of sights and colors.

⁷⁹ Ibid, p. 127.

⁸⁰ Zilczer, Judith. "Color Music: Synaesthesia and Nineteenth-Century Sources for Abstract Art." *Artibus et historiae* (1987): 101-126.

⁸¹ Riedweg, Christoph. *Pythagoras*. Cornell University Press, 2012, preface.

Pythagoras has a place not only in musicology, mathematics, but also in history of science and philosophy. Based on notion of Gesamtkunstwerk, he synthesized astronomy, geometry and music. In *Ten Books on Architecture*, Vitruvius discussed Pythagoras and ancient musical theory.

harmony of spheres. Pythagoras believed that without numbers, the intervals between musical notes wouldn't be perceivable. He also added that there was a connection between seven principal colors and seven natural musical notes.⁸²

This section will clarify how these seven musical notes create six intervals from the first to the last note in order to make a rhythmical proportion in music.

Pythagoras used the monochord which was an ancient straight single-string instrument and was usually called a *Kanon*.⁸³ The monochord was ideal to demonstrate the mathematical relationship of musical proportions, intervals, and ratios. This instrument was a rectangular soundbox with a string which was provided with one fixed and one movable bridge. Furthermore, Pythagoras's monochord was the beginning of presenting musical proportions and harmony in music. As the monochord bridge moves, different sounds and harmonies are created based on the length of the string.



Figure 2: Gafurio, Pythagoras Experimenting with Weights on the End of Fixed Length Strings, in *Theorica Musice*, 1492.

Source: Fauvel, John, Raymond Flood, and Robin J. Wilson, eds. *Music and mathematics: From Pythagoras to fractals*. Oxford University Press on Demand, 2006, p. 13.

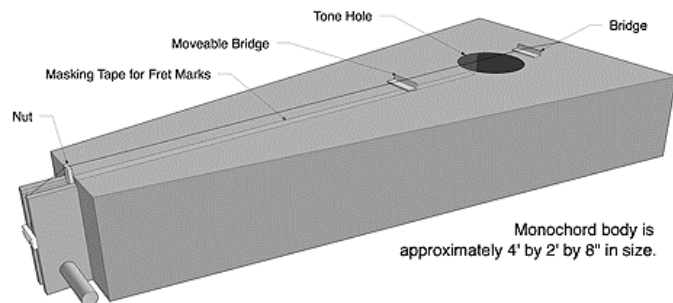


Figure 3: Monochord

Source: Downes, Chris. "Prime Numbers in Music Tonality." 2008, p. 2.

⁸² Ibid, p. 27.

⁸³ Riedweg, Christoph. *Pythagoras*. Cornell University Press, 2012, p 27.

Pythagoras's investigation into the monochord and the harmonics of stringed instruments resulted in the creation of the scales and harmonies in Greek music. The monochord, or *Kanon*, created harmony from a mathematical angle according to the length of the resonating section of the string.⁸⁴ Ancient Greek culture was permeated with music and brought the notion of it and musical activity into their literature and art.⁸⁵

Ancient musicologists also theorized and investigated the perception of sounds produced by different materials. They thought that the lower pitch sounds heavier which arises from the lighter disk and the upper pitch sounds sharper which arises from the thicker and blunter disk.⁸⁶

Later in the eighteenth century, Isaac Newton extended the analogy between color and music by claiming that white light is a mixture of spectral colors. In 1740, Newton attempted to find mathematical formulas based on the vibration of sound waves and reexamine them in terms of the wavelength of light.⁸⁷ He demonstrated that those seven colors define the seven pitches of musical scales. Each octave in music is composed of a seven-part scale (C, D, E, F, G, A, B, and then C to start an upper octave).⁸⁸

As what has been discussed in the first part of this chapter, Wagner admired the Greek drama since it plays an uninterrupted role in the overall impression that conveys to the eye and ear. In addition, throughout "The Artwork of the Future," he mentioned Greek myth and tragedies. Wagner, as a musician and composer influenced nineteenth century music by comparing the Greek drama and the Romantic era. Romantic music had a tendency toward restless motion and dynamic sound led the various musical developments to emphasize the rhythmic dimension. The Romantic Movement originated in the second half of the eighteenth century in Europe and was

⁸⁴ West, Martin Litchfield. *Ancient Greek music*. Clarendon Press, 1992, p. 4.

⁸⁵ Ibid, p. 5.

⁸⁶ Creese, David, and Stefan Hagel. "The Monochord in Ancient Greek Harmonic Science." *Aestimatio: Critical Reviews in the History of Science* 9, 2012, 337-351.

⁸⁷ Isaac Newton was an English mathematician, physicist, astronomer and author.

⁸⁸ Topper, David. "Newton on the number of colors in the spectrum." *Studies in History and Philosophy of Science Part A* 21, no. 2 (1990), p. 275.

embodied in the visual arts, music, and literature by emphasizing subjectivity and emotion.⁸⁹ Romanticism valorized nature as against artificiality, motion against stereotype, and mystery against reason. One of the crucial impacts on music was a reaction against formal and rational clarity of the previous centuries. Romanticism broke the outlines and presented various musical dimensions; such as melody, harmony, rhythm, and meter.⁹⁰

One of the most important characteristics of music during the Romantic era was the perception of color with musical consequences. The increased importance of harmonic color defined the means of chromatic harmony and the juxtaposition of remote keys in which each musical note had a specific distance from and proportion with the next one.⁹¹

In sum, while musical harmony cannot be calculated by any other means than mathematical rules, during Romanticism it was the emotional effect on listeners that was emphasized. Another aspect of the Romantic period was the use of national dance rhythms and the use of exotic texts and melodies.⁹² Harmonics in Greek means "the science of proportioned sounds, and *Harmonia* is the collective term used for their musical scales."⁹³ The Greeks defined harmony as a unity of diverse elements, a mathematical rule to lead opposing tensions.

It could be concluded from this section that Wagner drew the attention of Romantic music to Greek drama not only in mythic aspects but also in how they looked at nature. "The Greeks looked on landscape with no other eye than that with which the peculiar bent of the Grecian character had caused them to regard the whole of Nature."⁹⁴

Gottfried Semper, like Wagner, was inspired by Greek culture. In his books and writings, he frequently mentioned the rhythms and harmonies in ancient Greek arts. The next chapters will

⁸⁹ Dahlhaus, Carl. *Nineteenth-century music*. Vol. 5. University of California Press, 1989.

⁹⁰ Ibid, p. 140-175.

⁹¹ Ibid, pp. 130-135, 300-304.

⁹² Alperson, Philip. "Thinking about Music: An Introduction to the Philosophy of Music." 1984, p. 18.

⁹³ Ibid, p. 41.

⁹⁴ Wagner, Richard. *The Artwork of the Future*. Vol. 1. Reprint Services Corporation, 1895, p. 177.

examine how the notion of rhythm, harmony and scale in music have been considered by Semper in his writings and architectural works.

1.4 Gottfried Semper and Synesthesia

Semper's writings show his awareness of and sympathy for Wagner's focus on the unity of the performing arts and widespread interest in multi-modal sensory experience, his theoretical writings contain references between design and music that are of such a number and nature that they exceed being merely metaphorical use of language. In order to respond to the first question of research if there was any connection between architectural drawing and musical notes on Semper's plans, this section will investigate if Semper's notion developed the interaction and integration of the arts.

Semper wrote extensively about architectural theory, drawing upon his antiquarian studies. In 1851 in his book, *The Four Elements of Architecture*, he defined the wall, roof, platform, and hearth as the four primary architectural elements and how natural laws can influence art presentation.⁹⁵ For example, he addressed to the origin of enclosure and wall in weaving, to the relationship between traditional cloth and the way an architect explains the materiality of wall as a fabric and weaves based on plant form.⁹⁶ Another example in his book could be said that "The wildest tribes are familiar with hedge-fence and the most primitive spatial enclosure made from tree branches."⁹⁷

⁹⁶ Semper, Gottfried. *The four elements of architecture and other writings*. Cambridge: Cambridge University Press, 1989, p 102-104.

⁹⁷ Ibid, p 105.

Semper described his theory of masking and dressing the building by bringing examples of the types of motifs as well as patterns of knots in his book.⁹⁸ For him, the knot is the first technical symbol that ties the linear material together with different motifs and patterns of weaving and knitting to show how the motif of art is transferred between different materials. For instance, the dressing of walls probably began with woven fabrics, but then was continued with tiles and bricks. Semper's concept of *Stoffwechsel* or material transformation, accounts for the transference of motifs from one material technology (weaving cloth) to another (brick walling).⁹⁹ For him, the most crucial aspect of architecture was the surface, and he expanded the notion of designing the surface as weaving and dressing, based on rhythmical patterns of knots.¹⁰⁰

Moreover, his theoretical position draws from this thought, arguing that rhythm unites and underlies the various arts. Mary Hvattum explained that "the history of practical art initiates simultaneously with the motifs, embodying function, technique, and ritual action. The motifs remain constant through changes of material, technique, and historical context."¹⁰¹ Semper writes: "However remote ... from [their] point of origin, [the motifs] pervade the composition like a musical theme."¹⁰² In *Style*, he described how ritual and cultural aspects of art can reveal the aesthetic and beautiful based on the integration of arts. He propounds the notion of synesthesia as the way that interpretations of both colors and forms have been embodied as a musical perception:

Something other than the refinement of ancient practices for decorating garments and other fabrics with color most deserves our admiration, the consistency with which they

⁹⁸ Ibid, p 199.

⁹⁹ Moravánszky, Ákos. *Metamorphism: Material Change in Architecture* Birkhauser, 2017, p. 93-132.

¹⁰⁰ Semper, Gottfried. *The four elements of architecture and other writings*. Cambridge: Cambridge University Press, 1989 p. 197-200.

¹⁰¹ Hvattum, Mari. *Gottfried Semper and the problem of historicism*. Cambridge: Cambridge University Press, 2004, p. 14.

¹⁰² Semper, Gottfried. "In Search of Architecture." Trans. Wolfgang Hermann. Cambridge, Massachusetts: MIT Press, 1984, p. 168.

pursued certain simple principles of style, on which they based on the music of colors entirely in tune with their music of forms.¹⁰³

According to this explanation, it could be summarized that the rhythm of the juxtaposition of colors was in tune with the rhythm of sounds and musical notes like a piece of music. Furthermore, the rhythm of forms of decorations and ornaments was accompanied by the rhythm of sounds. For him, synesthetic perception was based primarily on visual perception. He tried to visualize the rhythm of the music on forms, patterns, and colors and claimed that the rhythmic tone of music in dances is in harmony with rhythmical patterns of motives, found in forms of accessories such as necklaces, and even the patterns of fabric knots.¹⁰⁴ While he didn't directly mention the term synesthesia, Semper expanded the notion that the interactive character of music and architecture was based on rhythms and beats on colors, forms, patterns as multi-sensorial perceptions. In *Style*, he specified that musical melodies and visual designs "are subject to the same laws," although noting that the ear is able to follow more sophisticated arrangements than the eye.¹⁰⁵ He described this as a "painterly-musical effect."¹⁰⁶

¹⁰³ Semper, Gottfried. *Style in the technical and tectonic arts*, p. 233.

¹⁰⁴ Ibid, p 82.

¹⁰⁵ Ibid, p. 86.

¹⁰⁶ Ibid, p. 87.

Figure 4: Patterns and proportions
Source: Gottfried Semper, *Der stil* (2nd ed. 1878), p. 13-16.

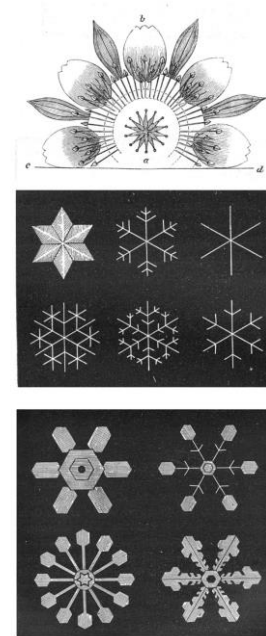


Figure 5: Patterns and Proportions in Snowflakes.
Source: Semper, Gottfried. *The four elements of architecture and other writings*. Cambridge: Cambridge University Press, 1989, 199.

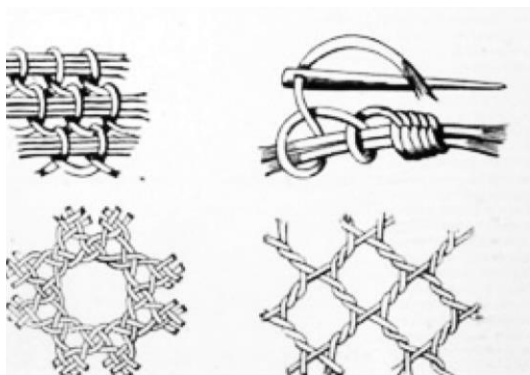


Figure 6: The Rhythmical Forms of Knots,
Source: *Der stil* (2nd ed. 1878).

Gottfried Semper met Richard Wagner for the first time in Meser's music shop while Semper was buying one of Wagner's works, the libretto of *Tannhäuser*. Harry Mallgrave, historian of Semper, explained that they had many discussions and arguments on several occasions about numerous topics, but without a doubt "their individual notions of Gesamtkunstwerk were each nurtured during these spirited exchanges."¹⁰⁷

¹⁰⁷ Mallgrave, Harry Francis. *Modern architectural theory: A historical survey, 1673–1968*. Cambridge University Press, 2009, p. 132.

In 1849 they accompanied each other in constructing the barricades during the revolution against the Monarchy in Dresden.¹⁰⁸ Wagner, in his autobiography, *My Life*, explained that when he was in Paris in 1850, his sister introduced him to an amazing friend of hers, Ernst Kietz, who made little sketches about any subjects of their conversations.¹⁰⁹ He also stated "my latest attempts at my writing, and thoughts expressed in my work, interested Semper greatly, and gave rise to animated conversations in which we were joined by Kietz," who was a young painter.¹¹⁰ This description shows the intercommunication of music, architecture, and painting by Wagner, Semper, and Kietz as a connection between visual and performing arts.

In 1861, ten years after meeting Wagner and raising many conversations regarding Wagner's writings, in his book, *Style*, Semper discussed the relationship between music and architecture. He mentioned:

Yet this artistic enjoyment of natural beauty is by no means the naivest or the earliest manifestation of the artistic instinct. The former is, in fact, undeveloped in a simple, primitive human being who already delight in nature's creative law as it gleams through the real world in the rhythmical sequence of space and time movements in the wreaths, the bead necklaces, the scrolls, the round dances and the rhythmic tone that attends it, the beat of an oar and so on.... These are

Harry Francis Mallgrave received his PhD in architecture from University of Pennsylvania in 1983. His dissertation focused on Gottfried Semper's ideas and notions.

¹⁰⁸ Semper along with his friend Wagner, took a leading role of erecting barricades in the street and he advocated from democratic change in Germany. Since they were both against of government authority, they were forced to flee the city. Semper fled to Zurich and later to London.

¹⁰⁹ Glasenapp, Carl Friedrich, and William Ashton Ellis. *Life of Richard Wagner: Being an Authorised English Version by WM. Ashton Ellis of C. F Glasenapp's "Das Leben Richard Wagner's.": The Theatre*. Routledge, 2018, p. 219.

Ernst Benedikt Kietz was a German painter (1815- 1890) and as Wagner mentioned in his autobiography, Kietz and Semper had many conversations regarding their attitudes towards arts.

¹¹⁰ Wagner, Richard. *Mein Leben*. BoD-Books on Demand, 2015, p. 367.

Wagner: "Meine neusten schriftstellerischen Versuche und die in ihnen ausgesprochen Gedanken interessierten ihn sehr; es kam darüber zu belebten Unterhaltungen."

the beginnings out of which music and architecture grew, the two highest purely cosmic arts, the two highest purely cosmic (non-imitative) arts.¹¹¹ From this explanation, it could be concluded that Semper was fascinated by the culture and rituals of ancient Greece not only in architecture, but also in music, dance, jewelry, and color. He saw embodied time and movement as a rhythmical proportion in arts, especially in music and architecture. As we understood that he believed in interaction, integration and multi-perception of arts, then this result clarifies that there was a connection between architectural drawing and musical notes on his drawings.

1.5 Gottfried Semper and Cosmology

As has been discussed in the previous section that Semper named architecture and music as two purely cosmic arts, this section will scrutinize what cosmology and cosmic laws mean for him. Semper did not directly mention synesthesia, but he talked about how the two or three arts could be considered in one category based on common characteristics of cosmology. The term cosmology in his writings, referred to the importance of the presence of Nature and natural laws in all arts.

In *Style*, Semper opened with a discussion regarding cosmology in art and nature. He said that we are surrounded by a world in which “the cosmic law is evident within the strictest limits, yet complete in itself and perfect in this respect. In such play, we satisfy our cosmogonic instinct.”¹¹² He also explained that the enjoyment of nature is alongside the enjoyment of art and they are in harmony with each other. Beauty, hidden in nature, as well as natural laws, forms, and patterns

¹¹¹ Semper, Gottfried. *Style in the technical and tectonic arts, prolegomena*, p. 82.

¹¹² Ibid, p. 82.

that are born in our receptiveness and active imagination, are all driven by the general perception of the beauty of any art.¹¹³

Semper claimed that natural beauty is the most naïve and earliest manifestation of the artistic instinct. He also introduced an example of Greek art, illustrating that this natural beauty gleams through the real world “in the rhythmical sequence of space and time movement.”¹¹⁴ He said these two elements are the initial notion of the creation of architecture and music as the two highest purely cosmic arts.¹¹⁵

According to Semper, all beautiful forms come from nature's creative law, which conforms to the law of Eurhythmia.¹¹⁶ Semper defined it, writing that “Eurhythmia is closed symmetry and stands in no direct relation to the observer but only to [the] center around which the elements of the regular form are arranged and strung peripherally.”¹¹⁷ As Vitruvius wrote in the first chapter of *Ten Books on Architecture*, eurhythmia is “beauty and fitness in the adjustment of the members.”¹¹⁸ Semper argued that his notion regarding architectural principles were in contrast with the traditional architectural Vitruvian notion that architecture depends on order, arrangement, eurhythmia, symmetry, propriety, and economy.¹¹⁹

A beautiful architecture, or a beautiful piece of music, involved in space and time, follows a fundamental principle of natural law. Semper illustrated examples of snowflakes and flowers to demonstrate that the rhythm of forms and patterns create harmony as a natural form.¹²⁰ According to Semper's demonstration, it could be concluded that the consideration of laws of nature in an artwork, such as eurhythmia, most clearly displays the pure beauty which is

¹¹³ Ibid, p. 82.

¹¹⁴ Ibid, p. 82.

¹¹⁵ Ibid, p. 82.

¹¹⁶ Ibid, p. 80-90.

¹¹⁷ Ibid, p. 86.

¹¹⁸ Pollio, Vitruvius. *Vitruvius, Ten Books on Architecture*. Harvard University Press, 1914.

¹¹⁹ Morgan, Morris Hicky, and Herbert Langford Warren. *Vitruvius: the ten books on architecture*. 1914, p. 13.

¹²⁰ Semper, Gottfried. *Style in the technical and tectonic arts, or, Practical aesthetics*. P. 86.

perceivable through our senses. "The enjoyment of nature is not very different from the enjoyment of art, just as the beauty of nature (because it is born in our receptiveness and even in our active imagination) is assigned to the general beauty of art as a lower category."¹²¹

The perception of rhythmic figures and patterns comes from certain laws of repetition. He believed that "musical figures, melodies, and visual ones are subject to the same laws [eurhythmic series], except that the ear is able to follow and resolve far more complex arrangements than the eye, which has to absorb everything at once."¹²² We perceive the nature of a music and the eurhythmic series at once, as we hear a whole song, however, our eyes need to move and wander in order to perceive an architecture. Harry Mallgrave explained that Semper identified two realms: cosmic (planetary) and microcosmic (mineral, plants, and animals.)¹²³ For Semper, the cosmos was a world full of wonder and forces whose laws we may wish to perceive in order to decipher, but never has been achieved. Those laws can reveal only a few fragmentary harmonies. Instead, "we make for ourselves a tiny world in which the cosmic law is evident within the strictest limits, yet complete in itself and perfect in this respect. In such play, we satisfy our cosmogonic instinct."¹²⁴ In this way, our nature is in harmony with all elements that convey the natural laws and we, as architects, try to simulate an architecture based on those laws such as rhythm.

Aby Warburg, a German art historian and cultural theorist, sketched and summarized his reading of Semper's 1856 essay on adornment and analyzed cosmic analogies into geometric axes based on Semper's ideas.¹²⁵ In his manuscript and sketches, he drew a set of perpendicular axes showing four directions and an intersection of two vertical and horizontal lines. A center and four points

¹²¹ Ibid, p. 82.

¹²² Ibid, p. 87.

¹²³ Ibid, p. 18.

¹²⁴ Ibid, p. 82.

¹²⁵ Papapetros, Spyros. "World ornament: The legacy of Gottfried Semper's 1856 lecture on adornment." *RES: Anthropology and Aesthetics* 57, no. 1, 2010, p 310.

show a symmetrical symbol. On the right side is a vertical line and two dotted lines which show a point at the left bottom point; farther down, the sketch shows the small tree crossed by a symmetrical axis, and the last sketch shows a figure of a man with semi stretched out arms.¹²⁶

Aby Warburg, in 1890, collected all these drawings in the index cards filled with manuscript notes from Semper's "Prolegomena" to his book *Style* and one of his essays named "On the formal principles of adornment."¹²⁷ Warburg, as an art historian, felt that Semper's essay needs more illustrations in order to show the two pairs of opposite cosmic forces; *Schwerkraft* versus *Wachstumskraft*; or gravity versus growth forces for symmetrical proportion and direction.¹²⁸

¹²⁶ Ibid, p. 310.

¹²⁷ Ibid, p. 310.

Aby Warburg (1866-1926) was an art historian who founded the Warburg library. He sketched from Gottfried Semper's 1856 essay on adornment (notes marked "Berlin, Fall 1890"), Warburg Institute Archive, Zettelkasten AesthetikWIA, ZK 041/021149.

¹²⁸ Papapetros, Spyros. "World ornament: The legacy of Gottfried Semper's 1856 lecture on adornment." P. 310.

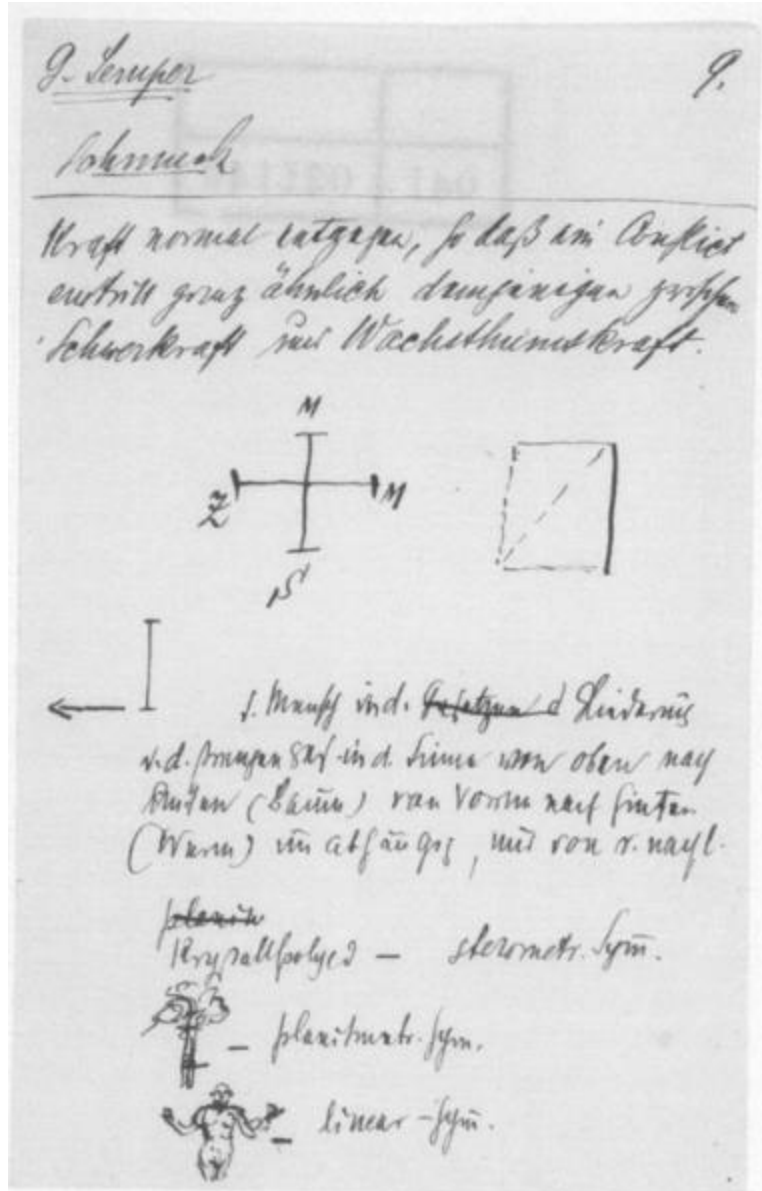


Figure 7: Aby Warburg, manuscript notes and sketches from Gottfried Semper's 1856 essay on adornment (notes marked "Berlin, Fall 1890"), Warburg Institute Archive, Zettelkasten Aesthetik WIA, ZK 041/021149.

Source: Papapetros, Spyros. "World ornament: The legacy of Gottfried Semper's 1856 lecture on adornment." , p. 311.

In this sketch, it seems that Warburg thought Semper tried to refer to the Vitruvian man based on his treatise of cosmic measuring. He maintained that the human body can reveal the qualities of formal beauty in the manner of a well-formed figure that has the two elements of unity and multiplicity; "The aesthetics of pure beauty have their material foundation in Dynamics and

Statics." ¹²⁹ Furthermore, Semper expanded the idea of a cosmic human figure based on the explanation of the symmetrical axis that is different from the symmetrical axis of other objects such as a tree. This cosmic axis showed symmetry as well as movement and growth direction. As an example, in the human body, there are two vertical and horizontal axes.

For instance, a man moved and his symmetrical axis moved from one point to another point that referred to the ability of movement and direction. "The horizontal axis of symmetry dissects the horizontal axis of direction, as well as the vertical direction of life at right angles. It is, one might say, the invisible balancing pole, which lends the form static support." ¹³⁰ The first Warburg sketch shows the four directions and the way that the human body grows and moves; vertical and horizontal axes and Semper explained the axes as "linear symmetry." On the other hand, a tree has a symmetrical axis that hasn't the ability to move. Its tendency is developing upwards into the sky and downwards under the earth and Semper describes it as "planimetric symmetry." ¹³¹

It seems that Semper's ethnographic research was developed based on the Vitruvian man but Semper's theory shows more than one axis of symmetry for a human figure, adding a horizontal axis as a notion of movement.

For Semper, as it has been mentioned earlier, architecture and music were the beginning of inquiry in cosmic and microcosmic arts. Semper categorized the arts into three groups. First, cosmic arts, including tectonics, music, and dance; second, microcosmic arts, such as song, sculpture; and third meloplastic (movement of body), which acts as a transition between the first and the second group.¹³² He wrote that the second group demonstrates the general idea and

¹²⁹ Semper, Gottfried. "On the formal principles of adornment and its meaning as a symbol in art (second section)." *Res: Anthropology and Aesthetics*, 57/58: Spring/Autumn 2010 (2011), p 302.

¹³⁰ Ibid, p 303.

¹³¹ Ibid, p 303.

¹³² Semper, Gottfried. "In Search of Architecture." Trans. Wolfgang Hermann. Cambridge, Massachusetts: MIT Press, 1984, p. 300.

uniformity of world history in proper cosmic formation. The third, also known as cosmic-microcosmic arts, such as poetry, painting, and drama, are historical arts and participate in the activities of the other groups.¹³³ Furthermore, he pointed out the synthesis of the arts by explaining how these three groups of arts can be intertwined as a unity: "tectonics is a truly cosmic art."¹³⁴

Although music, dance, and tectonics (architecture) function in quite different ways, he wrote that these cosmic arts shape a triad and have the same cosmic conception of their task. He came to the idea that in music, laws, and scales determine the form of music, and adornment brings the harmonious working together of the various elements in a piece of music. Moreover, tectonics creates spaces by means of motionless materials, but music comes from the fleeting realm of sounds caused by movement; "music pursues what is acoustically perceptible, shaping and molding it according to laws analogous to those valid in tectonics."¹³⁵

He stated that the perception of music as a cohesive whole is based on the gathering of sequential sounds. In an orchestra, for instance different instruments produce different tonalities of sounds. The ear has the ability to receive different sounds simultaneously but perceives them as a whole. Dynamism is the primary characteristic of the music. Furthermore, he said that the character of music is to arrange the sequence of sounds and control rhythm and melody as the musical notes change in order to take the audience's whole attention and exert a memorable effect on his mind.¹³⁶

On the other hand, the eye is an organ that can absorb a number of impressions at the same time, but is less capable of perceiving consecutive impressions as a unity. Semper elaborated that

Wolfgang Hermann, in the translation of the book, explained in the note, page 300, that Semper adopted the term "meloplastic" from Zeising, as he also followed Zeising's classification of fine arts into group of three. Hermann also mentioned that meloplastic is to display the movement of the human body.

¹³³ Semper, Gottfried. "The attributes of formal beauty." *introduction to "Theory of Formal Beauty" ("Theorie des Formell-Schönen," ca. 1856-1859)*, p. 219.

¹³⁴ Ibid, p. 219.

¹³⁵ Ibid, p. 220.

¹³⁶ Ibid, p. 220.

"when the eye moves quickly, the impressions merge, or when it moves slowly, they get blurred."¹³⁷

Moreover, these cosmic arts are defined by common cosmic characters, in that tectonic is static and music and dance are dynamic. An ideal unity needs two different poles for balancing.

Semper's interest in ancient Greece motivated him to study Greek culture and art. He asserted that Greeks were aware of the relationship between architecture, music, and dance and they were based on natural laws and natural rhythm.¹³⁸ As Wagner mentioned, ancient Greek art was also based on myth, having been in immediate contact with nature and natural laws. "With the Greeks the perfect work of art, the Drama, was the abstract and epitome of all that was expressible in the Grecian nature. It was the nation itself "in intimate connection with its own history that stood mirrored in its artwork that communed with itself and, within the span of a few hours, feasted its eyes with its own noblest essence."¹³⁹ That Wagner used "eyes" rather than ears implies that he was more accepting of the role of the visual in the synthesis of the arts.

Music, dance and architecture defined some terms for describing the qualities of formal beauty among cosmic arts, such as symmetry, harmony, analogy, eurhythmy, rhythm, and proportion, which were shared by all of these cosmic arts rather than belonging to any single one of them.¹⁴⁰ For example, it could be clarified that a dancer dances on the stage based on a piece of music, and follows a rhythm that belongs to both music and body movement.

Semper, in *Style*, discussed how the origin of architecture in society was inspired by nature. He said the Caribbean hut, considered as a whole, answered the purpose for which it has been constructed.¹⁴¹ The columns came from local bamboo trees, and the woven mats were hung up between these trees to present the wall element. Rather than scrutinizing the universal principles

¹³⁷ Ibid, p. 220.

¹³⁸ Semper, Gottfried. *Style in the technical and tectonic arts*, p. 82.

¹³⁹ Wagner, Richard. *The Art-Work of the Future and Other Works*. U of Nebraska Press, 1993, p. 52.

¹⁴⁰ Semper, Gottfried. "The attributes of formal beauty." *introduction to "Theory of Formal Beauty"*, p. 221.

¹⁴¹ Semper, Gottfried. and Mallgrave, H.F, London Lecture of Autumn 1854:" On Architectural Symbols". *RES: Anthropology and Aesthetics*, 9(1), 1985, p. 62.

and laws of architecture, Semper explained geographically, culturally, and historically specific conditions that affected architecture in both aspects of form and function.¹⁴²

He enhanced the crucial role of culture in the construction of the Caribbean hut, considering it "...no phantom of imagination, but a highly realistic exemplar of wooden construction, taken from ethnology."¹⁴³ Moreover, in *Style*, he investigated the four architectural elements in their purest and most original form: the mat enclosure as a wall, the hearth as the center point, the raised earth as a platform, and the column-supported roof.¹⁴⁴

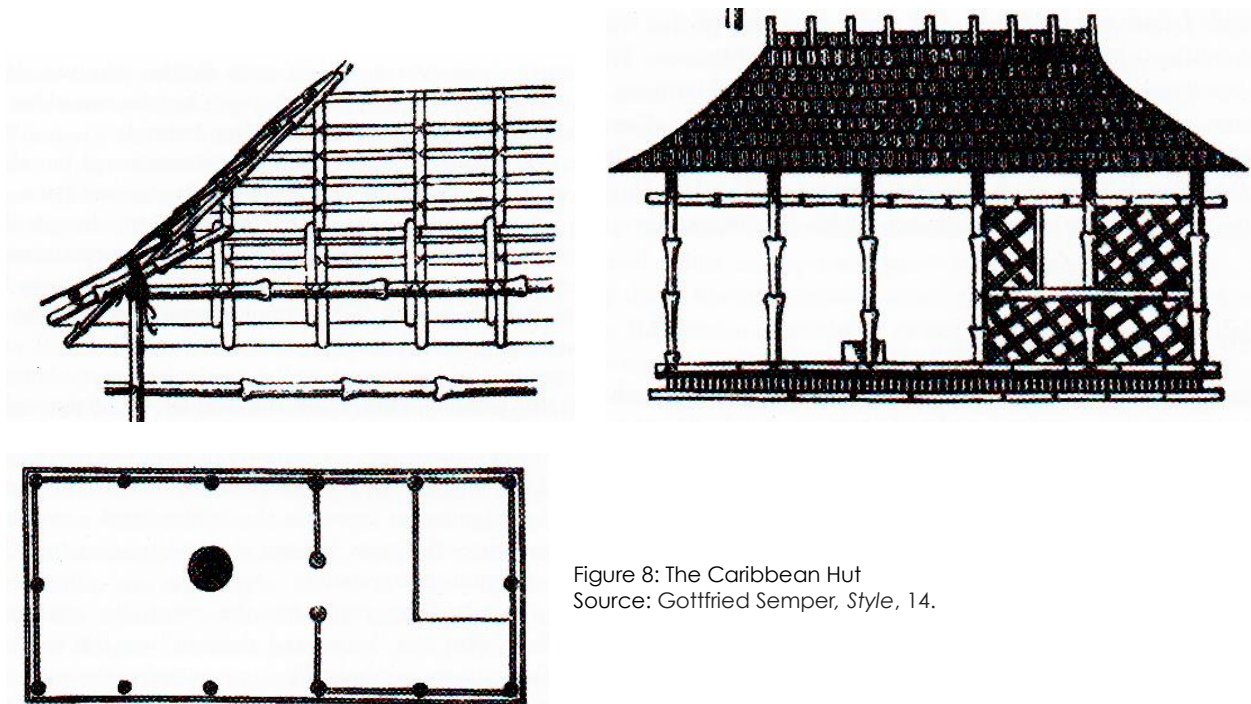


Figure 8: The Caribbean Hut
Source: Gottfried Semper, *Style*, 14.

¹⁴² Hvattum, Mari. *Gottfried Semper and the problem of historicism*. Cambridge: Cambridge University Press, 2004, p. 37.

¹⁴³ *Style in the technical and tectonic arts, or, Practical aesthetics*, p. 666.

¹⁴⁴ *Ibid*, p. 666.

Semper justified that *Gesamtkunstwerk* does not point to the synthesis of individual arts rather at the synthesis of cultural parts. For further clarification, from an architectural viewpoint, the Caribbean hut demonstrated this synthesis of cultural aspects. As an example, the hearth is a symbol of civilization, human culture, and heat. Moreover, the enclosure originating in the wickerwork wall is a symbol of the weaving technique in the cultural context and ritual action. The wall, roof, and platform protected the hearth, which creates fire, and heat, as well as civilization from various environmental factors. For him, architecture is included in the elements that convey the cultural meaning of a specific region.

According to what has been discussed above, we perceive that Semper and Wagner's admiration for Greek arts and Greek culture was based on the laws of nature. Semper also pointed to the idea of Vitruvius regarding the human figure and eurhythmmy (the harmony of proportion) that expanded the notion of the human body as a microcosm. The essence of Greek architecture, as well as other Greek arts, focused more on the notion that human beings came from natural laws and how symmetry, harmony, analogy, eurhythmmy, rhythm, and proportion hidden in nature can be revealed in the human body, who is the observer of the arts.

This research discovered an idea that Semper and Wagner considered a human body in two aspects of object and subject situations. On the one hand, as a subject aspect, the human body experiences the art as an audience and artist, as a perceiver of integration of arts by his or her senses. On the other hand, as an object aspect, the human body plays the model of symmetry, rhythm, proportion, and direction. For example, a body of a dancer as an object dances a rhythmical movement, as a subject presents the integration of music and dance to convey a feeling to the audience.

1.6 Gottfried Semper and Eurhythmy in Art

The task of synthesizing the arts for Semper was making the harmonious interaction between cosmic and microcosmic arts based on eurhythmy in order to reach out to the highest and ultimate element of unity, *Zweckseinheit*, the unity of purpose.¹⁴⁵ Based on the discussion in the previous section, Semper pointed out that symmetry and proportion could be presented based on either the vertical or horizontal axis. In the case of the human body, the proportional axis would be vertical and in the case of some animals swimming, flying, and moving horizontally on the earth, the axis would be horizontal.¹⁴⁶ This section will examine how eurhythmy has been defined by Semper and how it connects architecture and music.

He expanded the notion of eurhythmy in artworks based on three design elements, which correspond to the three dimensions of space. In so far as the multiplicity of form has to be uniformly arranged in relation to these three axes providing for beauty, the following three spatial properties of the beautiful emerge:

1. Symmetry (macrocosmic unity).
2. Proportionality (microcosmic unity).
3. Direction (unity of movement).¹⁴⁷

¹⁴⁵ Semper, Gottfried. "The attributes of formal beauty." *introduction to "Theory of Formal Beauty"*, p. 240. Zweck (purpose), einheit (unity). This purpose must conform to the three authorities of cosmic, microcosmic and cosmic-microcosmic arts. The unit of purpose must be reflected in one of them or the synthesis of one art from each group.

¹⁴⁶ Semper, Gottfried. *Über die formelle Gesetzmässigkeit des Schmuckes und dessen Bedeutung als Kunstsymbol*. Vol. 1. 1856, p. 20-21. Translation by author. "Ganz andere verwickeltere Umstände treten ein, wo die proportionale Axe horizontal ist, wie bei den schwimmenden, fliegenden und horizontal auf der Erde sich fortbewegenden Thieren."

¹⁴⁷ *Kleine Schriften*, p. 329. Translation by author.

"für die meisten Monumente der Baukunst, drei Achsen der Gestaltung, welche den drei Ausdehnungen des Raumes entsprechen. Insofern nun, in Beziehung auf diese drei Schönheitsachsen, die Vielheit der Form einheitlich zu ordnen hat, treten folgende drei räumlichen Eigenschaften des Schönen hervor:

1. Symmetrie (makrokosmische Einheit).

It could be interpreted that these categories are not related to the previous categories of cosmic and microcosmic arts since all symmetry, proportion and direction could be attributed to dance, music, architecture and other arts. Semper said: "Architecture shows a similar variety of combinations. Thus, in certain buildings, the macrocosmic moment forms the reflector of the expediency. Examples are the tumuli, the pyramids, Napoleon's tomb in the dome of the Invalids; they are developed on all sides, without any proportional structure and precisely because of this, they are very expressive. In other buildings the microcosmic moment is predominant. This includes the high square domed temples and even more decidedly, towers, where symmetry and direction are drowned out by proportionality. They are therefore significant as symbols of a religious tendency that strives towards the sky, despises the earthly, and yet would like to retain its individuality and its own self even in heaven. In the same way, in many works of technical arts and architecture, the directional movement appears to be the predominant one."¹⁴⁸ The earthbound buildings like tombs are related to gravity and sky-reaching buildings to levity.

According to what has been discussed about Semper's ideas, eurhythmy is achievable by unifying these three elements as a whole. For him, the symmetrical axis shows the proportion not only on the right and left sides, but also on the front and rear parts, as well as on the top and bottom parts of an architecture.

2. Proportionalität (mikrokosmische Einheit).

3. Richtung (Bewegungseinheit)."

Semper used the word "Einheit" in the passage which means "unity" and how those are perceivable as a whole not different and various fragments.

¹⁴⁸ *Über die formelle Gesetzmässigkeit*, p. 22-23. Translation by author.

"So bildet an gewissen Bauwerken das makrokosmische Moment den Reflector der Zwecklichkeit. Beispiele : die Tumuli , die Pyramiden , das Grabmal Napoleons im Dome der Invaliden ; sie sind all seitig entwickelt , ohne proportionale Gliederung und gerade dadurch als Mäler weltbeherrschender allberühmter Heroen sehr ausdrucksvoll . Bei andern Bauwerken ist das mikrokosmische Moment vorherrschend . Dahin gehören die hohen quadratischen Kuppeltempel und noch entschiedener die Thürme , bei denen Symmetrie und Richtung von der Proportionalität gleichsam übertönt werden."

Furthermore, these three distinct kinds of order represented the principles of the configuration of beauty as a natural form.¹⁴⁹ Semper also emphasized a whole perception rather than considering these orders as separated fragments. He said: "... in order for the relational unity to be expressed clearly and comprehensibly, a regulated arrangement of the parts, a eurhythmic order of the same, is necessary."¹⁵⁰

Semper also revised Vitruvius's statement that "Eurhythm consists of stringing together uniform segments of space to form an enclosure."¹⁵¹ For Vitruvius, eurhythm was a knot that tied together symmetry and proportion as well as made a harmony between intervals. Eurhythm connects the pieces and several parts that are formed one after each other based on symmetry or proportions which makes rhythm based on harmonious proportion.

Semper developed his idea, saying that for example, symmetry is only a piece and a fragment of a eurhythmic whole and we perceive art as a whole, not separated fragments. A cut through the planet Earth makes it two symmetrical sections, but it is perceivable as a whole unit. On the other hand, the snow crystals have a symmetrical form, in each separated part as well as in the whole unity. But we perceive a snowflake as a whole unity rather than separated fragments.¹⁵² Semper also pointed to the growth of a plant and he said that it could be considered as an individual leaf and as a whole when it grows vertically. Maintaining this direction depends on the distribution of roots, branches, leaves, and stems on the retina of the observer's eye, it reveals symmetrical form on vertical arrangement of parts. However, we should consider the matter that in each segment

¹⁴⁹ Prolegomenon to *Der Stil*, p. 198.

"Since in every phenomenon that claims perfection the principle of individualisation is symbolised clearly and distinctly by a certain arrangement of parts, there appear three moments of configuration [Gestaltungsmomente] that can be active in the generation of form."

¹⁵⁰ *Über die formelle Gesetzmässigkeit*, p. 10. Translation by author.:

"Damit sich die Beziehungseinheit klar und verständlich ausspreche, ist eine geregelte Anordnung der Theile eine eurhythmische Reihung derselben erforderlich."

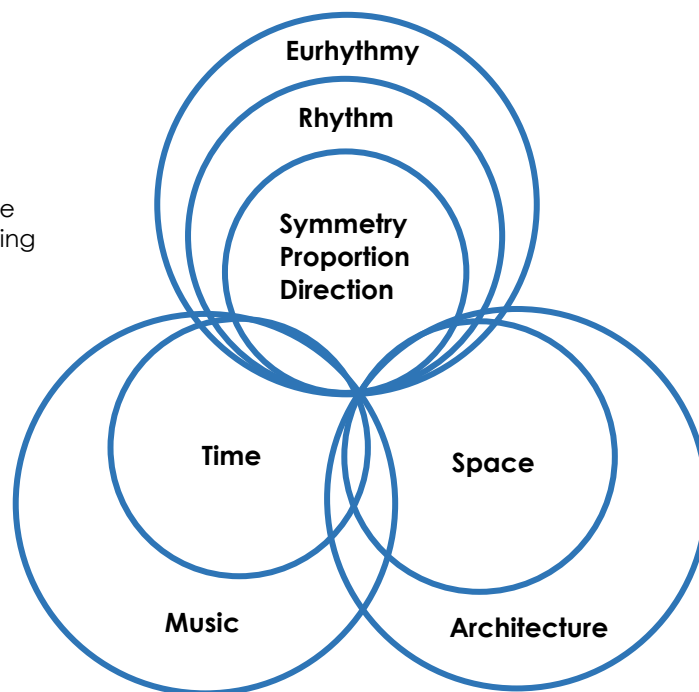
¹⁵¹ Semper, Gottfried. *Prolegomena, Style in the technical and tectonic arts, or, Practical aesthetics*. Getty Publications, 2004, p. 86.

¹⁵² Ibid, p 82.

and part of this plant, namely, the leaves, fruits, or branches, there are the laws of proportions and other symmetrical forms that we perceive it as a whole eurhythmically.¹⁵³

Based on what Semper explained and mentioned in his books and essays, "eurhythm is closely related not to symmetry but to proportion, because symmetry in a strict sense is only a piece, fragment of a eurhythmic whole."¹⁵⁴ By using the word "closely," he took our attention to proportion in order to explain that proportion includes many fragments that follow the rhythmical natural laws. Symmetry, proportion, and direction are originated from eurhythm which defines the harmonious rhythm and order between individual parts. Eurhythm creates rhythmical proportions between the fragments in order to reveal unity. For Semper, eurhythm does have direction and movement in itself, for that reason, the integration of architecture and music, has been embodied in rhythmical sequences of space and time movement.¹⁵⁵

Figure 9: Eurhythm, music and architecture
Source: Author's drawing



¹⁵³ Hvattum, Mari. *Gottfried Semper and the problem of historicism*. Cambridge: Cambridge University Press, 2004, p. 87.

¹⁵⁴ Ibid, p. 87.

¹⁵⁵ Semper, Gottfried. *Prolegomena, Style in the technical and tectonic arts, or, Practical aesthetics*, p. 82.

It could be concluded from this section that both Semper and Vitruvius talked about eurhythm and rhythm in a different way. For Vitruvius, eurhythm is produced by appropriate proportions between parts of a whole and he said in the first book, chapter two of his treatise, "eurhythm is found when the members of a work are of a height suited to their breadth, of a breadth suited to their length and they all correspond symmetrically."¹⁵⁶ For Semper, eurhythm includes rhythm in symmetry, proportion, and movement. He added the idea of motion and direction to eurhythm. Semper said, "Vitruvius confused eurhythm with proportion and, anyway, confused all the formal aesthetic concepts that he probably picked up by misunderstanding some Greek author."¹⁵⁷

In addition, both Semper and Wagner investigated Greek arts and believed that their arts follow rhythm and movement as a total work of art. Wagner in his essay, "Art and Revolution," wrote, "Rhythm is the natural, unbreakable bond of union between the arts of Dance and Tone; without it, no art of Dance, and none of Tone."¹⁵⁸ He also added, "Rhythm is in no wise an arbitrary canon, according to which the artistic-man forsooth shall move his body's limbs; but it is the conscious soul of those necessitated movements by which he strives instinctively to impart to others his own emotions."¹⁵⁹

Semper and Wagner both considered the rhythm of movement as having a crucial role in the integration of arts. For that reason, we can respond to the second and third questions of this research posed at the beginning of this movement that both Semper and Wagner believed in the correlation of arts-based on the existence of rhythm.

¹⁵⁶ Pollio, Vitruvius. *Vitruvius, Ten Books on Architecture*. Harvard University Press, 1914.

¹⁵⁷ Semper, Gottfried. *Prolegomena, Style in the technical and tectonic arts, or, Practical aesthetics*, p. 82.

¹⁵⁸ Wagner, Richard. *Richard Wagner's Prose Works: Art and Revolution*. Vol. 1. K. Paul, Trench, Trübner, 1895, p. 33.

¹⁵⁹ Ibid, p. 101.

1.7 Gottfried Semper and Mathematics in Art

Semper's background in mathematics from his early college education and his interest in the history of ancient Greece encouraged him to identify the different values of the mathematical formula in Greek utensils and vessels. This section will find out if Semper thought there are any mathematical rules and formulas behind the rhythm in Greek arts.

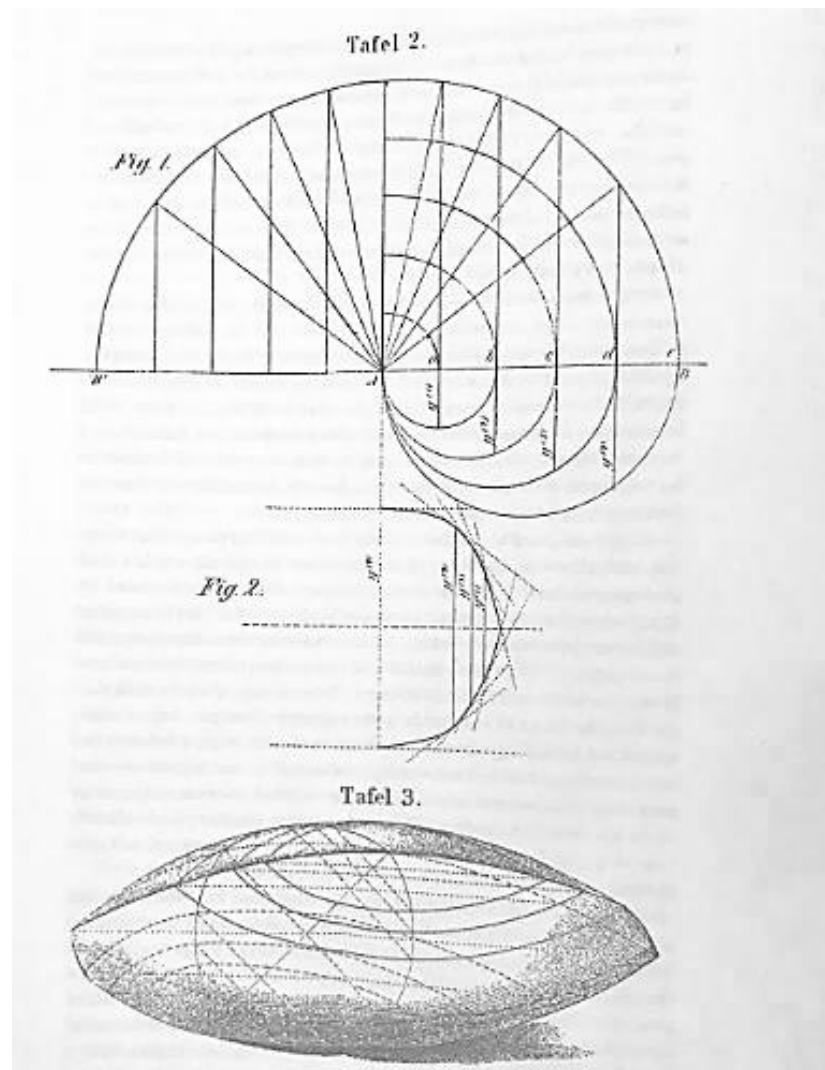


Figure 10: Almond-shaped projectile.

Source: Semper, Gottfried. *Ueber die bleiernen Schleudergeschosse* 1859, p 48

Harry Mallgrave in the introduction of the English translation of *Style* writes, that after sixty pages of analyzing the complex mathematical proportion of projectiles, Semper reached the conclusion that:

...It should not be maintained that the Greeks designed their art forms according to mathematical formulas, (which in the art would be absurd) but rather that the law of nature followed by the Greeks in the limits of their form-making everywhere letting tension dominate was not simply vaguely intimated but clearly recognized.¹⁶⁰

In the beginning, Semper assumed that the mathematical formula might be considered for the almond-like form, but he reached the conclusion that Greeks relied on their sense of beauty, which came from nature and natural laws. In his London Lecture of November 11, 1883, Semper claimed that "fine arts are hardly obtainable by calculation. This is very true, and I am the last to believe that mere reflection and calculation may at any time succeed in filling the place of talent and natural taste."¹⁶¹ His theory involved following the mathematic (proportion) rule and patterns concealed in nature.

In *An Attempt to Demonstrate the Dynamic Origin of Certain Forms in Nature and Art*, Semper testified that beauty is purely empirical, "that is, an abstraction based on the most crucial evaluation of architecture and even, the vessels and utensils of the Greek style, and the results of

¹⁶⁰ Semper, Gottfried, *Style in the technical and tectonic arts, or, Practical aesthetics*, p. 47.

Mallgrave, Harry Francis. *Gottfried Semper: architect of the nineteenth century*. Yale University Press, 1996.

Harry Francis Mallgrave in his book, *Gottfried Semper: Architect of the nineteenth century*, described that Semper showed his talent for mathematics at high school and his director gave him a referral to Carl Friedrich Gauss and Bernhard Thibaut at the University of Gottingen in Germany. He started studying mathematics, but after a couple of months he declared to his parents that he is more interested in practical tasks rather formulas, although he spent time reading books on mathematics and mechanics and science. Mallgrave also pointed out that Semper seriously considered hydraulic engineering but he changed his major and started studying architecture in Paris in 1826.

¹⁶¹ Mallgrave, Harry Francis, Joseph Rykwert, and Gottfried Semper. "London lecture of November 11, 1883." *RES: Anthropology and Aesthetics* 6, no. 1, 1983, p. 18.

appropriate measurement, size, and functional form."¹⁶² Semper also added that "what was then added to beauty is the analogy between the arts, namely between music and architecture, and the integration of their basic rules."¹⁶³ According to his explanation, for Semper, the real and pure beauty came out of intrinsic sense. The sense that was engaged in natural beauty and natural laws that follow natural laws like proportion and rhythm rather than the mathematical formulas. For a better explanation, it could be said that the part of mathematical laws that includes a logical sense of addition, subtraction, multiplication, and division are different than the part that includes sensible natural laws. In addition, in the introduction of the English translation of *Style*, Mallgrave referred to Semper's quote:

Semper resembled those found in forms of Greek architecture and came to the rather extraordinary conclusion that it "should not be maintained that the Greeks designed their art forms according to mathematical formulas (which in the art would be absurd) but rather that the law of nature followed by Greeks."¹⁶⁴

Based on this explanation, it could be concluded that mathematical laws have two branches. The first branch follows formulas, and the second follows natural laws in geometry like symmetry and proportion.

¹⁶² Semper, Gottfried. *Ueber die bleiernen Schleudergeschosse der Alten und über zweckmässige Gestaltung der Würfkörper im Allgemeinen: ein Versuch die dynamische Entstehung gewisser Formen in der Natur und in der Kunst nachzuweisen*. Verlag für Kunst und Wissenschaft, 1859, p. 1.

The title is about the leaden shots for slingshots of the ancients and about the appropriate design of the projectiles in general: An attempt to demonstrate the dynamic emergence of certain forms in nature and in art.

¹⁶³ Ibid.

Dieses Schoenheitssystem war ein rein empirisches, das heisst, eine auf die genauesten Ausmessungen der noch vorhandenen Ueberreste der Baukunst, der Gefässe und Geräthe griechischen Stiles und die Vergleichung der Resultate dieser Messungen begründete Abstraktion. Was dann noch dieser an sich verdienstlichen kombinatorischen Arbeit von der Analogie zwischen den Künsten, namentlich zwischen der Musik und der Baukunst und von der Gemeinschaft ihrer Grundregeln hinzugefügt wurde, vagirte zwischen ästhetischen Gemeinplätzen und absoluter Willkür.

¹⁶⁴ Semper, Gottfried. Introduction to *Style in the technical and tectonic arts*, p. 47.

In ancient Greece, Pythagoras applied the relationship between cosmos, mathematics and geometry not only to "harmonies of music but also to the courses of the heavenly bodies, in whose movement he divined mathematical order and direction of universal intelligence." The four arts of geometry, arithmetic, astronomy and music had been considered as *Quadrivium*. Later, in medieval times, grammar, rhetoric, and dialectics as the *Trivium* had were added to the *Quadrivium* and together they become known as the seven liberal arts. Since Semper was interested in Greek history, it could be explained in a way that he claimed Greek arts were mostly focused on the mathematical laws of geometry rather than mathematical laws of arithmetic and formulas.¹⁶⁵

In 1884, five years after Gottfried Semper's death, his sons, Manfred and Hans decided to collect their father's writings, with an intention to offer some desired information and insight to the scholars, teachers, and artists who had apprehension in the field of art, science and specifically in architecture and applied arts.¹⁶⁶ Manfred Semper, in the introduction of *Short Writings*, said that some of the writings were published earlier by the author himself, either in the form of individual brochures or as articles for art journals and other newspapers.¹⁶⁷ Manfred added that some of

¹⁶⁵ Abelson, Paul. *The seven liberal arts: A study in mediaeval culture*. No. 11. Teachers' College, Columbia University, 1906.

¹⁶⁶ Manfred Semper (1838-1913) was Semper's second of six children and studied from 1855-1859 at the Institute of Technology in Zurich. Manfred as an architect designed many buildings in Germany and Italy. He also designed a tombstone for his deceased father in Rome. In 1871, Manfred accepted the construction management of the second Opera house in Dresden, which was designed by his father and took about seven years to be built.

Hans Semper (1845- 1920) was an art historian; He began studying law and classical archeology at the university of Berlin in 1863 and he continued his study in art history field at the university of Munich. Later, he received his PhD from university of Zurich without having studied there.

These two brothers decided to collect and publish their father's essays in 1884.

¹⁶⁷ Semper, Gottfried. *Kleine Schriften von Gottfried Semper*, hrsg. von Hans und Manfred Semper, (1884), p. III-VII. Translation by author.

Einige dieser unbekannt gebliebenen Arbeiten waren zwar offenbar vom Versasser für den Druck bestimmt, aber wie dies in dem Leben eines jeden Schriftstellers vorkommt, durch zufällige Umstände nicht dazu

these works, which have remained unknown, were evidently destined to be published by the author, but, as happens in the life of every writer, by chance circumstances did not allow publication. These essays were individual parts of the conclusion of his main work, which Semper unfortunately no longer left in finished form, but his sons wanted to collect them and complete what he wanted to publish.¹⁶⁸

Some of the other essays were prepared as drafts or papers for public lectures, still others as preliminary studies for his book, *Style*. Manfred and Hans published Semper's writings as a book, *Kleine Schriften*. One of these essays described art as the result of a mathematical function.

Since mathematics underlying the explanation of arts for Semper, throughout his life, he put a lot of effort and wrote many notes to expand the idea that mathematics in an artwork can only reveal the part of art which remains pure over time, and addressed it as an idea, purpose, and concept. Although the conceptual art, idea, and purpose might look like an artistic aspect of design, he tried to interpret it as a responsive result to the project or the face of art that could not be changed over time like mathematics. On the other hand, other functions like climate, religion, site, and context might look like factors that could not be stable over time. Later, in this section, it will be discussed how mathematics result does not change although the factors are not stable.

In the essay, Semper explained that:

gelangt, während andere als Vorlagen oder Heste für öffentliche Vorträge ausgearbeitet wurden, wieder andere als Vorstudien zu einer größeren Arbeit, dem „Stil“, zu betrachten sind.

¹⁶⁸ Semper, Gottfried. *Kleine Schriften von Gottfried Semper*, hrsg. von Hans und Manfred Semper, (1884), p. III-VII. Translation by author.

Im vorliegenden Bande treten die Unterzeichneten mit einer Sammlung kleinerer Schritten ihres Vaters, Gottfried Semper, vor das kunstgebildete Publikum, in der Hoffnung, diesem letzteren damit manche erwünschte Mitteilung und Anregung zu bieten, und mit dem Wunsche, die Kenntnis und die Anschauung von der allseitigen und mannigfaltigen Wirksamkeit des Verstorbenen, als Denker, Gelehrter und seinsühlender Kritiker im Fache der Kunstwissenschaft, sowie als Lehrer und Hauptsörderer eines bewußtvollen, stilgerechten Schaffens im Gebiete der Architektur und des Kunstgewerbes, soweit als möglich zu vervollständigen oder wieder auszurischen und damit einen Akt der Pietät zu erfüllen.

Every artwork is a result of using a mathematical expression, a function of any number of agents or forces, which are the variable coefficients of its embodiment. $Y = F(x, y, z \text{ etc.})$ In this formula, Y stands for the overall result of $x, y, z, \text{ etc.}$, and represents just as many different agents that either work together or are independent of each other. The nature of this mutual influence or independence is expressed here by the symbol F (function). If the factors $x, y, z \text{ etc.}$ remain the same, but F is changed, then Y will be redesigned in a different way than it was before, it will be fundamentally different from the earlier condition. The new condition and new principle is obviously modified on the direction that depends on how we feel about adding new values for the items x, y, z .¹⁶⁹

A distinction between $x, y, z, \text{ etc.}$ must be made between two groups of influences that have a decisive effect on the creation of an artwork.

The first comprises those requirements, which are grounded in the artwork itself and are based on certain laws of nature and need, remain without change at all times and under all circumstances. We denote this category of influences with the letter F . On the other hand, the second group comprises those influences which we can describe as having an

¹⁶⁹ Ibid, p. 267-268. Translation by author.

"Jedes Kunstwerk ist ein Resultat, oder, um mich eines mathematischen Ausdrucks zu bedienen, eine Funktion einer beliebigen Anzahl von Agentien oder Kräften, welche die variablen Koeffizienten ihrer Verkörperung sind. $Y = F(x, y, z \text{ etc.})$ In dieser Formel steht Y für das Gesamtergebn und $x, y, z \text{ etc.}$ stellen ebenso viele verschiedene Agentien dar, welche in irgend welcher Richtung zusammen oder aufeinander wirken, oder voneinander abhängig sind. Die Art dieser gegenseitigen Beeinflussung oder Abhängigkeit ist hier durch das Zeichen (Funktion) ausgedrückt. Wenn die Faktoren $x, y, z \text{ etc.}$ dieselben bleiben, dagegen F verändert wird, so wird Y in einer anderen Weise als vorher sich umgestalten, es wird fundamental verschieden werden von seiner früheren Beschaffenheit. Dieses neue Prinzip wird selbst verständlich seinerseits wieder modifiziert, je nachdem wir uns veranlaßt sehen, für die Buchstaben $x, y, z, \text{ etc.}$ neue Werte einzusetzen"

external effect on the creation of an artwork. They correspond to the letter **Y** in the general formula used for this explanation.¹⁷⁰

Semper pointed to the relationship between mathematics and artwork. He believed that the basic notion, idea, and concept of the artwork, which arise from its purpose and use, are independent of its style, location, material, and condition of it. "These natural and original forms are called the types of ideas. It remains unique and conveys the pure expression in nature itself over time. It grants the artistic feeling and satisfaction when in any work of art, no matter how far removed from its archetype, the unity of this composition is embodied by the basic idea, similar to the way in musical work, the melody sounds its theme." ¹⁷¹

Semper mentioned that the external influences which can affect an artwork have been divided into three groups. The first comprises the materials or types of construction which can be replaced by new technology and new innovation over time. The second comprises the local and ethnological influences on artistic formations such as climate, religion, politics, economy, and the

¹⁷⁰ Ibid, p. 268.-269. Translation by author.

Es sind zwei Klassen von Einflüssen zu unterscheiden, welche bei der Entstehung eines Kunstwerkes bestimmend einwirken. Die erste derselben umfaßt diejenigen Anforderungen, welche in dem Kunstwerke selbst begründet sind und auf gewissen Gesetzen der Natur und des Bedürfnisses beruhen, die zu allen Zeiten und unter allen Umständen sich gleich bleiben. Diese Klasse von Einflüssen bezeichnen wir mit dem Buchstaben Y. Die zweite Klasse umfaßt diejenigen Einflüsse, die wir als von außen her auf die Entstehung eines Kunstwerkes wirkend bezeichnen dürfen. Ihnen entsprechen in der oben angewendeten allgemeinen Formel die Buchstaben x, y, z etc.

¹⁷¹ Ibid, p. 269. Translation by author.

... Die Grundidee eines Kunstwerkes, die aus dessen Gebrauch und Bestimmung hervorgeht, ist unabhängig von der Mode, vom Material und von zeitlichen und örtlichen Bedingungen. Sie ist das Motiv eines Kunstgegenstandes. Die Motive besitzen gewöhnlich ihren einfachsten und reinsten Ausdruck in der Natur selbst, sowie in den frühesten Formen, welche ihnen von den Menschen im Anfang aller Kunstindustrie gegeben wurden. Diese natürlichen und ursprünglichen Formen heißen die Typen der Ideen. Es gewährt dem künstlerischen Gefühle eine Befriedigung, wenn in irgend einem Kunstwerke, mag es noch so weit von seinem Urbilde entfernt sein, doch die ganze Komposition von dieser Grundidee beherrscht wird, ähnlich wie in einem musikalischen Werke das Thema durchklingt, und zweifellos ist Klarheit in der Erfassung dieser zu Grunde liegenden Urmotive eine Hauptaufgabe des Künstlers.

condition of the environment. Last but not least, includes all personal influences that give a unique and individual character to an artwork. These influences can be of a twofold nature; they can be emitted by the clients or by the artists or by those who have practically produced the work of art. These three different groups of influences embody in artwork and form various features of concept which Semper called style. He also added that a work has no style if the material has been treated in a way that does not correspond to its nature.¹⁷²

In his mathematical formula, he interpreted **F** as a concept, idea, function, or the purpose of artwork, the influence which is independent of style and material. On the other hand, the influences like x, y, z, etc., which have been put together in the parentheses, can have an impact on creation and presentation of the artwork. The result, which stands as **Y**, comes from a static factor (purpose) and includes dynamic factors like material, climate, religion, etc. There is no "correct" or "wrong" answer for this artistic formula, but his notion expanded over art and science and he considered these two aspects like two wings of creation. Furthermore, since he didn't provide an explain this formula as a whole like $Y = F(x, y, z, \dots)$, he meant that it does not work as separated fragments, as either $Y = F$ or $Y = (x, y, z, \text{etc.})$. It is also undeniable that there is no order or hierarchy for the influences in parenthesis.

Based on Semper's notion of mathematics and artworks, and what has been discussed above, it could be claimed and assumed that *Gesamtkunstwerk* does not only concern total works of art and a synthesis of the arts, but also the integration of mathematics and art as a unity. Because

¹⁷² Ibid, p. 271. Translation by author.:

Ihre Zahl ist unbegrenzt, doch können sie in drei bestimmte Gruppen gesondert werden . Die erste Gruppe umfasst die Materialien und die Arten der Ausführung oder die Prozesie, welche bei der Ausführung in Frage kommen . Die zweite Gruppe umfasst die lokalen und ethno logischen Einflüsse auf künstlerische Gelfaltungen , die Ein flüsse des Klimas , religiöser und politischer Einrich tungen und anderer nationaler Bedingungen . Die dritte Gruppe ist diejenige , welche alle persönlichen Einflüsse in sich einschließt , die einem Kunstwerke einen individuellen Charakter verleihen . Diese Einflüsse können zwei facher Natur sein , sie können von den Auftraggebern oder von den Künstlern oder denjenigen ausgehen , welche das Kunst werk praktisch herzufellen haben . Diese drei verschiedenen Gruppen von Einflüssen auf die Verförperung von Kunstwerken bilden ebensoviele verschiedene Merkmale jenes wichtigen Kunstbegriffes : Stil

this unity of art and wholeness of perception would not appear if we eliminate one wing of the creation. Mathematical laws define natural laws in a way that include symmetry, rhythm, proportion, and scale rather than mathematical formulas.

For Semper, mathematics was used as part of art, as well as defining and explaining the arts. For instance, the formula $Y = F(x, y, z, \dots)$, showed that principles and natural laws, such as symmetry and proportion, which were involved in numbers and sequences, were based on natural logical math as well as pure concept and idea that could be stable over the time. On the other hand, factors such as climate, religion, and culture were not based on mathematics laws and could not stay over time. For a better explanation, he presented the relationship between mathematics and art using a mathematical formula to show that even natural laws, proportion, and numbers could provide an aspect of the concept and idea of an artwork.

1.8 Conclusion of the First Movement

This chapter provides responses to two questions posed in this research. Richard Wagner proposed the idea of the synthesis of the arts, *Gesamtkunstwerk*, and considered the presence of music, dance, and poetry in his works. Gottfried Semper, his friend, who attended many discussions with Wagner regarding the philosophy of art and the problems of the current century, categorized the arts into three groups. The first was cosmic arts including music, tectonics, and dance. The second group was microcosmic arts, including song, sculpture, and meloplastic (movements of the human body). He also explained the third group as cosmic-microcosmic arts that include painting, poetry, and drama. Besides the cosmic and microcosmic arts, he explained the cosmic, and microcosmic unities as well as the unity of the movement. Symmetry, proportion, and direction (macrocosmic, microcosmic unity, and unity of movement) in any art, originated

from eurhythmmy that defines the harmonious rhythm and order between individual parts. Eurhythmmy was first used in Vitruvius's treatise as rhythmical proportions and Semper revised it as a rhythm of the many pieces and fragments in order to establish unity.

For Semper and Wagner, the ancient Greek arts came from a cultural context and contained pure ideas. Semper investigated the relationship between mathematical formulas and artworks, in Greek arts. He picked an almond-like projectile and after much research, he concluded that although it seems the form has been configured based on mathematics, Greeks took the beauty of forms from the laws of nature. For that reason, he used mathematics as means to define and explain the arts. For instance, the formula $Y = F(x, y, z, \dots)$, showed principles and natural laws such as symmetry and proportion, which were involved in mathematical laws like geometry rather than arithmetic laws and formulas.

Semper claimed that mathematical laws of geometry like the eurhythmmy, rhythm, symmetry, proportion, and direction define the harmony of proportion in nature, which is based on design ideas and concepts and remains pure and stable over time.

As we understood that Semper believed in eurhythmmy and rhythm, the next chapter will be devoted to scrutinizing one of Semper's works, the Dresden opera house. This will offer a response to the first question of this research, if there is any connection between architecture and musical staff/ notes on the drawings and how Semper integrated arts into architecture. In addition, it will be investigating how the musical staff works as an architectural scale on the drawings.

Second Movement

ANDANTE, ADAGIO



Figure II: Score of *Siegfried Idyll* (1870), Richard Wagner, Partitur S.6

Source: Akg-images.com

Andante (moving at walking pace) or *Adagio* (literally slow) is the second movement of a symphony and following the first movement, emphasizes full, slow tempo and movement that gradually gains tension.

2.0 Introduction

In looking at the integration of different forms of art, leading to unity in their expression, this dissertation examines proportions and measuring scales that can apply to almost any branch of arts, mathematics, and science. The Vitruvian man, for instance, had specific body proportions, which were used since ancient times to define the ideal form of a “well-shaped man” and define the proportions between different measures derived from the body.¹⁷³ Proportions and symmetry have long been utilized in painting and sculpture with an intention to depict the ideal form of the human body, while at the same time, specific measures and scales were used to create various patterns and forms (in music and body movements, namely, dancing) through which human beings were connected to the outer world.¹⁷⁴ All of these have been claimed to derive from the laws of nature.

This study suggests that architecture can be understood to be integrated with other forms of art based on similar rhythmical patterns (symmetry, proportion and direction) and arguably bring about a unity that functions as a whole. This chapter will examine scale and measurement as well as the relationship between architecture and music in Semper's drawings. The author proposes that the architectural scale on the bottom of the Dresden theater floor plan (figure 1) has been drawn based on a musical staff.

This chapter will be discussing how in Semper's Dresden Theater, various arts came together using rhythmical patterns (both in music and body movement) creating a whole and how rhythm to Semper is the combination of music, dance, and architecture. Moreover, for him, the rhythmical patterns could be traced in nature, in the human body as well as music, all of which resembled architectural rhythmical patterns as well. Inspired by this idea, the notion of *Gesamtkunstwerk* in

¹⁷³

Vitruvius, and Morris Hicky Morgan. *The ten books on architecture*. Dover, 1914, p. 73.

¹⁷⁴ Padovan, Richard. *Proportion: science, philosophy, architecture*. Taylor & Francis, 2002, p. 164-174.

the works of Semper and Wagner indicates the crucial role of integrating various art forms in creating a unified whole through rhythm.

In addition, the current study will be investigating how rhythmical patterns (symmetry, proportion, and direction) in different forms of artistic expression, whether music, dance, and architecture contribute to the creation of integrated unities and total works of art, specifically through the work of Semper's Dresden opera designs..

2.1 Vitruvius and Scalar Narrative

Since Semper was interested in ancient Greek culture and arts, as was established in the first movement, he disagreed with Vitruvius's notion of eurhythmy and proportion. Vitruvius claimed that eurhythmy is perceivable based on appropriate proportion, but Semper thought of eurhythmy as the integration of symmetry, proportion, and movement. Vitruvius during the days of the Roman empire had written his treatise and talked about proportion in architecture.¹⁷⁵ During late 1480, in the Renaissance, Leonard Da Vinci studied proportion and the human body in anatomy. He took the idea of human measurement from Vitruvius and drew a Vitruvian man as a perfect geometric figure.¹⁷⁶

In that drawing, not only the circular but also the square figure could encompass the human body as we measure the distance from the top of the head to the soles of the feet and find this measure equals that from finger to finger of the outstretched arms. We get the measure of height and breadth of a square, though he doesn't claim that the square is centered on the navel.¹⁷⁷

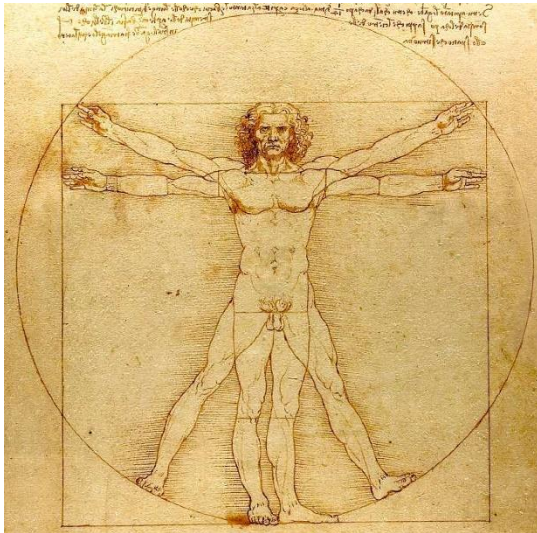


Figure 11: Vitruvian man by Leonardo da Vinci
Source: Zöllner, Frank. *Leonardo da Vinci*, p. 36.

¹⁷⁵ Zöllner, Frank. *Leonardo da Vinci, 1452-1519*. Taschen, 2000, P36.

¹⁷⁶ Ibid, P 36-38

¹⁷⁷ Pollio, Vitruvius. *Vitruvius, the ten books on architecture*. Harvard university press, 1914. P 73.

2.2 Scale and Klafter (Fathom) in Semper's Work

The history of scale is a history of human imagination since in nature, whether great or small, everything is always full size.¹⁷⁸ "Only human imagination conceives of scale and it is a key to understanding embodied architectural drawing."¹⁷⁹ The purpose of scale is establishing a ratio to compare an actual size with apparent size based on a regular proportion.¹⁸⁰ For Vitruvius and most of human history, the measurement was based upon body members such as the finger, palm, foot, elbow (cubit), and fathom. For larger measurements, the body was actively involved in movement such as the pace and perch.¹⁸¹ Measures were regularized in cities by stone reliefs and metal bars attached to public buildings. The metric system, developed at the end of the eighteenth century, was required to be adopted by law in January 1872 in North Germany and in 1876 in Austria.¹⁸² At that time, the world was considered to have a common system of measures.¹⁸³ "The choice must lie between our own and the metric."¹⁸⁴ If people wanted to bring their own system into commensurability, it should be mentioned the goal and the purpose of this system.¹⁸⁵ In 1867, in Paris, thirteen measures of length from different countries were introduced to the world under the name of foot or its equivalent.¹⁸⁶ It could be interpreted that for that reason, the artists and scientists used the metric system for their works in order to be known in the world, and used the foot system in order to be presented to their countries.

¹⁷⁸ Emmons, Paul. *Drawing Imagining Building: Embodiment in Architectural Design Practices*. Routledge, 2019, p. 183.

¹⁷⁹ Ibid, p.183.

¹⁸⁰ Ibid, p.183.

¹⁸¹ Ibid, p.183.

¹⁸² Barnard, Frederick Augustus Porter. *The Metric system of weights and measures*. American Metric Bureau, 1879, p. 40-43.

¹⁸³ Ibid.

¹⁸⁴ Ibid, p. 42.

¹⁸⁵ Ibid.

¹⁸⁶ Ibid.

Unlike the abstraction of modern measures, pre-modern measures were conceptually understood as part of the character of the thing it measured. In some sense, the measure was the thing. While many regions used the fathom, for example, each city would have its own specified length that was often displayed on an important building such as the main church opening upon a public market square (figure 12). The rod or perch was determined in sixteenth century German towns by lining up each foot of the first sixteen men to exit church after a Sunday service. The foot measure was derived from taking an average of one sixteenth of the whole (figure 13).¹⁸⁷

The same measure, such as a foot, varied by place from city to city. Palladio wrote in 1570: "units of measurement differ just as cities and regions do."¹⁸⁸ Furthermore, even within one locale, the same measure varied for different materials. The more precious, the shorter the measure. Filarete explains, "the *Braccio* [or cubit] for measuring wood is longer than that for wool. The *Braccio* for wool is longer than that for velvet, and so on."¹⁸⁹ As the human body varies, so naturally did measures vary.

The representation of scale in architectural drawings is typically shown graphically as a line subdivided with marks to indicate the size of the measure in the selected scale. Architectural scales apply a ratio to the selected measure to create a "small" version of the measure that is mathematically reliable.

¹⁸⁷ www.units.fandom.com

¹⁸⁸ Palladio, Andrea. *The four books on architecture*. Mit Press, 2002, p.19.

¹⁸⁹ Filarete, *Treatise on Architecture*, trans. by John Spencer, New Haven, 1965, l. 4r, p. 9.



Figure 12: German town hall in Regensburg cubit and *Klafter* on the wall.
Source: <https://www.bilder-reiseberichte.de/regensburg/fuss-elle-klafter.htm>



Figure 13: Rood=16 feet, Determined by first 16 men to leave church on first Sunday (German, 16th century) Source: <https://www.bilder-reiseberichte.de/regensburg/fuss-elle-klafter.htm>

In studying the original Semper drawings held in the GTA Archive, ETH Zurich in order to investigate if there is a musical staff acting as an architectural scale on the original drawings, it was found that Gottfried Semper's second theater plan drawings have two graphic scales. The first shows the *Masstab* (standard metric scale) and underneath it, he drew another scale bar that was labeled with "WKFT" as an abbreviation of "Wien *Klafter*." An arrow connects or references the *Wien Klafter* (Vienna Fathom) to *Masstab* (standard metric scale). According to documents from GTA Archive, ETH Zurich, the second theater in Dresden was designed by Gottfried Semper and built by Manfred Semper. The chronology showed that it was designed from 1870- 1871 and executed from 1871-1878. The archive collected 86 plans, 10 plan photos, 1 model photo, 34 photos and 5 written documents.¹⁹⁰

¹⁹⁰ gta Archiv / NSL-Archiv <http://www.archiv.gta.arch.ethz.ch/>

20-0196 // Zweites Hoftheater in Dresden / Architekten: Gottfried Semper, Manfred Semper (Bauführer) / Ortsangaben: Objektort: Theaterplatz, Dresden / Chronologie: Entwurf ab 1870; 1871/1878 ausgeführt / Bestand: 86 Pläne; 10 Planfotos; 1 Modellfoto; 8 Druckgrafiken; 8 Druckgrafiken (Fotos); 34 Fotos; Schriftliche

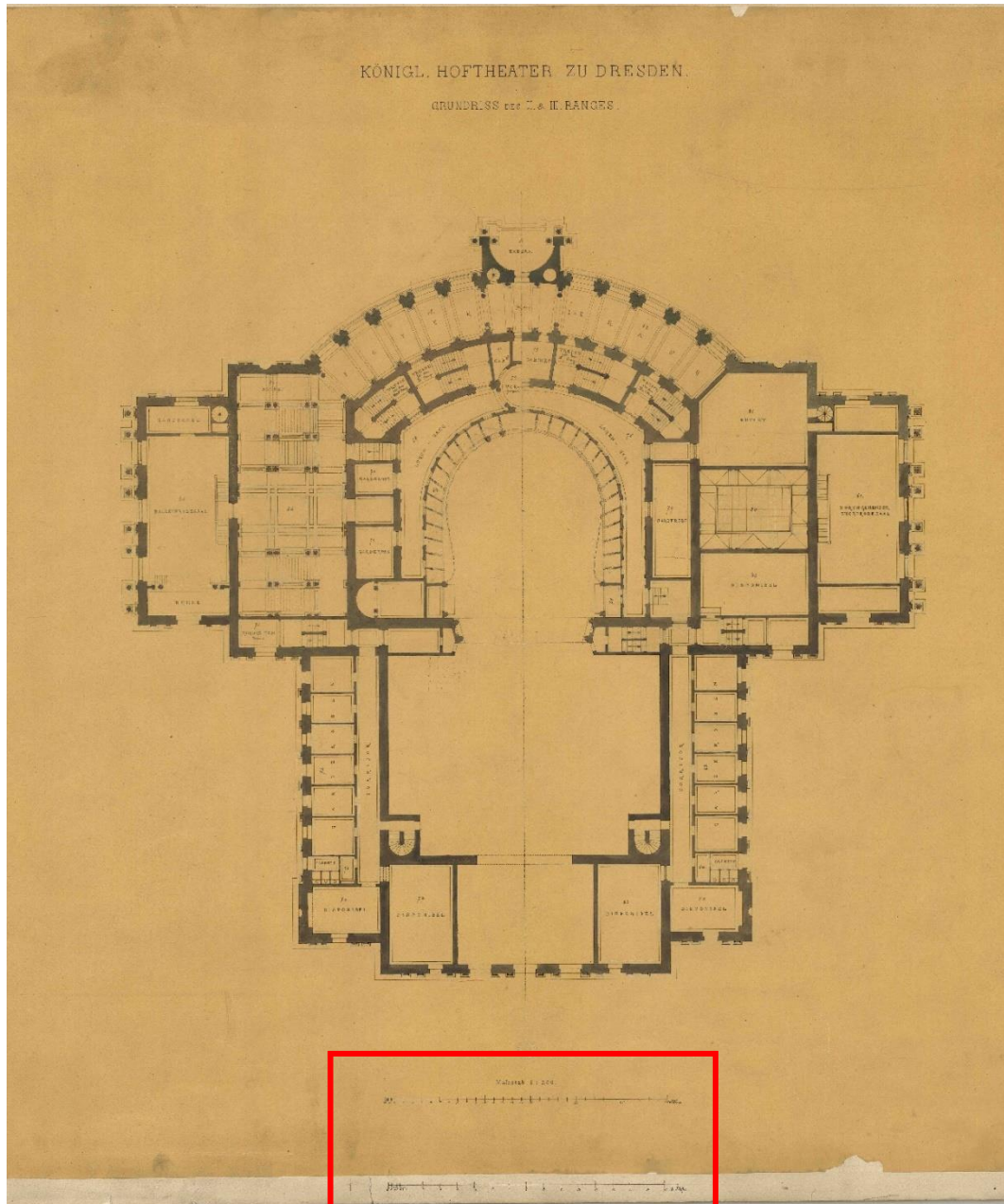


Figure 14: Architectural scales on Semper's drawing
Second Dresden theater floor plan
Source: GTA Archives / ETH Zurich, Gottfried Semper

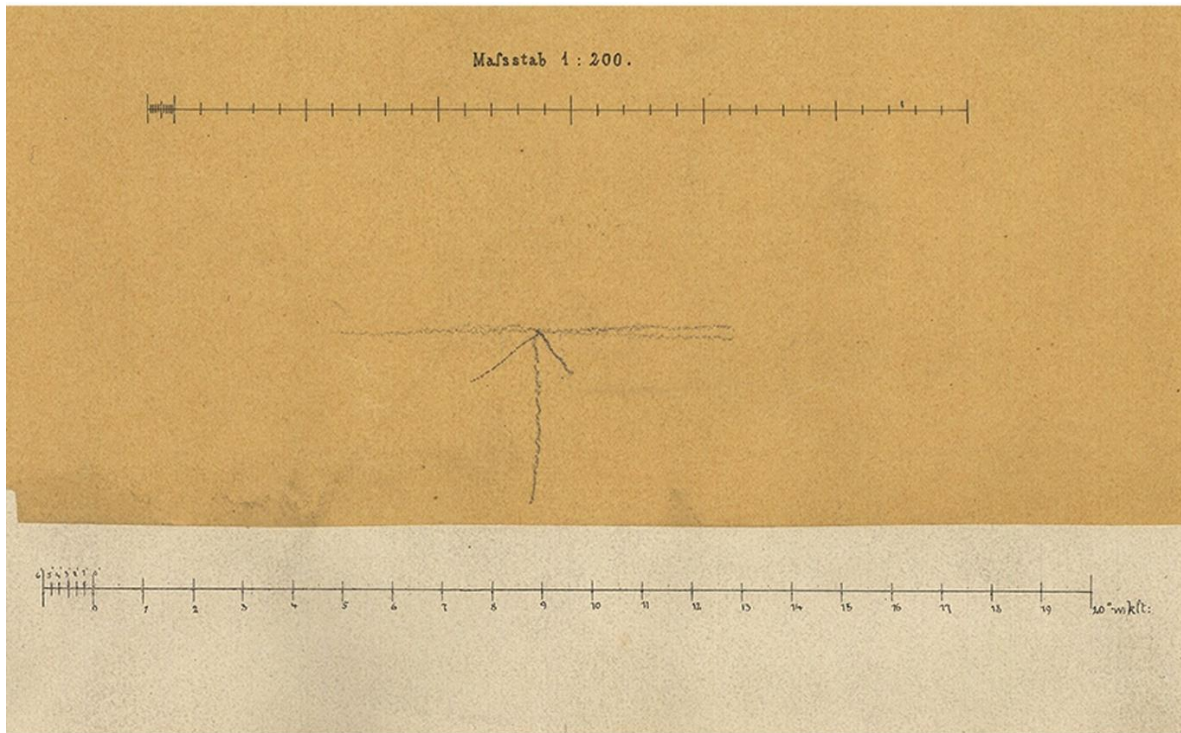


Figure 15: Architectural scale on Semper's drawing
Meter and Klafter scale
Source: GTA Archives / ETH Zurich, Gottfried Semper

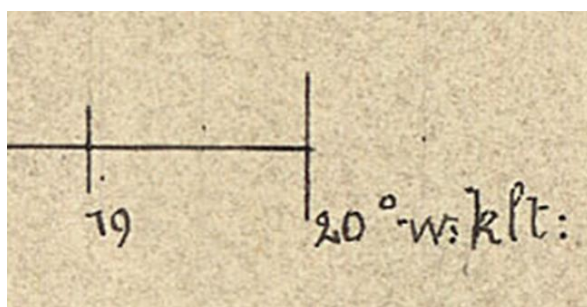
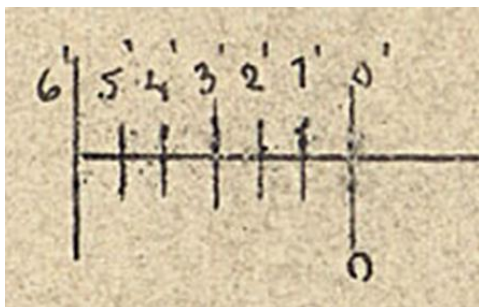


Figure 16: Measurements and Divisions
Source: GTA Archives / ETH Zurich, Gottfried Semper

Klaffer or fathom is a historical unit of measurement, which was used in central Europe and beyond as a metrologic system. The fathom was also used in the US as part of its imperial system.¹⁹¹ The *Klaffer* unit was a measurement derived from the human body; specifically the span of outstretched arms from the tip of the right hand's longest finger to the other tip of the left hand's longest finger. When the arms are held out to the sides, they are like a Vitruvian man and the measure corresponds to the height of the adult human being. This bodily measure as outstretched arms was visualized in the ancient Greek metrologic stone carving (c.450 BC) now at the Ashmolean Museum in Oxford.¹⁹² Semper may have seen this artifact during his time in England. In any case, the *Klaffer*, unit was evidence of his notion regarding vertical and horizontal symmetry that has been discussed in the previous movement. In addition, the Vitruvian man shows the vertical axis of symmetry and the *Klaffer* shows Semper's notion regarding vertical and horizontal axes of symmetry that moves from the top to the bottom, and from left to right.



Figure 17: Ancient metrologic stone carving (c.450 BC) now at the Ashmolean Museum
Source: Emmons, Paul. *Drawing Imagining Building: Embodiment in Architectural Design Practices* 185

¹⁹¹ Stevenson, Angus, ed. *Oxford dictionary of English*. Oxford University Press, 2010.

The Oxford dictionary explained the Fathom as a noun meaning "a unit of length equal to six feet (approximately 1.8 m), chiefly used in reference to the depth of water. In addition, as a verb, measure the depth of (water). Also, – origin Old English *fæthm*. The original sense was "something that embraces", (plural) "the outstretched arms"; hence, a unit of measurement based on the span of the outstretched arms, later standardized to six feet.

¹⁹² Rykwert, Joseph. *The dancing column: on order in architecture*. Cambridge, MA: Mit Press, 1996, p. 100.

The unit of *Klafter* was still used in the nineteenth century.¹⁹³ The variability of measures discussed above was also true among central European countries for the *Klafter*.¹⁹⁴ European countries copied this unit and customized it. The *Klafter* or fathom is taken traditionally as 1.8 meters as an approximation. In Austria, its length was 1.8965 meters, in Bavaria, a *Klafter* was 1.7511m and in Hesse, a state of Germany, it was 2.5 m, which was larger than other regions.¹⁹⁵

Contrary to the metric scale that has been divided into 10 smaller digits, Semper followed the traditional division of the *Klafter* into 6 smaller digits. This reflected the bodily proportion that six feet equals one *Klafter*. It also contains the other perfect number besides ten that Vitruvius recognized in his treatise; six.¹⁹⁶ It is highly unusual to have two scales for a single drawing. The scale used is not merely an abstract measure of distance, it also indicates how the designer considered relationships of size and proportion for the effect of the building. Any use of numerology (number symbolism), not uncommon at this time, depends upon the number of units of the conceived measure and will not translate into other measures.

To try to figure out why he used two scales for a single drawing, the author scrutinized other original drawings of the second Dresden theater from the ETH Archive and found that all sections, elevations and floor plans included metric scale, but only on some of them was the *Klafter* shown

¹⁹³ Oldenburg, Henry, ed. *Philosophical Transactions:: Giving Some Accompt of the Present Undertakings, Studies and Labours of the Ingenious in Many Considerable Parts of the World*. Printers to the Royal Society, 1801, p. 449-459.

¹⁹⁴ Ibid.

¹⁹⁵ Langhof, Peter, Beger, Jens und Lippert, Bernd, *Münzen, Maße und Gewichte in Thüringen Hilfsmittel zu den Beständen des Thüringischen Staatsarchivs Rudolstadt Bearbeitet*, Thüringisches Staatsarchiv Rudolstadt; Informationsheft Nr. 7, 3. Auflage 2006.

In the US, the fathom came to be used primarily for measuring water depth and was considered as 6 feet equal to 72 inches (1.8288 meters.)

¹⁹⁶ Vitruvius, Book III, chapter 1, sec 6.

on the boarder of the paper (figures 18 and 19). On the section drawing, Semper drew a sketchy *Klaffer* scale below the bottom of metric scale (figure 20& 21).

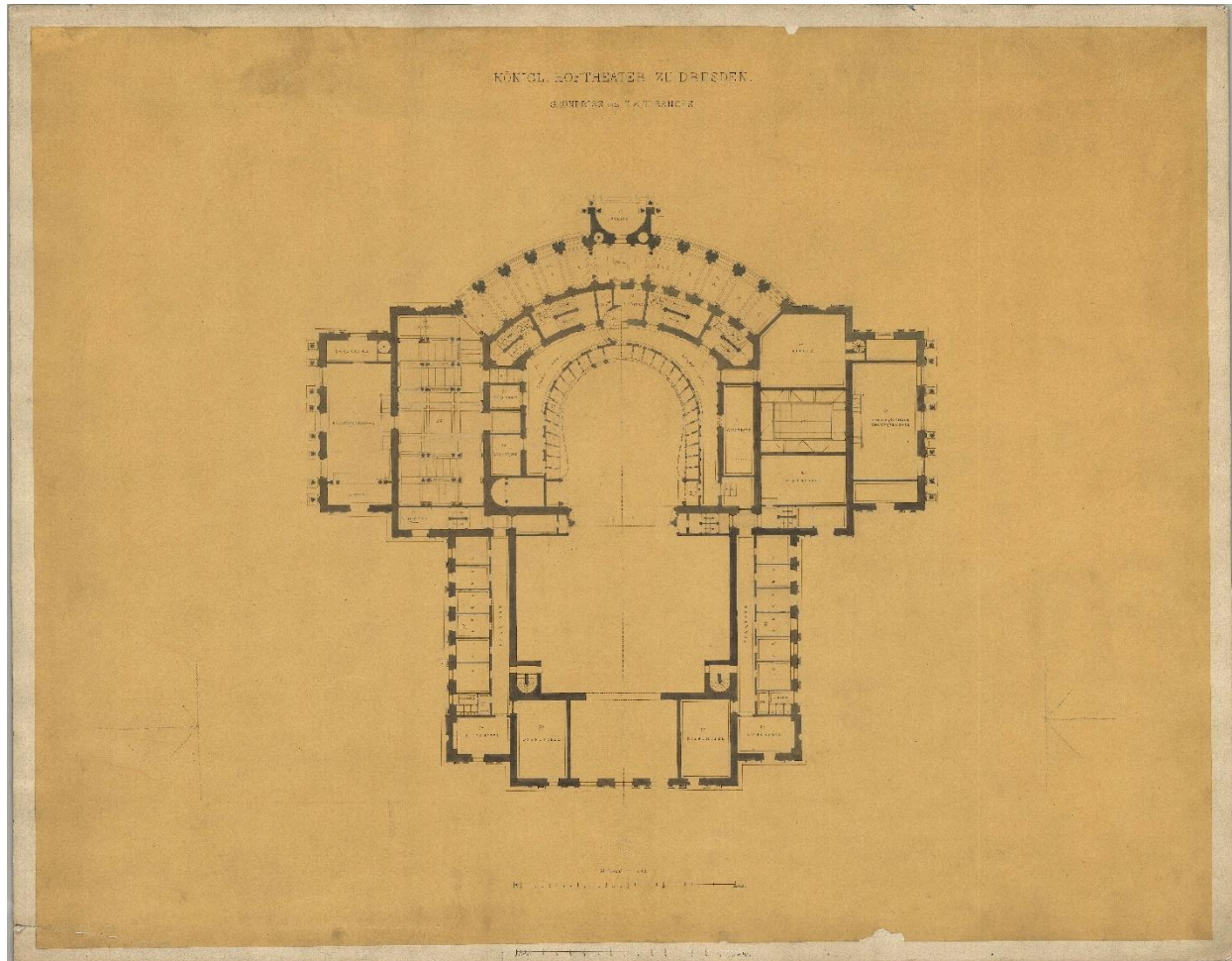


Figure 18: Second Dresden Theater, second floor plan
Klaffer scale has been added on the border of the sheet
Source: GTA Archives / ETH Zurich, Gottfried Semper

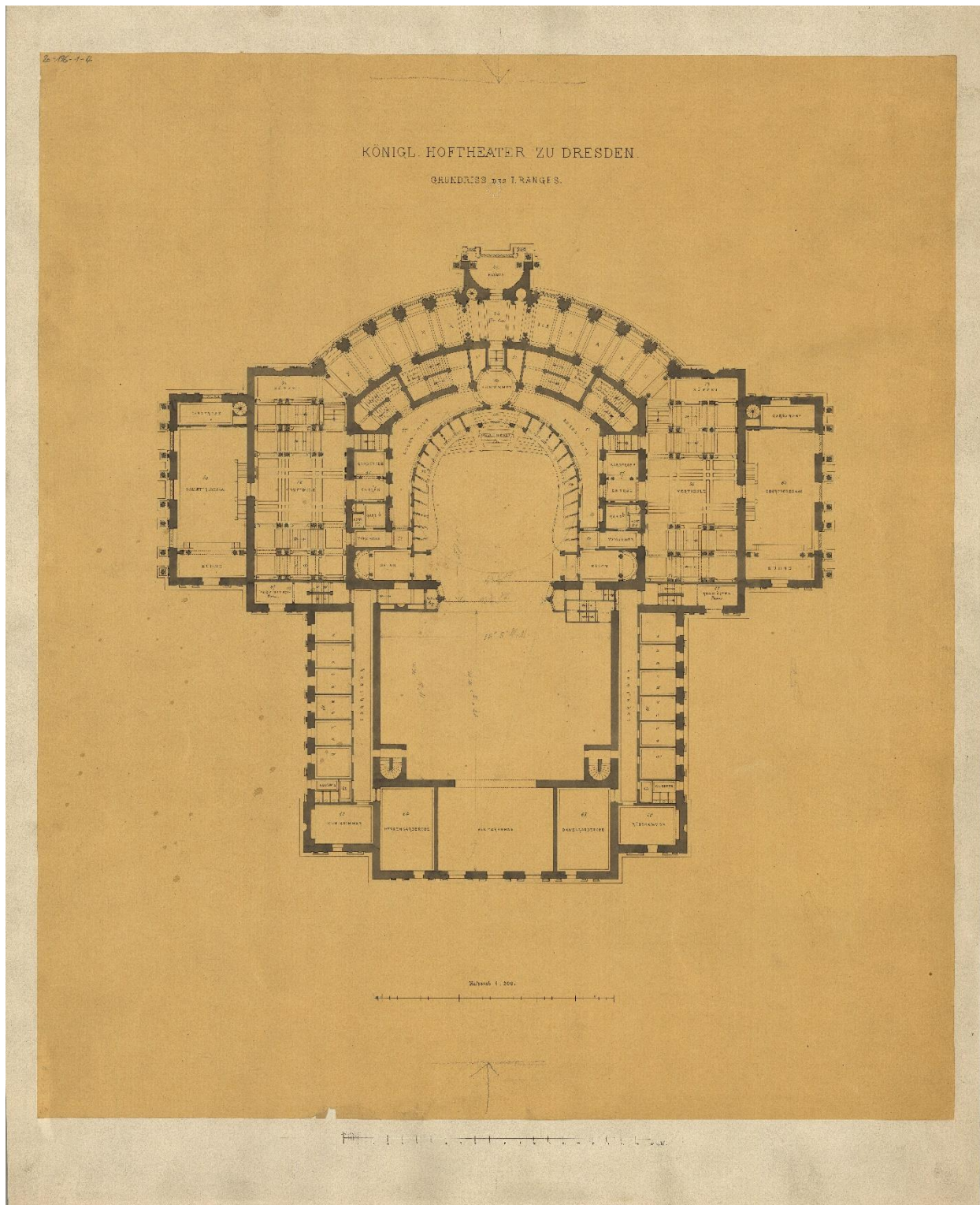


Figure 19: Second Dresden Theater, first floor plan
Klaffer scale has been added on the border of the sheet with two arrows.
 Source: gta Archives / ETH Zurich, Gottfried Semper

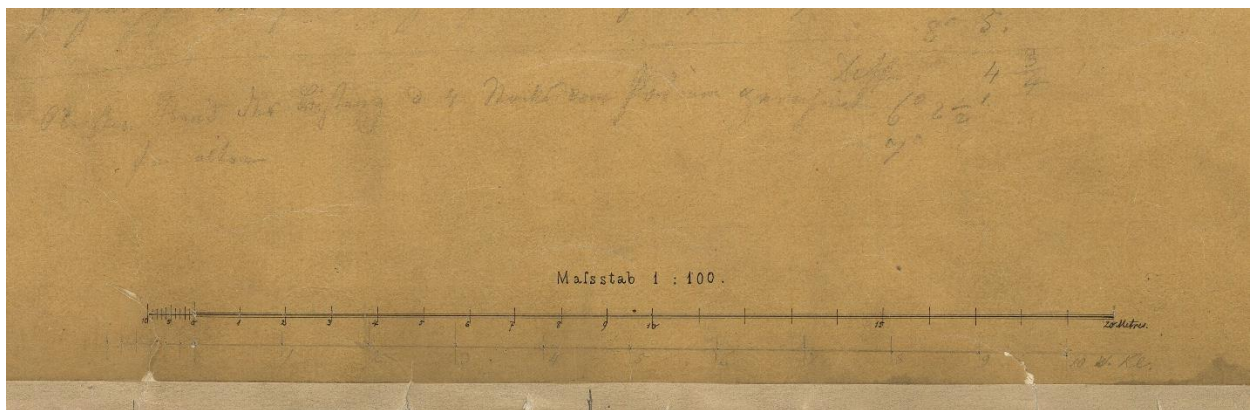
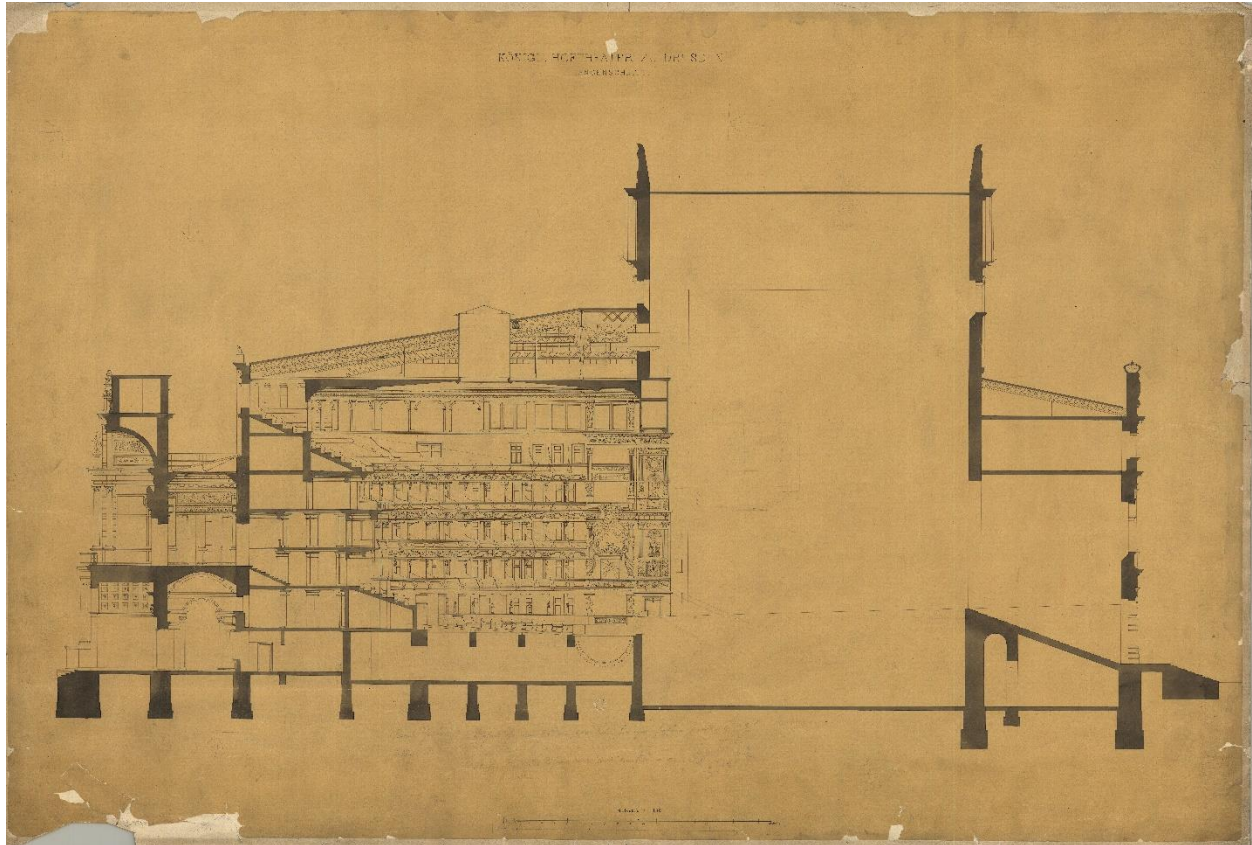


Figure 20&21: Second Dresden Theater, section.
 Klafter scale has been added below the metric scale.
 Source: GTA Archives / ETH Zurich, Gottfried Semper

It looked like he added *Klafter* scale later after finishing the drawings. The author also discovered that on the drawings that show the stage, *Klafter* has been added later and there was no

evidence of *Klafter* on other drawings like details, landscape drawings and elevations (figure 22 and 23).

First, the author wondered if Semper's son or other people added the *Klafter* scale to the drawings, but after matching Semper's hand drawing and handwriting to the *Klafter* scale, it has been concluded that they were his original markings.

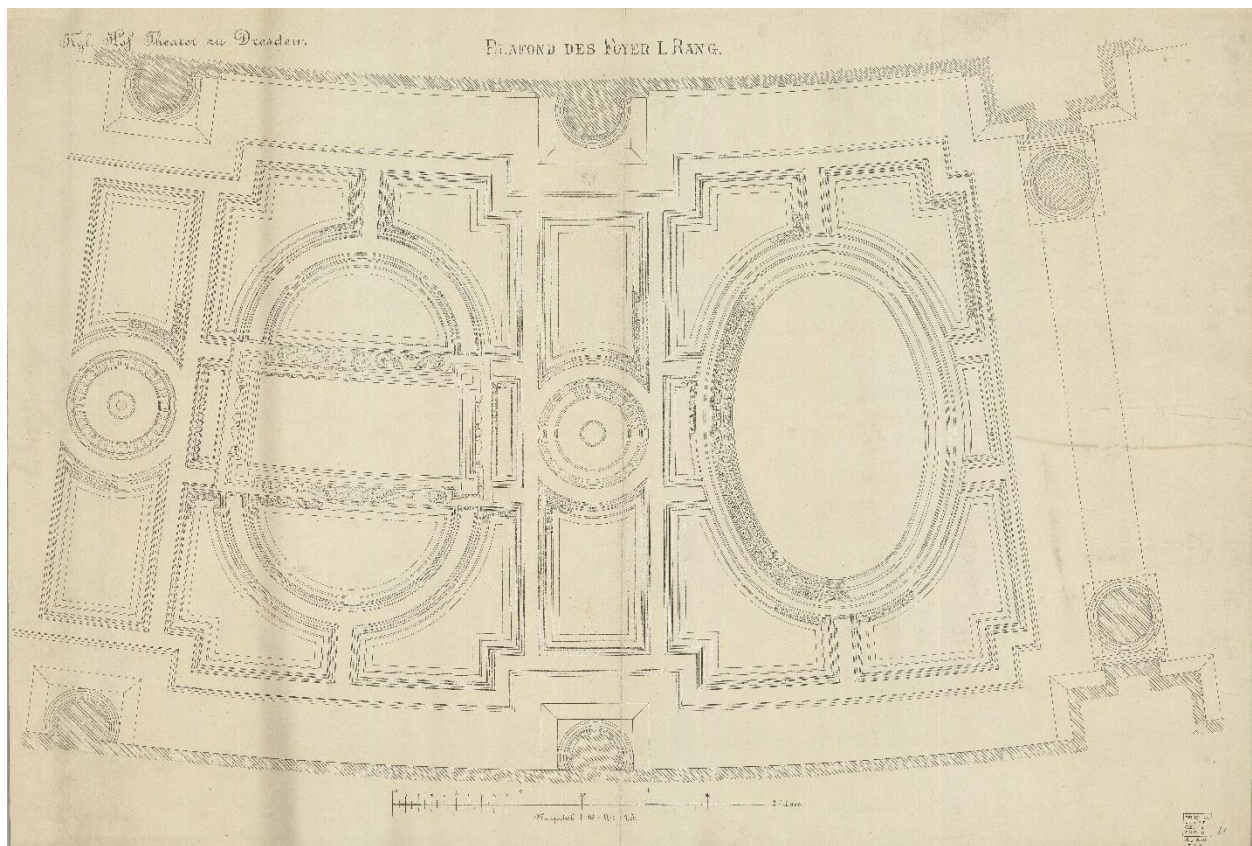


Figure 22: Second Dresden Theater by Semper, Landscape drawing
Source: GTA Archives / ETH Zurich, Gottfried Semper

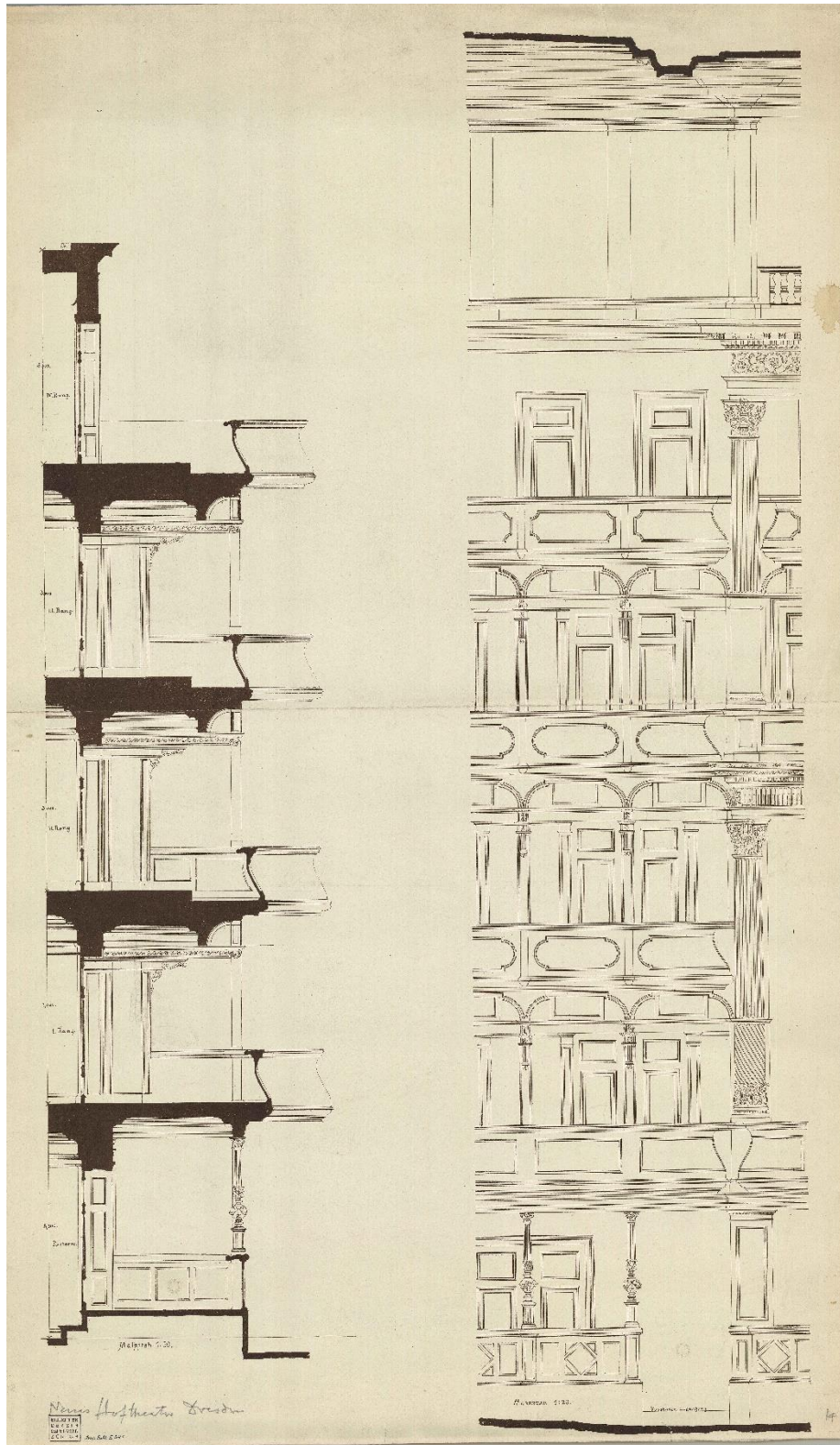


Figure 23: Second Dresden Theater by Semper, elevation and details
Source: GTA Archives / ETH Zurich, Gottfried Semper

Semper, in his book *Style*, expanded the idea of scaling and human proportion, writing that “the scale of the ancient architectural style is intrinsic to the work, related not to man but to itself and the idea contained in and individualized by it. Its scale is not the foot but the module or some other unit belonging to it.”¹⁹⁷ Based on his description, it could be understood that he attempted to use not only the foot as a unit of *Klafter*, but also other body members like outstretched arms and fingers. “Module or some other unit belonging to it” was from Vitruvius understood typically as a column base diameter, so Semper seemed to be intentionally adding the human-based measure beyond the abstract meter measure.

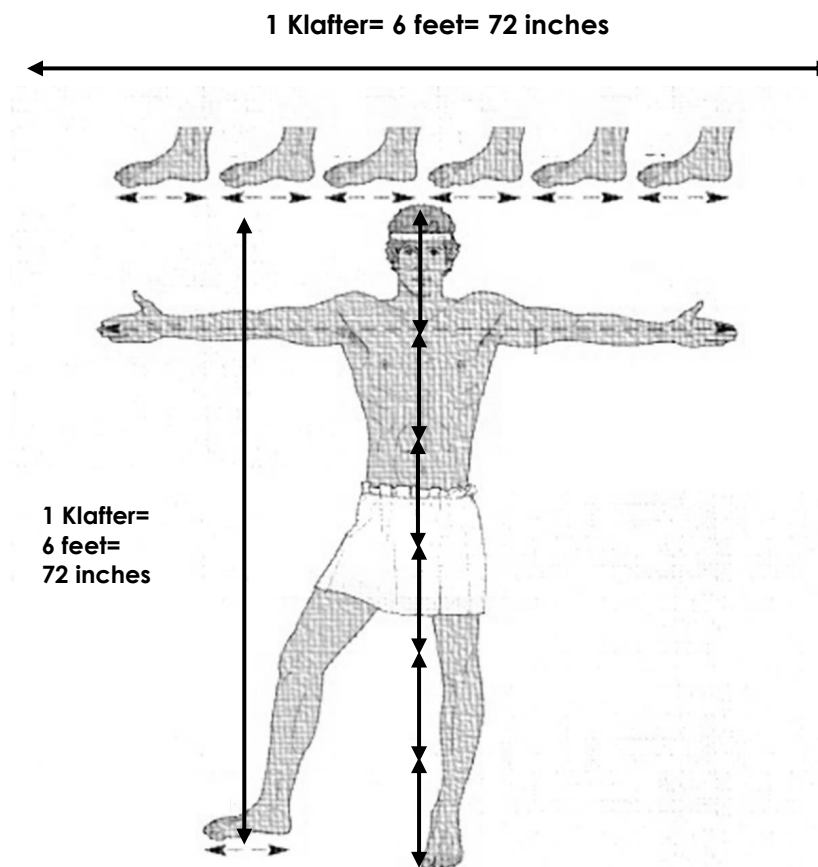


Figure 24: *Klafter* and human body
Author's drawing

¹⁹⁷ Semper, Gottfried. *Style in the technical and tectonic arts*, p. 302.

Semper takes this argument from Eugene-Emmanuel Viollet-le-Duc's article on "Architecture" in his dictionary on gothic architecture.¹⁹⁸ Thus, for classical architecture, the module, identified by Vitruvius as the column base, determines the scale of temple buildings. The module is intermediate between scale as dimension and the module-based proportions of the size of the building. In other words, the module must be given a separate element of dimension for it to be constructed according to any size. Semper asserts "To mediate the monuments of the ancient style and man, who cannot directly apply his foot here, a third normative standard is needed, to define as relatively large or small the harmonious, the absolute, which in itself is neither large nor small." Thus, for Semper's theater design, the *Klafter* is the "third normative standard" that relates between the abstract proportion and the human.

In the conclusion of this section, this research offers a response to the first question if there was a musical staff as a scale on the drawing. It could be clarified that while it may have been inspired by a musical scale, Semper did not literally draw directly a musical staff as a scale. Instead, he used *Klafter* to embody the motion and movement in architecture like a human body was dancing based on the rhythm of 6 on the stage. The author proposes that Semper, later after finishing the drawings, wanted to infuse a soul like that of a performer onto the stage of the second Dresden theater plans in order to integrate dance, music, and architecture.

The next section will be explaining how this research identifies a rhythm of 6 based on the rhythm of *Klafter*.

¹⁹⁸ Viollet-le-Duc Eugène-Emmanuel. *The Foundations of Architecture: Selections from the Dictionnaire Raisoné*. 1st ed. New York: G. Braziller, 1990, p. 75.

2.3 Klaffer and Rhythmical Scale in Music and Architecture

A composer uses the musical notes, scale, and musical staff to compose and communicate a piece of music. Scale plays a crucial role in composing melody, like an architectural standard scale bar. An architect reads the architectural drawings based on a scale bar that could be considered as imperial, metric, or other drawing systems. This is like a musician who plays a piece of music based on key and scale on the musical staff. The word scale derives from Latin *scala* meaning stair or ladder. The musician ascends and descends with tones while the architect does the same with sizes.

A musical scale uses a series of musical notes and pitches to show the half steps or whole steps that comprise the specific scale. While "a half step is the closest distance between two intervals in traditional Western music,"¹⁹⁹ in Eastern music, also a quarter scale has been used for a melody. There are many types of melodies in Western and Eastern music that are defined by half and whole steps.²⁰⁰ An interval or step is the tonal distance between two musical notes which is easily seen on the piano keyboard. If you play the note C on the piano and then go up to the next musical note that is a black key C#/ Db, this is a half step. If you go up from C to the next musical note with a whole distance or step, then you play musical note D.²⁰¹

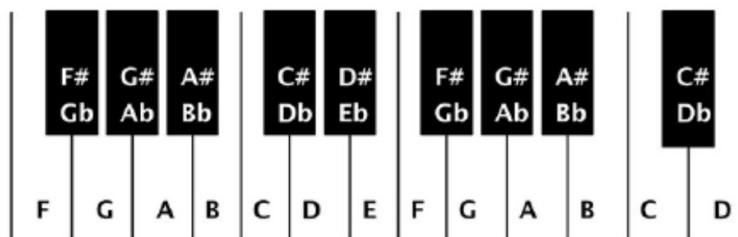


Figure 25: Whole and half steps, black and white keys on piano
Source: Coppenbarger, Brent. *Music theory secrets: 94 Strategies for the starting musician*. p 28.

¹⁹⁹ Coppenbarger, Brent. *Music theory secrets: 94 Strategies for the starting musician*. Rowman & Littlefield, 2014, p. 28.

²⁰⁰ Ibid, p. 28.

²⁰¹ Ibid, p. 28.

The sharp “#” and flat “b” signs show the half step between two musical notes. There are many scales in music and the most common are minor and major. The difference between these two scales is the place of the half step. In the minor scale, the half step is located between second and third musical notes, and in the major scale it is located in the third and fourth.²⁰² Thus, both minor and major scales include eight musical notes and seven steps per octave with unequal intervals (figure 26). Major scales convey the sense of happiness and minor scales, the sense of sadness. Since Wagner has composed music drama, operas and symphonies, he used both scales in order to create different atmospheres or feelings in his music.



Besides these two well-known scales, some other scales are the combination of whole and half steps. The scale that consists of all half steps is the chromatic scale with twelve musical notes all divided with half intervals. “By half steps see them grow, a semi-tone here, all twelve notes in a row.”²⁰³

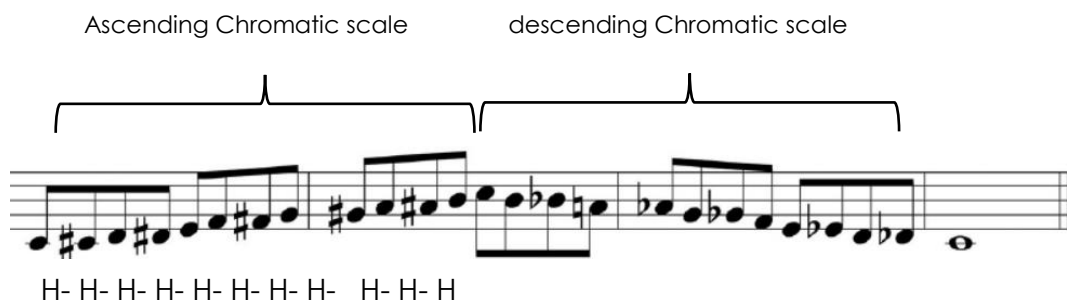


Figure 27: Ascending and descending chromatic scale
Source: Author's drawing

²⁰² Ibid, p. 26.

²⁰³ Ibid, p. 31.

Furthermore, another scale that uses only whole steps is known as the whole-tone scale. The whole-tone scale consists of seven musical notes and six intervals with a whole step between each musical note. In music, a step or interval could be defined as the difference in pitch between two consecutive musical notes. An octave starts from one note and ends on the same note with double its frequency. Richard Wagner used the whole-tone scale in his works and he influenced many other European musician in nineteenth century.²⁰⁴ As a result, a whole-tone scale in music consists of seven musical notes with six tones and equal intervals.

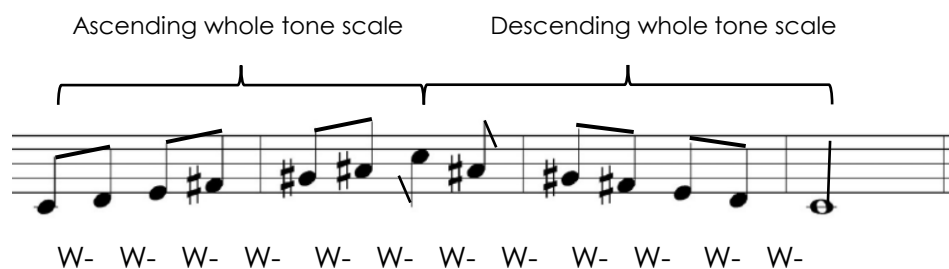
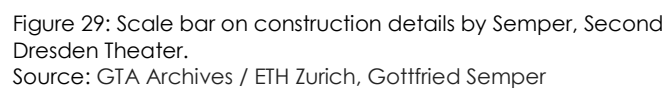


Figure 28: Whole tone scale
Source: Author's drawing

Klaffer, a physical linear measure consisting of six feet, is related by the author to the whole-tone scale in music that corresponds with the six intervals and whole steps between seven musical notes per octave. Since each musical note's position on the staff tells the musician what pitch to play, in another plan for the theater, it was assumed by the author that Semper used horizontal lines as an architectural scale bar in order to metaphor a musical staff and rhythmical movement in architecture, music and dance (figure 29). The vertical subdivisions mark off feet and *klaffer* to provide measures like the measures in musical scores that identify the tempo. Semper's scale bar and its horizontal lines were identical to a musical staff in order to interpret it as the body moves throughout the space, it is like the musical notes moving on the musical staff and composing a

²⁰⁴ Ewell, Philip. "On Rimsky-Korsakov's False (Hexatonic) Progressions Outside the Limits of a Tonality." *Music Theory Spectrum* 42, no. 1, 2020, p. 122-142.

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A musician reads pitches on the staff, and could determine how long or short to play a particular pitch because the duration of musical notes is dependent on the time and is called rhythm. Rhythm helps the melody to move forward which works as the context of a piece of music.²⁰⁵ Moreover, time plays a crucial role in creating a rhythm and scale, as well as in composing a melody.

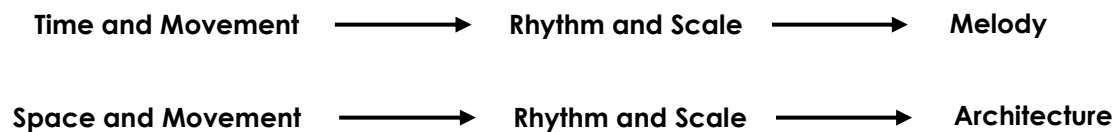


Figure 30: The role of rhythm and scale in music and architecture
Source: Author's drawing

According to what has been discussed above, for composing a piece of music, we need time and movement to create rhythm. On the other hand, we need space and movement to create rhythm in order to create architecture. Semper showed movement by drawing a *klaffer* scale bar as a metaphor for moving throughout the spaces. It could be concluded that Semper tried to visualize a man or woman with outstretched arms moving in architectural space, his or her rhythmical body movement could be interpreted as rhythmical architectural scale and musical scale based on the number six. This number is derived from six feet, as the body moves in space, and six intervals between seven notes, as musical notes move on the musical staff. Although Semper did not directly draw a musical staff as a scale bar, he infused the soul of the music into the stage of the theater by creating a *Klaffer* scale and showing movement based on the rhythm.

²⁰⁵ Copenbarger, Brent. *Music theory secrets*, p. 24.

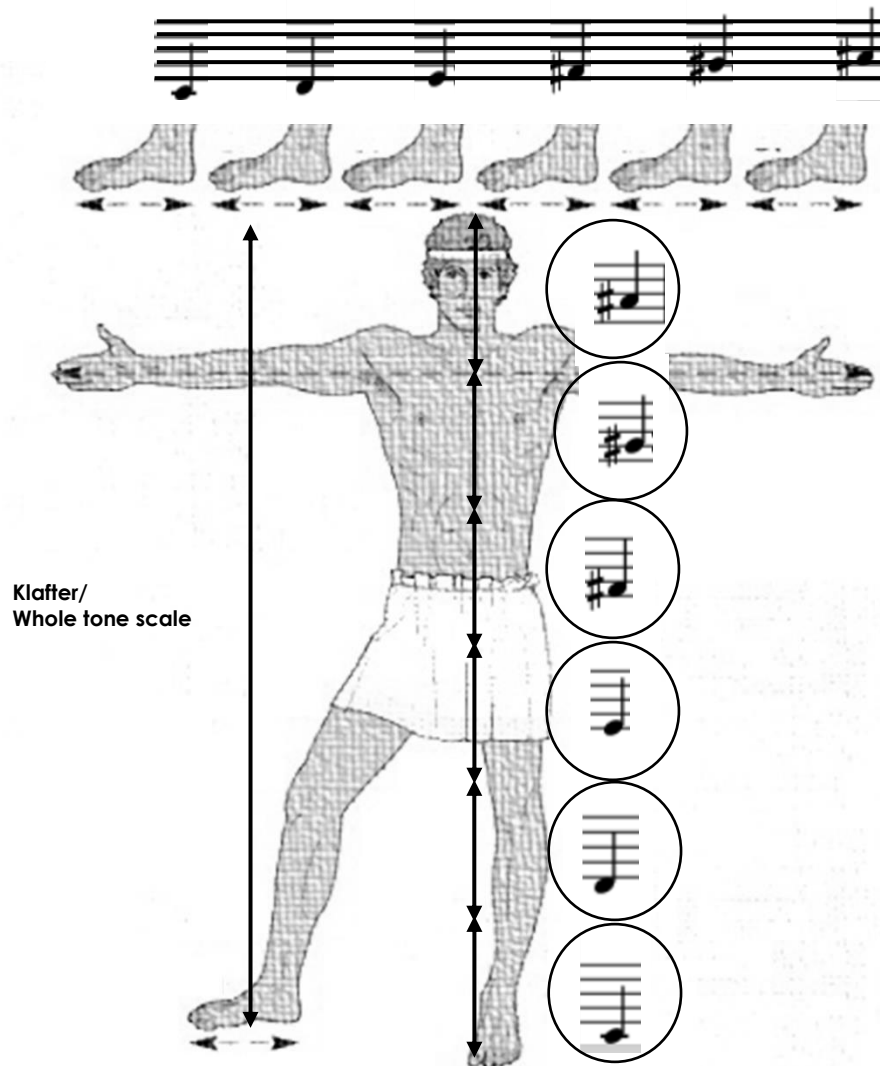


Figure 31: *Klafter*, whole-tone scale in music and human body
Source: Author's drawing

2.4 Wagner's Architecture: The Bayreuth *Festspielhaus*

Wagner wanted to construct an ideal opera house for performing his musical-dramatic works, which could reveal his notion of *Gesamtkunstwerk*. He designed Bayreuth *Festspielhaus* in 1871 to

promote audience engagement with the performance.²⁰⁶ Wagner built and opened this opera house for performing the complete opera of *The Ring of the Nibelung*.²⁰⁷ For him, it was an ideal connection between architecture and music because it allowed him to reveal his ultimate idea of *Gesamtkunstwerk*.

Wagner took Bayreuth's opera house concept from Semper's proposed design for the Munich opera house. Joseph Rykwert, in *The Judicious Eye*, mentioned that Gottfried Semper proposed a model and layout for an opera house in Munich, which was not constructed and Wagner adopted some parts of Semper's drawings for Bayreuth opera house without his permission.²⁰⁸

In 1864, Ludwig II, the nineteen-year-old king of Bavaria in Germany, read all of Wagner's writings and essays, praised his idea of revolution in contemporary art, and asked Wagner to consider a monumental theater in Munich that was dedicated to the German nation as a future place for Wagner's performance in Munich. Wagner proposed his friend, Gottfried Semper, as an architect to design the theater.²⁰⁹

Semper proposed to install the theater in the middle wing of the exhibition hall in the Munich Glass Palace. His model and proposal were opposed by the people of Munich who refused to transform the historic monumental Glass Palace into the theater.²¹⁰ At the same time, Semper designed a monumental festival hall for Munich. His outstanding concept showed how a bridge could make a connection between river, city, and theater. Semper added two slender lateral wings to the main theater building to create symmetry and proportion. Although the project was rejected by

²⁰⁶ Rykwert, Joseph. *The Judicious Eye : Architecture against the Other Arts*. Chicago: University of Chicago Press, 2008.

²⁰⁷ *Der Ring des Nibelungen* is a German epic music drama with several mythical creatures which was inspired by ancient Greek music. This opera tells a story in four cycles.

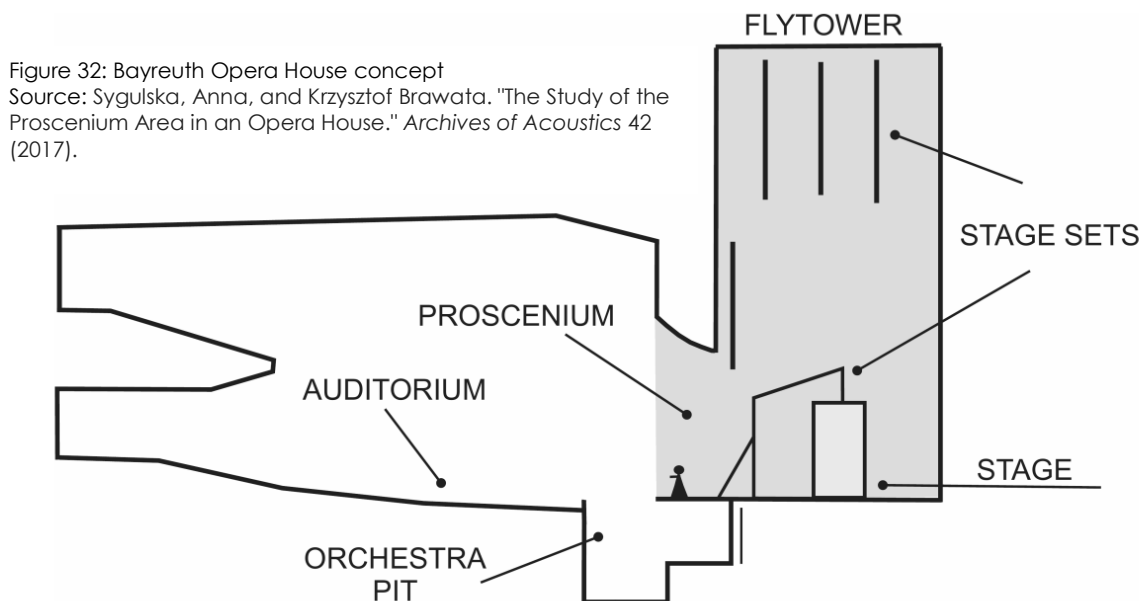
²⁰⁸ *The judicious eye*, p. 166.

²⁰⁹ Wyss, Beat, and Denise Bratton. "Ragnarök of Illusion: Richard Wagner's" Mystical Abyss" at Bayreuth." *October*, 1990, p. 57-78.

²¹⁰ *Ibid*, p. 57-78.

the city, later he used some of these ideas in the design and building of the second Dresden Theater.

In addition, since the Bayreuth Theater opening was in 1876 and in that time, Semper's health began to deteriorate, he did not have an opportunity to write about the similarity of Wagner's Theater to his proposed model for the Munich Theater.



According to what has been discussed in the previous chapter, Wagner admired poetry and acting in ancient Greek music drama. For him, the new revolution of opera music was a presentation of a new style of performance in which music on one hand, and poetry and dance, on the other hand, worked as a singular unity. Bayreuth's opera house was built to manifest the integration of text, sound, and dance in the body of the architecture. This building presented his theory that elevated the roles of the other arts at the same level.²¹¹ Rykwert wrote that it seems the exterior of the theater building, made simply of undecorated bricks, was no concern for him

²¹¹ Rykwert, Joseph. *The Judicious Eye: Architecture against the Other Arts*. p. 164-167.

because he concentrated on the interior and his concept of interaction between artist and audience.²¹²

He claimed that the purpose of this architecture was to make a harmony between the inner sense and outer expression which was not visible in the modern era. He eliminated all the decorative elements that distracted the audience's attention from the stage and performance in order to enhance the connection between audience and performers by creating an unbroken line of sight by obscuring the source of music.²¹³ This innovation was already proposed by Semper.

For the first time, a sunken orchestra pit with a curved hood concealed the musicians in complete darkness in order to eliminate any distractions among the audience and performers. He designed the recessed pit under the stage and the seats in descending curve-shaped rows to create unbroken lines of sight without any interruptions. Unlike the ancient and traditional semi-circular seating for the audience, the wedge-shape made all seats face toward the actors on the stage. Furthermore, box seats were only at the back, not on the sides, which normally had a poor view of the stage. The great acoustic abilities of the sunken pit and the entire auditorium did not let the orchestra overpower the voices, but empowered the unity of released sound with the voices and actions of performers.²¹⁴

²¹² Ibid, p. 166.

²¹³ Ibid, p. 166.

²¹⁴ Spotts, Frederic. *Bayreuth: A history of the Wagner Festival*. Yale University Press, 1994, p. 47.

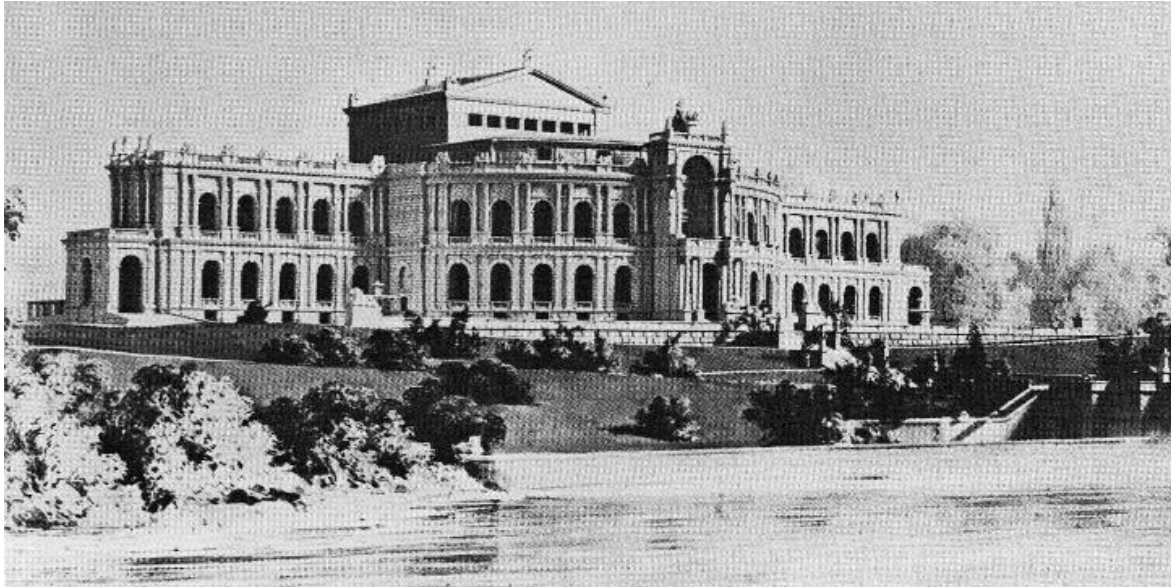


Figure 33: Gottfried Semper, design for the opera house in Munich
Source: *The judicious eye*, 164.

The final architectural design of the Bayreuth opera house included a somewhat Roman-style auditorium with 30 fan-shaped rows of seats that steeply descended.²¹⁵

The sound of the orchestra was released onto the stage and it mixed with the sounds and voices of performers and then projected into the auditorium.²¹⁶ By concealing the orchestra, he emphasized the intangible nature of music that infused into the soul. *Gesamtkunstwerk*, especially in Bayreuth's opera house, conveyed the message of social unity by combining all arts for reaching a greater purpose that was the unity of performers and audience members. For Wagner, the opera house was the initial step of revolution in art and politic. Although the notion of *Gesamtkunstwerk* appeared on the stage of the opera house, this idea went through arts, philosophy, culture, and tradition.

²¹⁵ Timmermans, Matthew. "The Bayreuth Festspielhaus: The Metaphysical Manifestation of Wagner's *Der Ring des Nibelungen*." *Nota Bene: Canadian Undergraduate Journal of Musicology* 8, no. 1, 2015, p. 63.

²¹⁶ *Ibid*, p. 66.

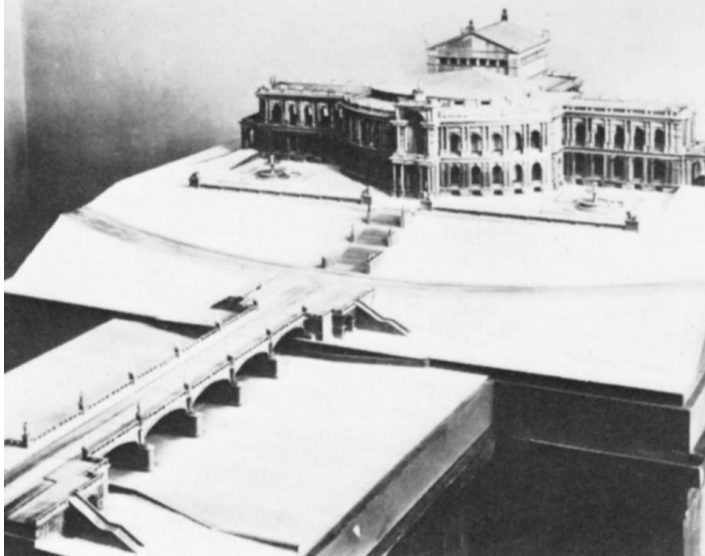


Figure 34: Model of the Festival Hall at Munich
Source: Wyss, Beat, and Denise Bratton.
"Ragnarök of Illusion: Richard Wagner's" Mystical
Abyss" at Bayreuth."

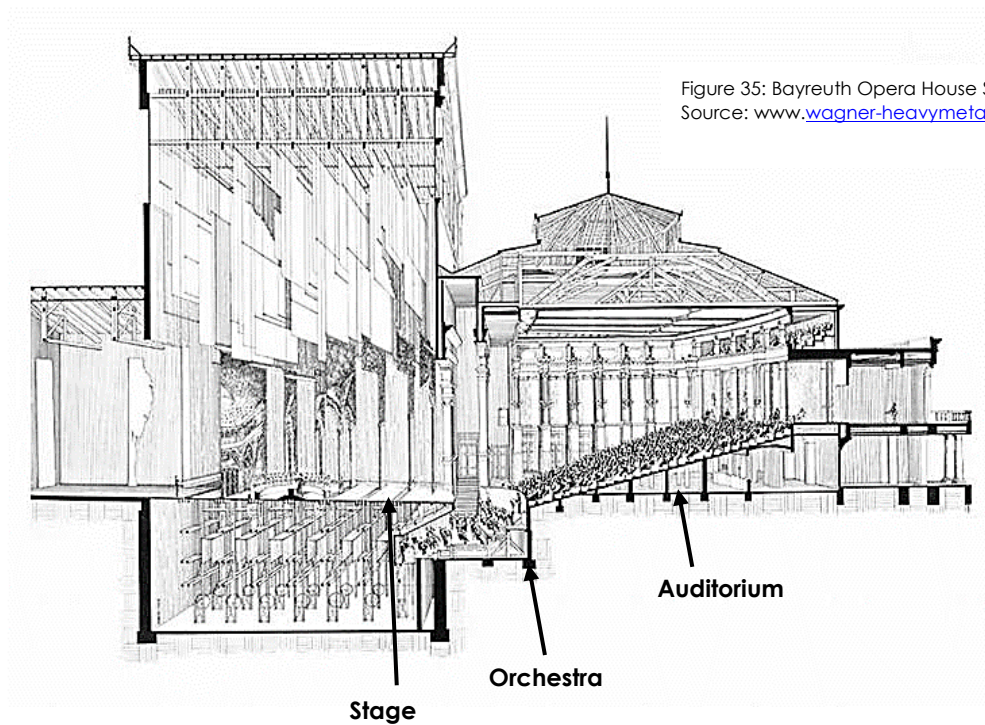


Figure 35: Bayreuth Opera House Section
Source: www.wagner-heavymetal.com

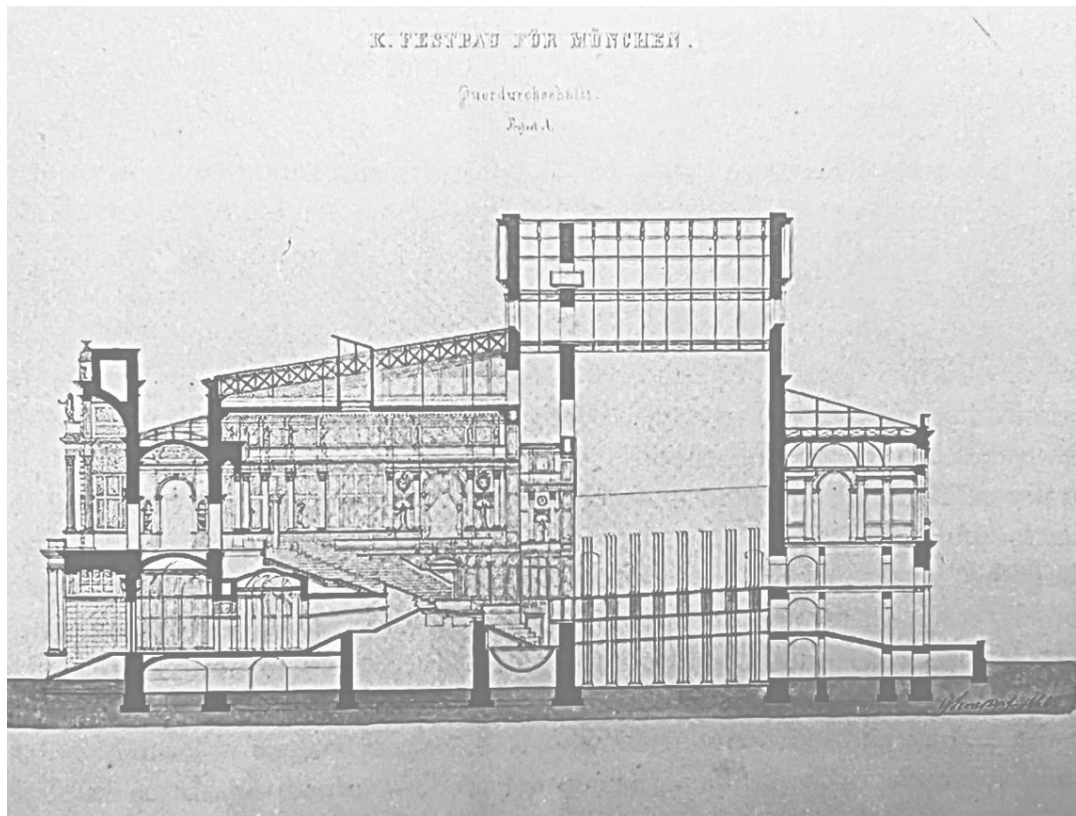


Figure 36: Munich Theater by Semper, section
Source: Mallgrave, Harry Francis. *Gottfried Semper: architect of the nineteenth century*, P 261.

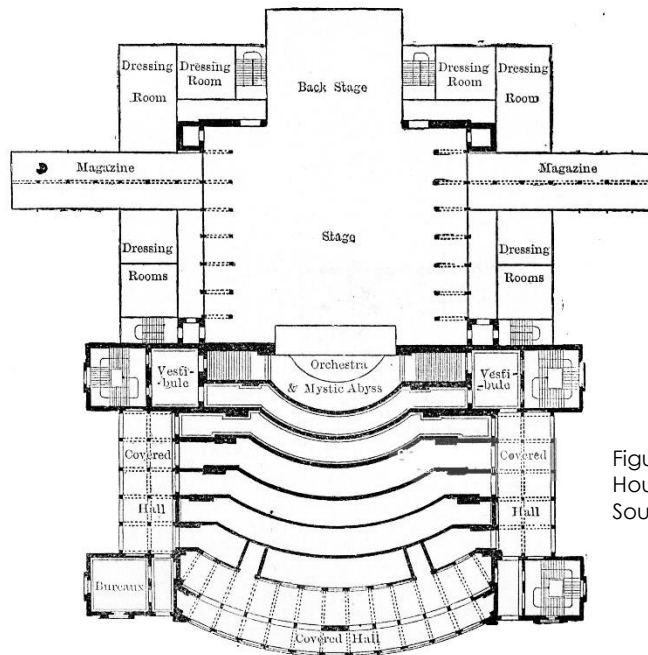


Figure 37: Bayreuth Opera House Floor Plan
Source: www.gettyimages.ca

WAGNER'S THEATRE—GROUND PLAN.

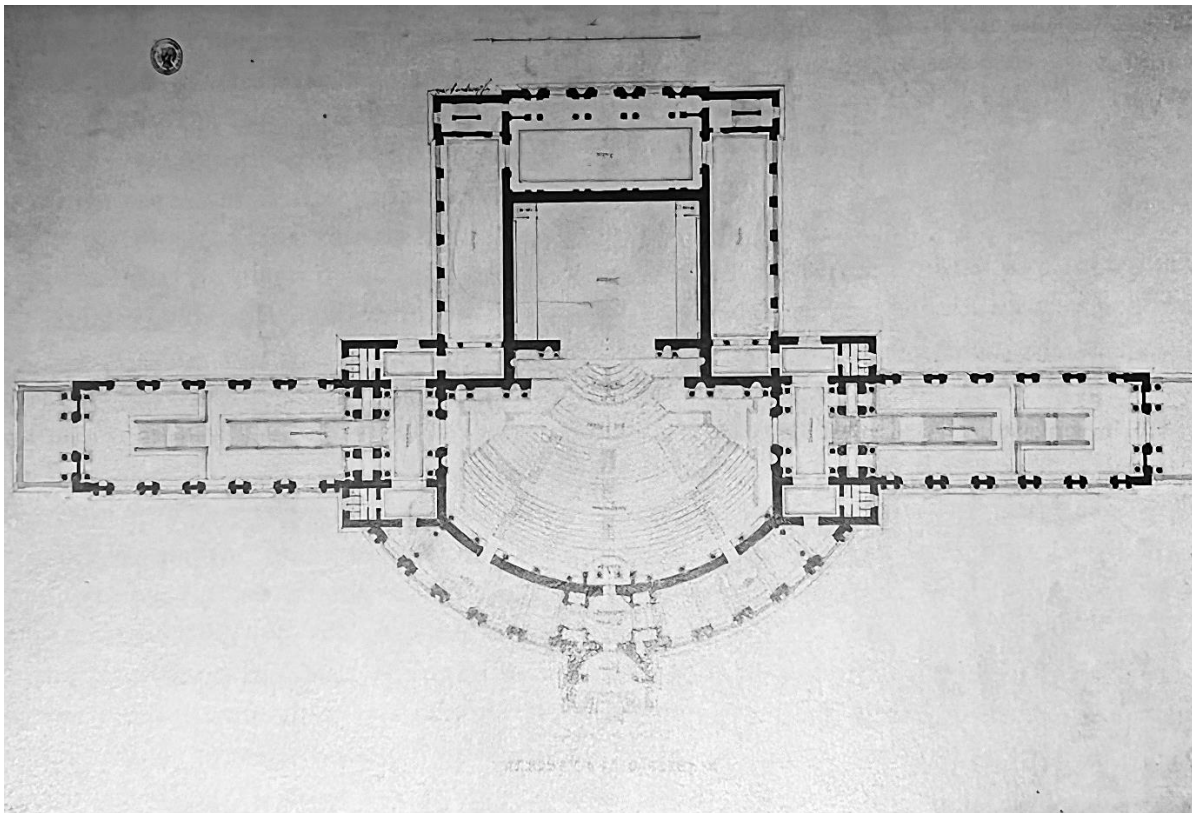


Figure 38: Munich Theater by Semper, floor plan
Source: Mallgrave, Harry Francis. *Gottfried Semper: architect of the nineteenth century*, P 261.

This research scrutinized that Wagner took the middle part of building from Semper's proposal included stage, orchestra place and auditorium. In addition, Wagner added rhythmical columns on two sides of the auditorium. Both projects took the orchestra one level down in order to open the eye's horizon between stage and audience.

2.5 Semper and the Dresden Opera Houses

The first Dresden Opera House was built and designed by Gottfried Semper and opened in April 1841. The building style is an amalgam of three styles: Renaissance, Baroque as well as Greek classical style. Since Semper was interested in Greek culture and art, most of his works including this opera house were inspired by ancient Greek architecture. However, much of his design work utilized Renaissance approaches because this allowed the integration of traditional motifs modified by contemporary conditions.²¹⁷ For example, the rounded theater front reflected ancient theater forms but was also being pursued by contemporary architects including Karl Friedrich Schinkel.²¹⁸ Harry Mallgrave wrote that the Renaissance style offered Semper a large range of "formal motifs possessing great expressive possibilities" for "plastic articulation and allegorical narration."²¹⁹

After opening with enthusiastic reception, a devastating fire destroyed the building in 1869. The citizens of Dresden demanded Semper to rebuild and reconstruct the opera house. He was in

²¹⁷ Hvattum, Mari. *Gottfried Semper and the problem of historicism*. Cambridge: Cambridge University Press, 2004. p. 156.

²¹⁸ Mallgrave, Harry Francis. *Gottfried Semper: architect of the nineteenth century*. Yale University Press, 1996, p. 118.

²¹⁹ Ibid, p.120.

exile because of his involvement in constructing barricades in Dresden in the revolution of 1849 at which time the King vowed to hang Semper in his own theater. However, he designed the second building and asked his son, Manfred Semper, to use his plans and supervise constructing the second opera house based on his drawings, which were completed in 1878.

The design and iconography of the main entrance sums up its conception by Semper as a *Gesamtkunstwerk*. One of the significant allegorical elements of the second building was Semper's idea regarding including several statues on the front façade. On the right and left of the entrance, he designated the statues of Friedrich von Schiller, German poet, philosopher, and historian, and German author Johann Wolfgang von Goethe. On the sides, in niches above each other, there are two sitting and two standing statues. These six statues are the symbol of *Gesamtkunstwerk* at the main portal to show the synthesis of the different arts.²²⁰



Friedrich von Schiller



Johann Wolfgang von Goethe

Figure 39: Six statues on the façade
Source:
www.statues.vanderkrogt.net/object.php?webpage=ST&record=desn030



William Shakespeare



Sophocles



Molière



Euripides

²²⁰ Fassadenstatuen an der Semperoper,
<https://statues.vanderkrogt.net/object.php?webpage=ST&record=desn030>



Figure 40: Front Facade
 Source: Mallgrave, Harry Francis. *Gottfried Semper: architect of the nineteenth century.*, cover of the book

The sitting figures are on the left, Shakespeare, English poet and playwright, and on the right Moliere, French playwright and actor. Moreover, the standing statues on the left and right, respectively are Sophocles and Euripides, Greek tragedians.²²¹

The statues of Dionysus and Ariadne are located on top of the exedra, and below these two, at the corner of the exedra, four muses stand as a symbol of the integration of arts. Terpsichore (dance), Thalia (comedy), Melpomene (tragedy), and Polyhymnia (mimic art).²²² In studying Semper's sketches for the second Dresden Theater (figure 41), it can be seen that Semper drawings demonstrate his attention to symmetry in form and in the arrangement of sculptural

²²¹ Ibid.

²²² Mallgrave, Harry Francis. *Gottfried Semper: architect of the nineteenth century.* Yale University Press, 1996, p. 346.

figures on the main façade. The highest point of the pitched roof pointed to the sky like it shows the direction of growing (unity of movement), that derived from his treatise, *Der Stil*.²²³

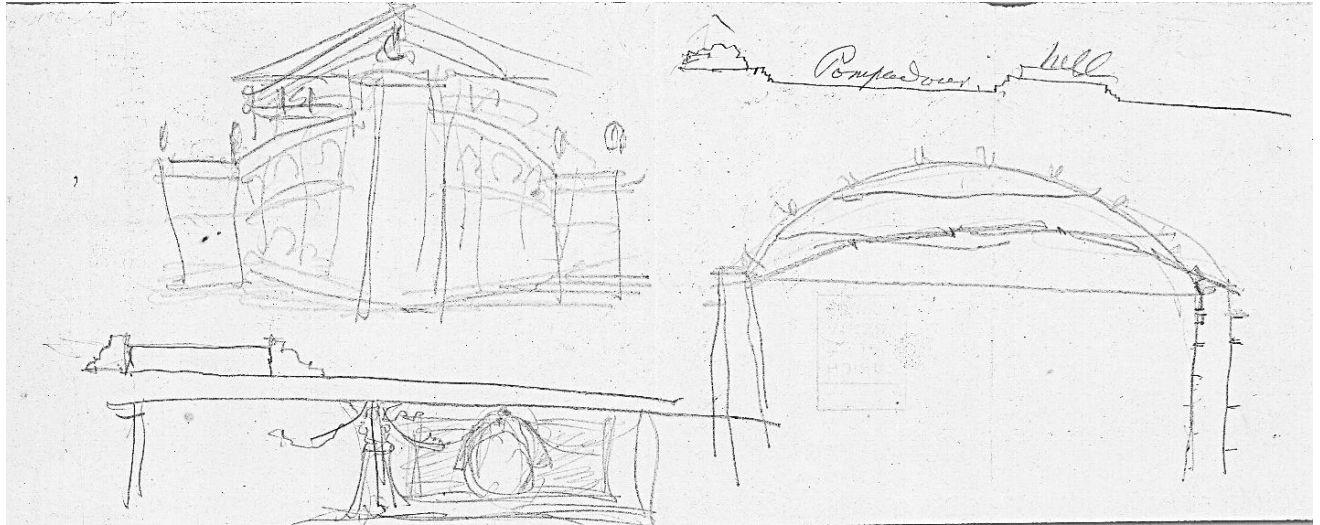


Figure 41: Semper's sketches, Second *Hoftheater*, Opera House, and Exedra at entrance
Source: gta Archives / ETH Zurich, Gottfried Semper

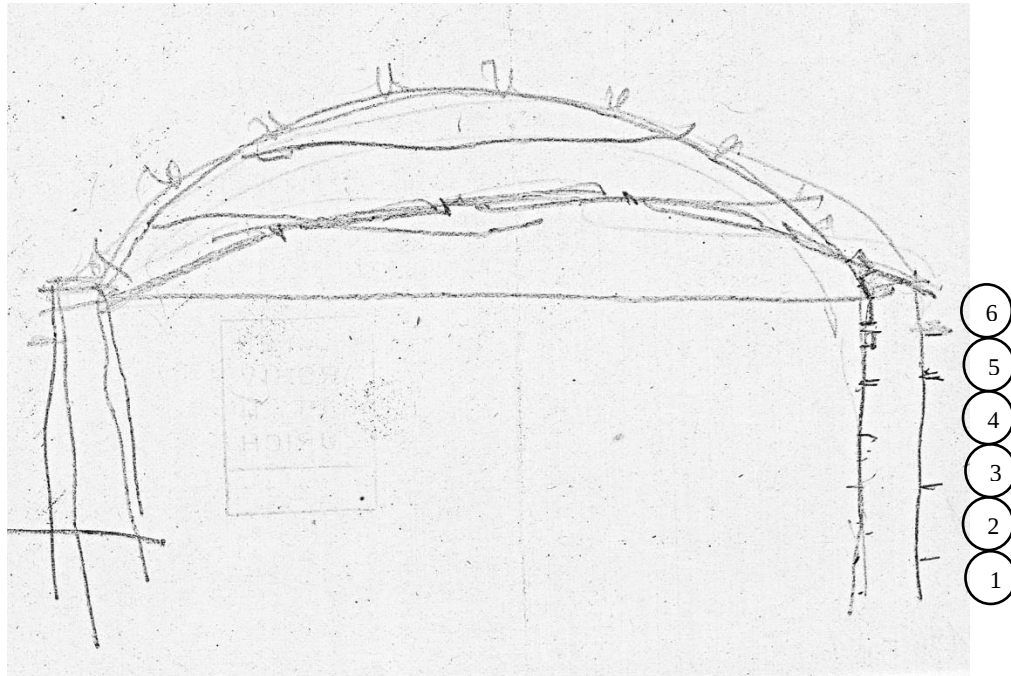


Figure 42: Six intervals as one *Klafter*.
Source: gta Archives / ETH Zurich, Gottfried Semper

²²³ Semper, Gottfried. *Style in the technical and tectonic arts, or, Practical aesthetics*, p. 96.

Semper's sketch shows how he measured six steps and intervals on two sides of the entrance. According to what has been concluded in the previous chapter, it could be explained that this unit of 6 has been derived from a *Klafter* that was based on six feet and six rhythmical intervals.

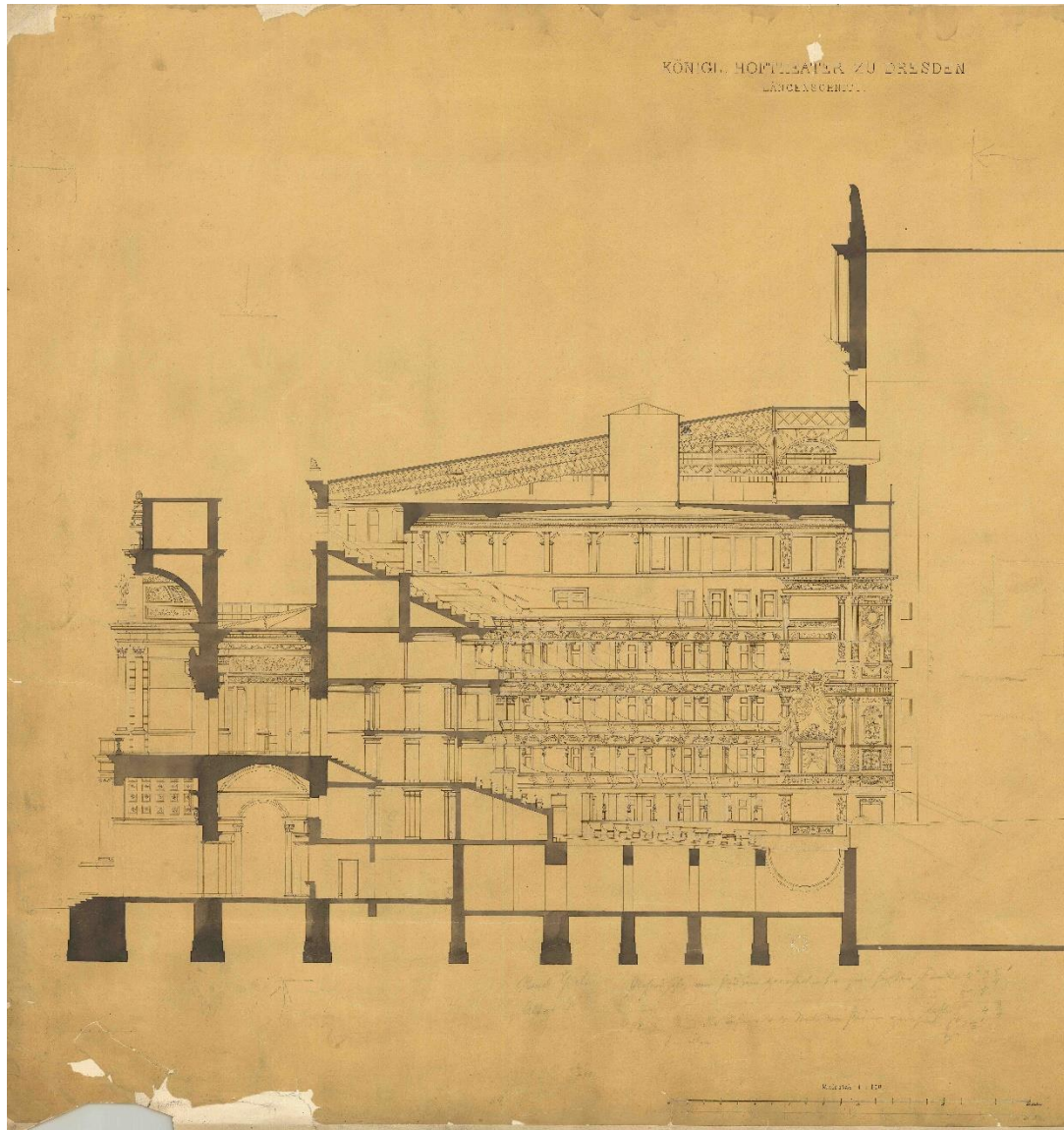


Figure 43: Second *Hoftheater*, Opera House, section
Source: gta Archives / ETH Zurich, Gottfried Semper

The arrangements and dimensions of the new auditorium are almost the same as the first version of the theater, yet the ceiling of the second *Hoftheater* is noticeably higher due to adding a fifth gallery. However, the seating arrangement and the stage more or less follow the same patterns as the first theater. It seems that Semper has attempted to keep the interior quite similar to the original design.²²⁴

The second Dresden Theater is popularly known as “Semper-Oper.” In the middle of the nineteenth century, in Germany, theaters were considered not only the main place for presenting contemporary arts but also an apolitical place that initiate a revolution in art. Dresden theater was a tribute to aesthetic democracy, a place of reunion for arts, philosophy, and spirit.

In his design, Semper considered the presence of human beings on the stage as performers, in the auditorium as the audience, and in his drawings with the *Klaffer* scale. For Semper, the body moves rhythmically, creating architectural spaces, and on the stage performing opera and dance, and finally, as the audience arrives into the theater and sitting while enjoying the performance. Dresden opera house has been built in the way that the presence of a human body was perceivable on and behind the stage, as well as in the auditorium.

Also, according to what has been discussed regarding Semper's *Klaffer* scale bar and his measurements based on six units, the auditorium section shows how Semper applied these proportions in length, width and depth. (figure 44).

²²⁴ Mallgrave, Harry Francis. *Gottfried Semper: architect of the nineteenth century*, p. 340-345.

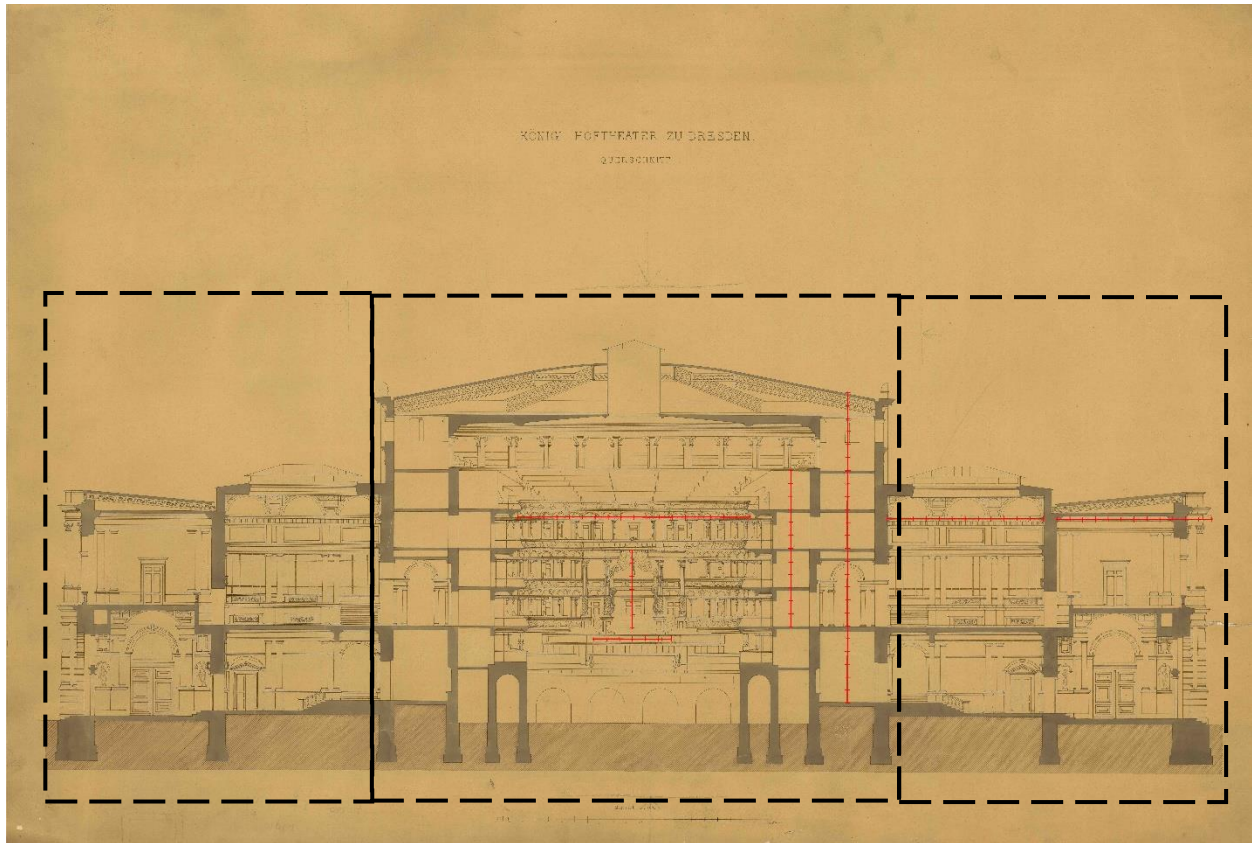


Figure 44: Second *Hoftheater*, Opera House, section, Klafter and measurement
 Source: gta Archives / ETH Zurich, Gottfried Semper

Since Semper used the *Wiener Klafter* and the stage length is 6 *klafter*, it could be concluded that the stage dimension is $6 \times 1.89 = 11.34$ meters or $6 \times 6 = 36$ feet. Since the *Klafter* has different dimensions in meter in various regions, this research focused on measuring the feet. In other words, it could be explained that a human body with outstretched arms moves six times rhythmically across the width of the stage. In the musical octave, the whole tone scale shows 6 whole intervals or steps. Similarly, in a dance performance, from the tip of the finger to the other tip of the finger shows 6 feet or 6 steps as well. As a body moves on the stage, body plays rhythmical musical notes based on the whole tone scale, as on a piano.

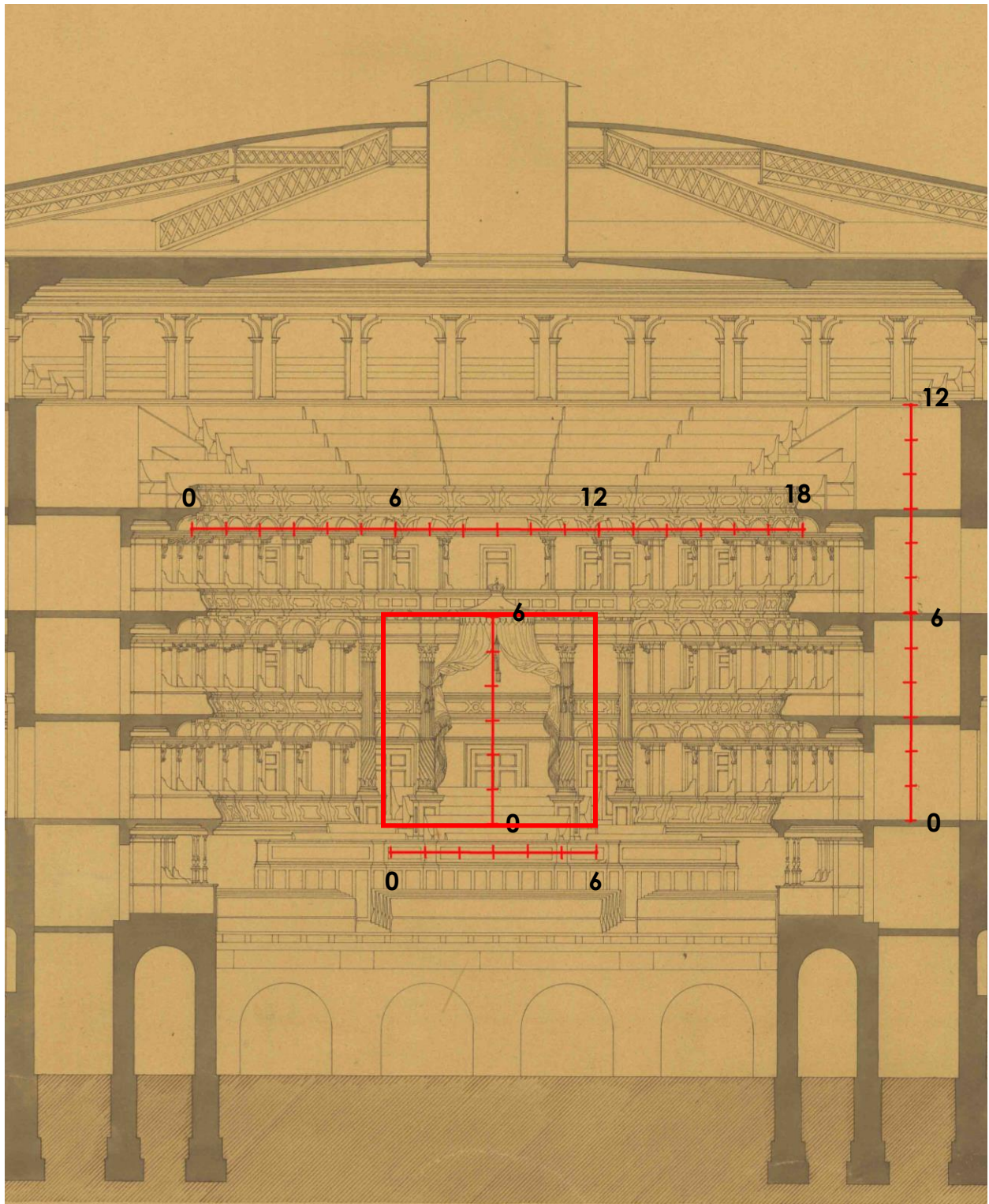


Figure 45: Second Dresden Hoftheater, Stage section, *Klafter* and measurement
 Source: gta Archives / ETH Zurich, Gottfried Semper
 Author's sketch on the original drawing

On Semper's section drawing, it could be interpreted that the main stage in the auditorium shows 6 octaves, 6 *Klafter*, 36 whole steps, 36 feet. It could be interpreted that the "total work of art" and *Gesamtkunstwerk* as he brought various proportions and scales in mathematics, body movement, and rhythm. Although he designed a stage, his main goal was how to make a rhythmical direction as a unity of the movement.

As previously mentioned, Semper pointed out that symmetry and proportion could be incorporated based on the vertical and the horizontal axes. The moving direction, symmetry, and proportion integrated and worked as a whole and a unity. He also explained that natural laws in artworks have to be uniformly arranged in relation to these three aspects of beauty.

1. Symmetry (macrocosmic unity).
2. Proportionality (microcosmic unity).
3. Direction (unity of movement).²²⁵

He attempted to integrate symmetry, proportionality, and direction in his works, especially in the Dresden opera house as a metaphor for *Gesamtkunstwerk's* Performance. The bodily *Klafter* based on proportions permeate the major building spaces.

Movement for him was the beginning of the exploration of Vitruvius's idea of eurhythm. For Vitruvius, as well as Semper, Eurhythm was the adjustments of the members when they all correspond symmetrically and bringing balance and harmony between the parts to be perceived as a whole. In this building, the symmetrical form correlated to proportional divisions of 6 and created the unity of direction on the stage, in and through the spaces.

The human figure as an objective aspect presents the eurhythm on his or her body, and as a subjective aspect can perceive the integration of arts.

²²⁵ *Kleine Schriften*, p. 329.

1. Symmetrie (makrokosmische Einheit).
2. Proportionalität (mikrokosmische Einheit).
3. Richtung (Bewegungseinheit).

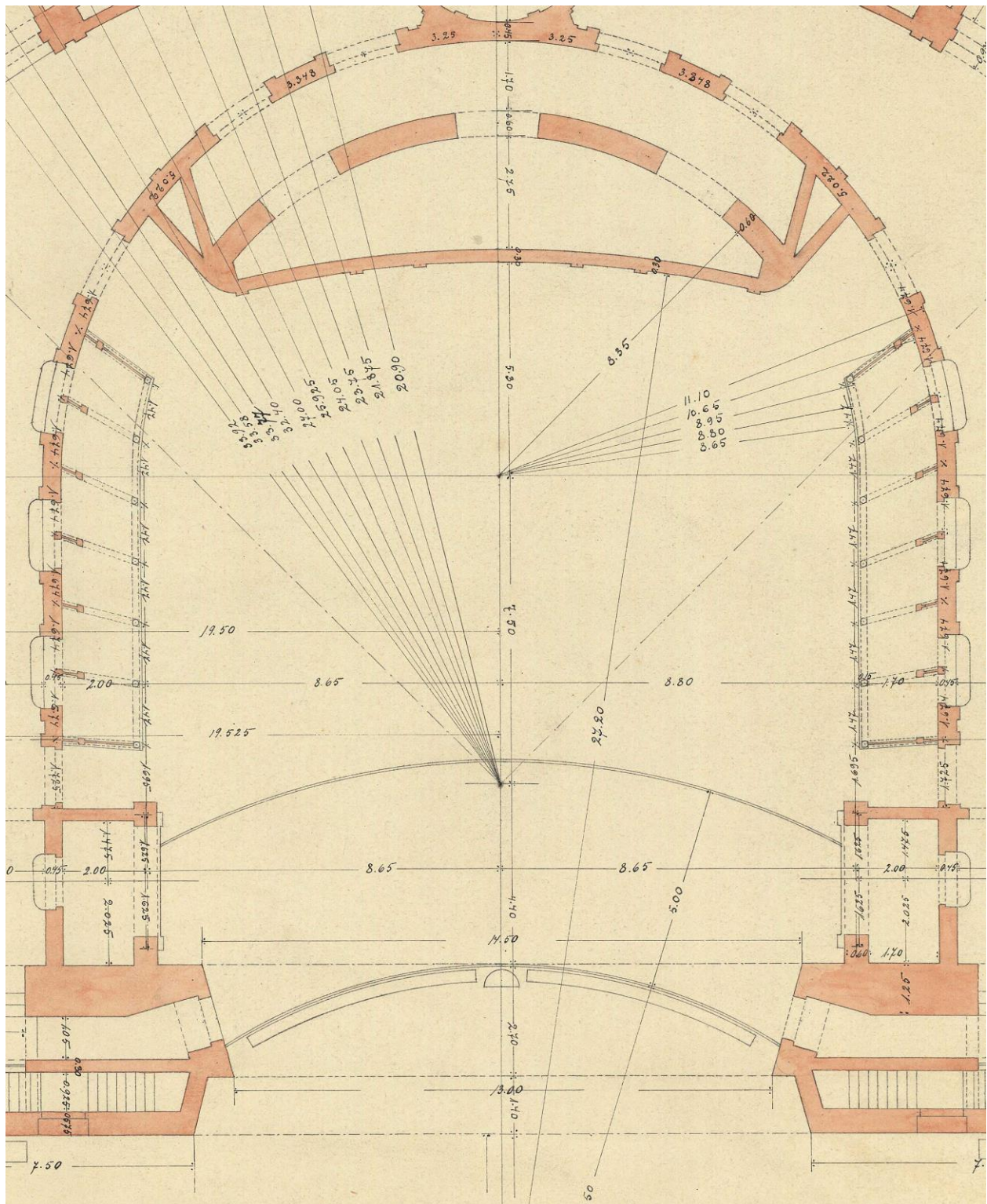


Figure 46: Second Dresden Hoftheater, Floor plan, Auditorium
Source: gta Archives / ETH Zurich, Gottfried Semper

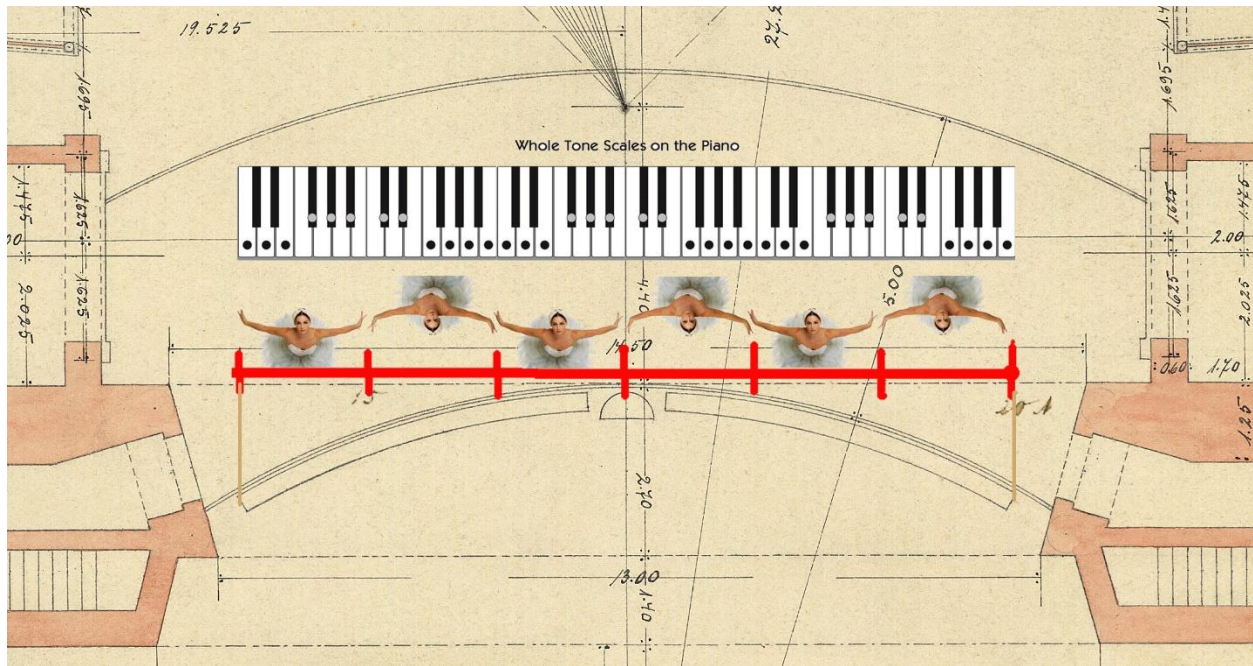


Figure 47: Second Dresden Hoftheater, stage, *Klaffer* and measurement
 Source: gta Archives / ETH Zurich, Gottfried Semper
 Author's sketch on the original drawing

There are two major differences between the earlier and later designs; first the separation of the stage from the auditorium and second, the design of the staircases. The staircases in this work are not linear, as it was not suitable due to the spatial limitations of this area; hence, Semper widened the measurements and gave a luxurious touch to the circulation areas of the staircases. Furthermore, the height and depth of the backstage areas have become larger compared to his earlier design. He separated the stage from the auditorium due to considerations of fire and as an essential part of the whole design.

The left and right wings of the auditorium were similar in plan and section. He used units of 6 and the *Klaffer* scale for section drawing as well. The secondary entrance part and the middle part between the auditorium and entrance were built based on the 12 *Klaffer* and 12 steps. It should be explained that all main spaces and main parts in the building were built on multiples of the number/unit 6.

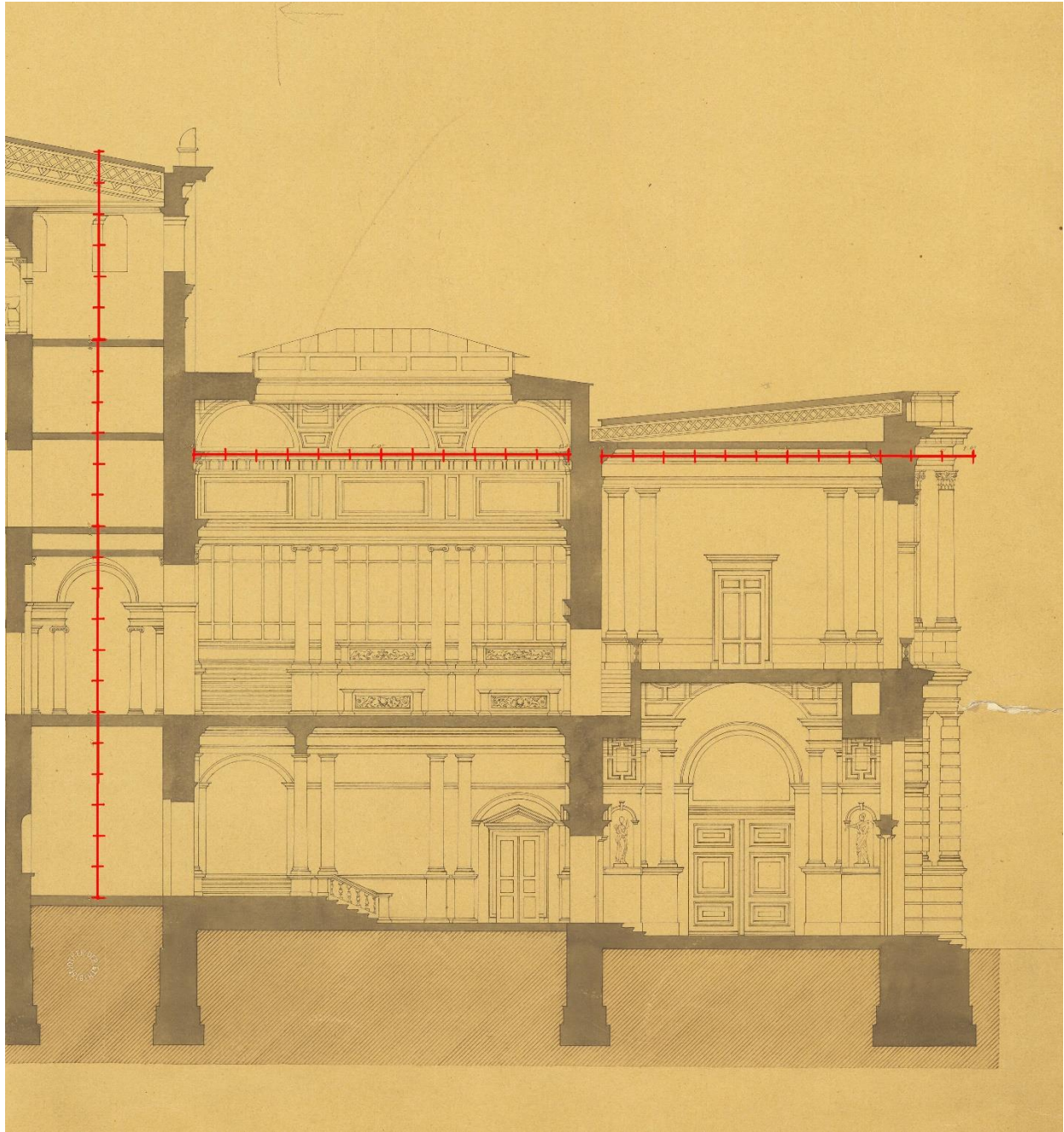


Figure 48: Second Dresden Hoftheater, Section, Secondary entrance and middle part
Source: gta Archives / ETH Zurich, Gottfried Semper
Author's sketch on the original drawing

The opera house became a place where various forms of art come together. Music as rhythmical time, dance as rhythmical movement, and architecture as a space of rhythmical happenings occur simultaneously in various but coordinated scales. This new and more expressive form of theater reflected this view and flourished from Semper and Wagner. This research concluded that for Wagner, an opera was a perfect form of integration of dance, music, and poetry and for Semper, an opera house was a perfect space of integration of music, dance, and architecture. In his plan with the *Klafter* scale, Semper showed two groups of radial rhythmical measuring lines. One group of radial lines originating from the center of the downstage above the orchestra and the other group originating from the center of the auditorium (figures 46 and 49). For him, the stage was not only the place for performing an opera but also a place for creating an architectural space with architectural dimensions especially the human body scale with the *Klafter*. The origin point for the measurements of the building marked by the circular arc of the auditorium is not an obvious place to mark as a measure, but it is the location of the soloist performer standing on the stage.

This research also assumed that since Semper wrote about eurhythmmy from Vitruvius, then he borrowed the *Klafter* from Vitruvius's geometric description of human proportions. In addition, he drew attention to the stage by a group of radial measuring lines in order to visualize a performance on the stage creating a spotlight for that art (figure 46). It could be interpreted that first, he established the central axis, then he identified more than one point where arcs of circles are drawn from the axis to create the curves of the building. For the outer curves (building exterior, lobby and stairs, he located the point at the front of the orchestra pit where the conductor stands. This is in the sense that the art was being conducted by a conductor. For the arcs of the interior of the house, he has a point about midway in the seating for the audience. The conductor, audience and performer were located on the axis of the auditorium.

Although it is often described as an elliptical plan, it is actually constructed from and conceived as a series of arcs.

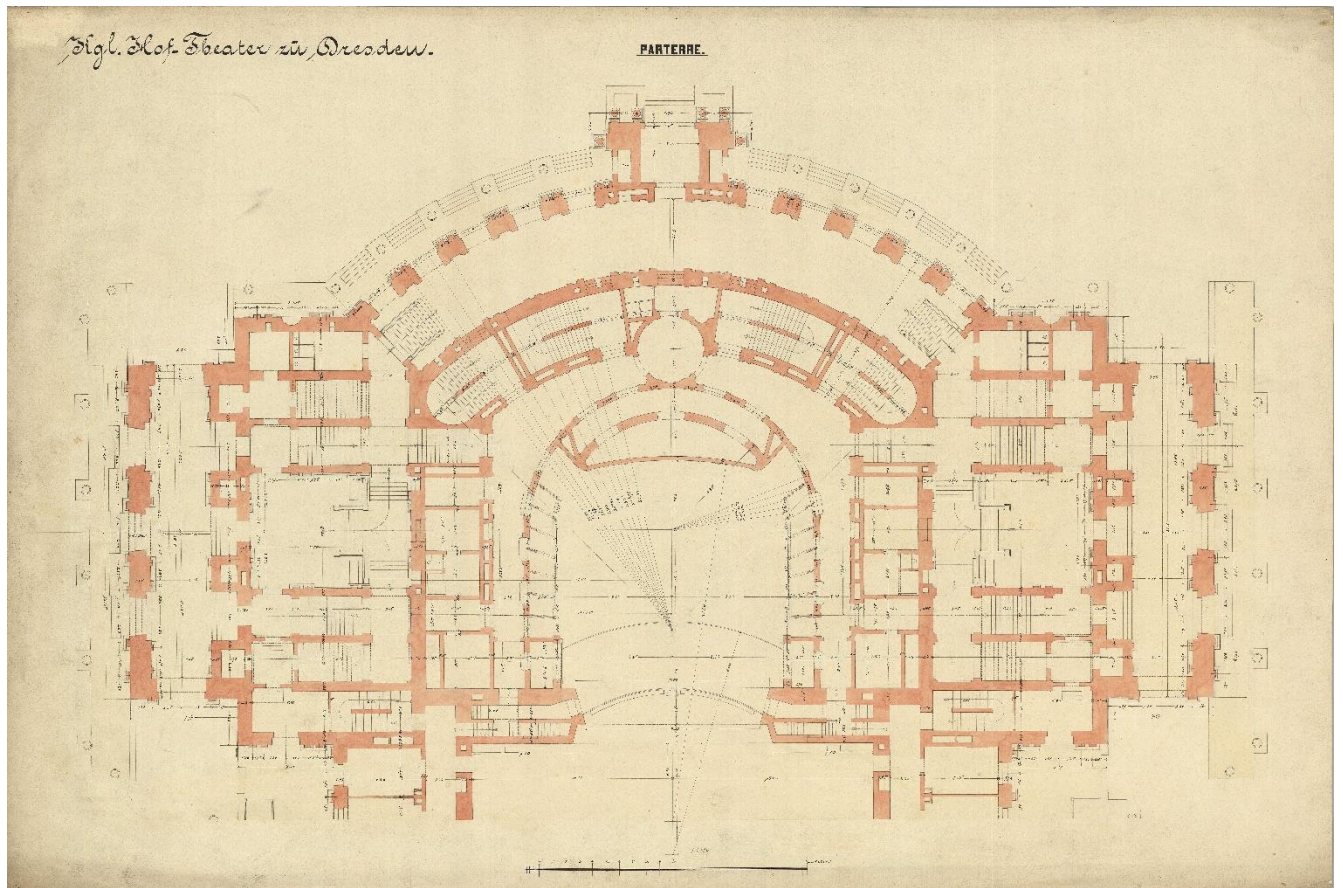


Figure 49: Second Dresden Hoftheater, Floor plan
Source: gta Archives / ETH Zurich, Gottfried Semper



Figure 50: Stage, backstage, orchestra space and audiences' space
Source: <https://www.flickr.com/photos/mbell1975/49182431373>

Semper went back to Vienna in 1877 and visited his almost finished theater for the last time. He was under pressure to write the third volume of *Der Stil*. But instead he agreed to a second edition of the first two volumes. He could not be present at the opening of his Dresden *Hoftheater* as his lung disease had made him too weak. After that, he traveled to Genoa, then Rome. Eventually, his lung disease worsened and he began to have kidney failure as well. He died in May 1879 in Rome, while his sons Emmanuel and Manfred were sitting next to him on that day.

This section asserted how music, dance (body movement), and architecture are rhythms in and of the Dresden Theater. The musical rhythm of a symphony is a dynamic element that creates the duration of sounds and influences the rhythm of body movement. Measuring the rhythm of the body in architecture (*Klafter*) and in dance was dependent on the rhythm of the music. It is also assumed that, Semper used the *Klafter* scale to demonstrate that architecture became an experiential phenomenon included tempo and duration like music, as a scale figure moving through the space of the drawing.

2.6 Semper's Theory of Dressing

The previous section has discussed three principles of eurhythmy on floor plan and section. This section will be explaining how Semper looked at the elevation of the second Dresden Theater based on his notion of dressing. Symmetry, proportion and movement on the floor plans, sections and elevations show how Semper tied the parts of the building to the whole.

The notion of the masking and dressing of the architecture underlies Semper's speculation that monumental architecture had its origin in the commemorative stage and theatrical

performance.²²⁶ According to Harry Mallgrave, the idea of masking architecture is the fictional potential of art as the key to Semper's overall thinking.²²⁷ Semper thought about motifs and ornaments on the façade in order to present eurhythmy as a cloth for the building.

Nietzsche in his lecture "The Greek Music Drama" gathered information on Semper's interest (which was implied in *Der Stil*) in employing theatrical masks in order to suspend or deny the outer reality, as Semper had said that theatrical crafts are essential elements in bringing a meaningful symbol of humanity if used as the form.²²⁸ Nietzsche's "The Greek Music Drama" conforms to this theme by referring to it and reciting different parts of it while bringing examples of Aeschylus and Sophocles as more complex choral works. Nietzsche explained that the pleasure that comes from the ancient choral songs is because of the elimination of reality, which brings freedom to the human spirit and exalts it.²²⁹ Semper, Wagner and Nietzsche praised the Greek arts that came out of the culture, people and infused to the human spirit and Nietzsche's works drew inspiration from Richard Wagner and Gottfried Semper.²³⁰

Semper's ideas in *Der Stil* strengthened Nietzsche's distaste for the bourgeois society's admiration of the rationalist moderation and intellect. Semper's second Dresden Theater reflected *The Birth of Tragedy* by Nietzsche by exalting the Dionysian statue. Prior to Nietzsche, Semper's enthusiasm for theatricality goes back to the 1830s when later Wagner shared the same interest and finally, it was handed to Nietzsche. This research assumed that the reason of Greek story telling on the façade by Semper, was a response to his notion regarding masking and dressing as uniting the parts and making a whole.

²²⁶ Hvattum, Mari. *Gottfried Semper and the problem of historicism*. p. 21.

²²⁷ Ibid, p. 21.

²²⁸ Nietzsche, Friedrich. "Greek Music-Drama." *New Nietzsche Studies* 10, no. 3/4, 2017, p. 1-13.

²²⁹ Mallgrave, Harry Francis. *Gottfried Semper: Architect of the nineteenth century*, p. 340-345.

Friedrich Wilhelm Nietzsche was a German philosopher and cultural critic in nineteenth century who influenced on modern intellectual history. He studied of classical antiquity especially ancient Greek and Latin history. His body of work included art, music, philosophy, religion, culture, science and tragedy.

²³⁰ Köhler, Joachim. *Nietzsche and Wagner: A Lesson in Subjugation*. Yale University Press, 1998, p. 80-90.

Semper in *Four Elements of Architecture*, explained that architecture included four crucial elements: the hearth, the roof, the enclosure, and the platform.²³¹ He emphasized the analogy of the human body and architecture by the idea of dressing (*Bekleidung*). The German word *Kleidung* means clothing, *verkleidung* "cladding", and *Kleid* "dress." Semper attempted to clarify that the first step of wall design was cladding the space, as a dress appeared cultural, ornamental, and decorative.

Furthermore, Semper's notion of dress conveyed the three factors that he emphasized in his book as principles of cosmology. Mari Hvattum explicated Semper's idea that the wickerwork and technique of weaving originated the symbolic motifs that came from the culture.²³² As a result, Semper brought the notion of *Bekleidung*, "dressing" to the building, which revealed the synthesis of cultural factors. For him, the woven cloth was origin of human culture and traditional stories of a people or nation.

This study reached out that for Semper the architecture looks like a naked body that needs weavings for the spatial enclosure. In fact, he de-materialized the enclosure and insisted on completely hiding the structure behind the surface by dressing the building with ornamental figures and elements. The surface for him, wall, or enclosure, meant to be a representation of the rhythmical patterns of motifs and ornaments. The façade of the building is the threshold between inside and outside. As the patterns of a fabric create a whole unity of a cloth, patterns of the wall (motifs and ornaments) create a whole unity of elevation.

Semper developed the idea of *Bekleidung* by talking about the crucial role of the knot that was invented to unite the individual pieces and separate surfaces into one complete whole. He emphasized this with the statement that "the beginning of the building coincides with the beginning of the textile."²³³ By expanding this idea, it could be concluded that the knot was the

²³¹ Semper, Gottfried. *The four elements of architecture and other writings*. Cambridge: Cambridge University Press, 1989.

²³² Hvattum, Mari, *Gottfried Semper and the problem of historicism*, p. 70.

²³³ Semper, Gottfried. *Style in the technical and tectonic arts, or, Practical aesthetics*. p. 247.

beginning of the construction and the rhythm embodied in knitting, motifs, music, and ritual dance that developed the idea of *Gesamtkunstwerk*. For instance, Semper brought examples of the Assyrian stone panel decorated with carpet patterns, Greek snake ornaments, and Delphian sacrificial dance show how rhythm came out of nature, and accompanied the arts to achieve a unity of purpose.²³⁴

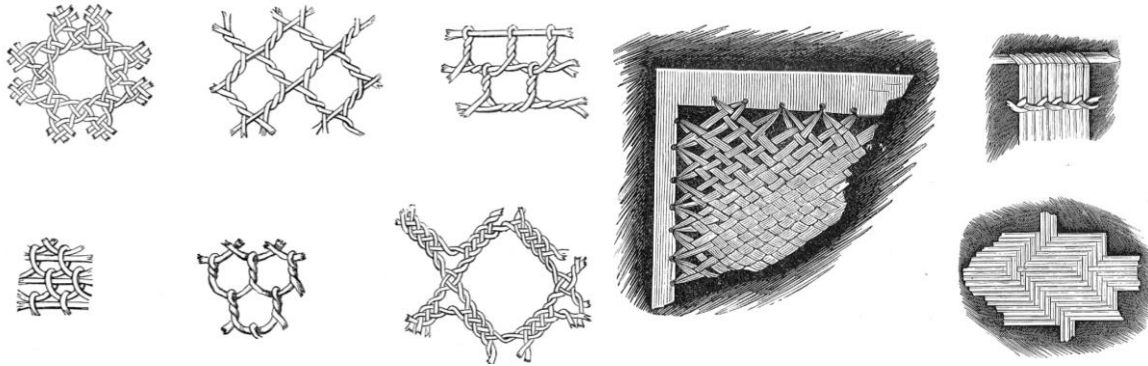


Figure 51: Rhythm and techniques of weaving and knitting
Source: Style, P 175-177.



Figure 52: Snake ornaments of Greece
Source: Style, P 77.

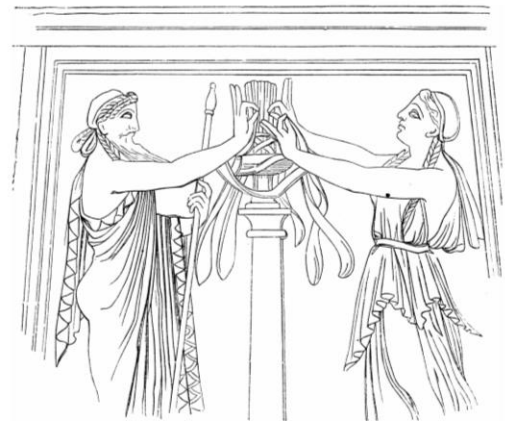


Figure 53: Assyrian stone panel
Source: Style, P 51.

Figure 54: Delphic sacrificial dance
Source: Style, P 121.

²³⁴ Ibid, p. 121.

Human beings first learned how to protect their bodies from heat, wind, and hazards by using natural covers like shaggy animal skins or tree bark. Later, they imitated the natural covers with weaving and patterns that they found in nature. The idea of unifying and wholeness that has been discussed in the first chapter could be explained by comparing the purpose of covering/dressing with the purpose of binding. For Semper, the purpose of the dressing was to close, protect, envelop, and cover itself as a unity; whereas the binding revealed itself as a plurality.²³⁵ The principle of surface covering, masking, and cladding followed from the uniformity of what the dressing enclosed as a unity and a whole.²³⁶

Semper also mentioned that "it is evident that the laws of symmetry and proportion are applied simultaneously, first with regard to the surface's width and height as well as its general linear boundary, second, with regard to any figures or designs on the surface."²³⁷ For him, the direction of the surfaces, especially walls and elevation surfaces, naturally were considered as upright surfaces.

Semper explained that the first basic principle of the general formal factor is the vertical surface since it has been placed in front of the human body as an upright posture. For that reason, the vertical surface includes a vertical axis placed in the middle of the surface, that is, the left side should mirror the right side. He added that the proportional patterns on the upright surface, either squares or natural patterns, gave a specific character to it. Semper also believed that "A surface can also present itself as standing upright or hanging vertically by flaring toward the top to bottom so that a contrast between the two is expressed by the form."²³⁸

It could be figured out that Semper explained symmetry and proportion on the upright surface in order to emphasize the vertical direction as a main purpose of elevation. For him, the presence of a human body in and out of the spaces on the drawings was a crucial factor to examine

²³⁵ Ibid, p. 123.

²³⁶ Ibid, p. 127.

²³⁷ Ibid, p. 124.

²³⁸ Ibid, p. 125.

eurhythmy. Although he drew plan drawings as horizontal surfaces, it could be perceived that he put *Klafter* scale on the bottom of his drawings to show that plan lines are based on upright posture and body moves throughout the spaces.

Semper said, "The principles of symmetry and proportion apply to vertical surfaces and hanging curtains- surface dressings with figures or design."²³⁹ He brought the figures prior to design in order to embody the dress of the wall in a costume of a human body. For Semper, through ritual, culture, dance, and art, human beings captured the creative law of nature and ritual dance jointing parts into a whole through textile art and rhythmical body movement. In addition, ornaments and decorations on the elevation were analogous to weaving in order to tell the story and convey the meaning. The rhythm created a structure for this meaning to become understood by others. Semper mentioned that "Textile art, therefore, itself an imitation of ritual, rhythm, and dance, is the source not only of the practical arts but also of architecture."²⁴⁰ In *Der Stil*, he used the word texture/ surface in textile as well as architecture.



Figure 55: Second Dresden Hoftheater, Front Elevation
<https://www.invaluable.com/auction-lot/andras-kaldor-hungarian-born-1938-viaado-concert--371-c-9a24d21b78>

²³⁹ Ibid, p. 127.

²⁴⁰ Mubashra, Asna, Syed Ali Qamber, and Nalini Madaan. "Architextiles: Design in its Multifunctional State." *International Journal of Innovation, creativity and change*, Volume 15, Issue 8, 2021, p. 29.

The rhythmical arches on the *Hoftheater* façade, on the left and right wings, created a pattern that reveals the symmetrical form. Windows, arches, stones, and sculptural figures on the façade dressed the building with proportional elements. The pitched roof on the rear portion of the building emphasized the vertical direction and created a hypothetical line in the middle of the building to distinguish the axis of the symmetrical façade. Moreover, the rhythmical proportions of unit 6 are visible on the elevation as he divided the stonewall into 6 intervals by considering the openings and windows. The author visualized that a dancer dances in front of the facade, as this facade plays rhythmical musical notes based on the whole tone scale.

Symmetrical beats and similar proportions occur on each floor in an upward progression through the orders. This section concluded that the notion of dressing presented the idea of *Gesamtkunstwerk* and how various parts could be integrated as a unity of the whole. Ornaments and decorations created symmetry, proportion, and movement on the façade. It seemed that Semper weaved and tied the parts in order to make a cloth for the elevation. This cloth included eurhythmmy in architecture, dance, and music.



Figure 56: Second Dresden Hoftheater, Front Elevation
Author's sketch

2.7 Conclusion of the Second Movement

Firstly, this movement investigated the first statement of the research regarding the evidence of the musical staff as a scale on Semper's drawings. After studying the original drawings from ETH Zurich, it was understood that besides a metric architectural scale, Semper used a Vienna *Klafter*/fathom scale. Although he did not draw a musical staff, this research assumed that the five lines on the drawing (figure 29) presented the sense of a musical staff and the way musical notes created the rhythm of intervals. *Klafter* was considered a whole-tone scale in music that has six intervals and whole steps between seven notes per octave.

Secondly, as previously discussed, the notion of integration of arts led Semper and Wagner to show a different performance of the arts. For Wagner it appeared in his operas and for Semper, appeared in his opera house. Wagner borrowed the rhythm to connect poetry, dance, and music and Semper used rhythm as a crucial factor of eurhythmy to connect architecture, music, and dance (body movement.) In addition, it has been discovered that for Semper the essence of music was manifested in the rhythm of body movement in order to measure an architectural space since he added *Klafter* scale to the metric scale later after finishing the drawings.

Thirdly, this chapter also examined Semper's theory of dressing, the study emphasized Semper's idea regarding the resemblance of the human body and architecture. In doing so, Semper mentioned that human clothing and the process of wall design as well as covering the surfaces of the space both have come from the rhythmical patterns like tying the knots. For him, the process of covering the surfaces (whether the human body or a building) indicates connecting the parts in order to present it as a unified whole. As a purpose of *Gesamtkunstwerk* was synthesizing the arts and bringing the fragments in a whole unity, it could be described that Semper's notion of *Bekleidung* was connecting the motifs, decorations and ornaments on the façade in order to make a whole unity as a cloth for the building.

Finally, as a result, this research proposed that if in figure 46, the radial measuring lines pointing to the seat of the conductor, the place between audiences and performers, Semper probably was thinking of conducting a performance on the stage based on the *Klafter* and rhythm of 6 intervals with Wagner's opera.

The next chapter will be presenting dance in the second Dresden Theater according to the story of *Klafter* to comprehend holistically Semper's ambition for his unfinished work which was an integration of architecture, music, and dance.

Third Movement

Minuet

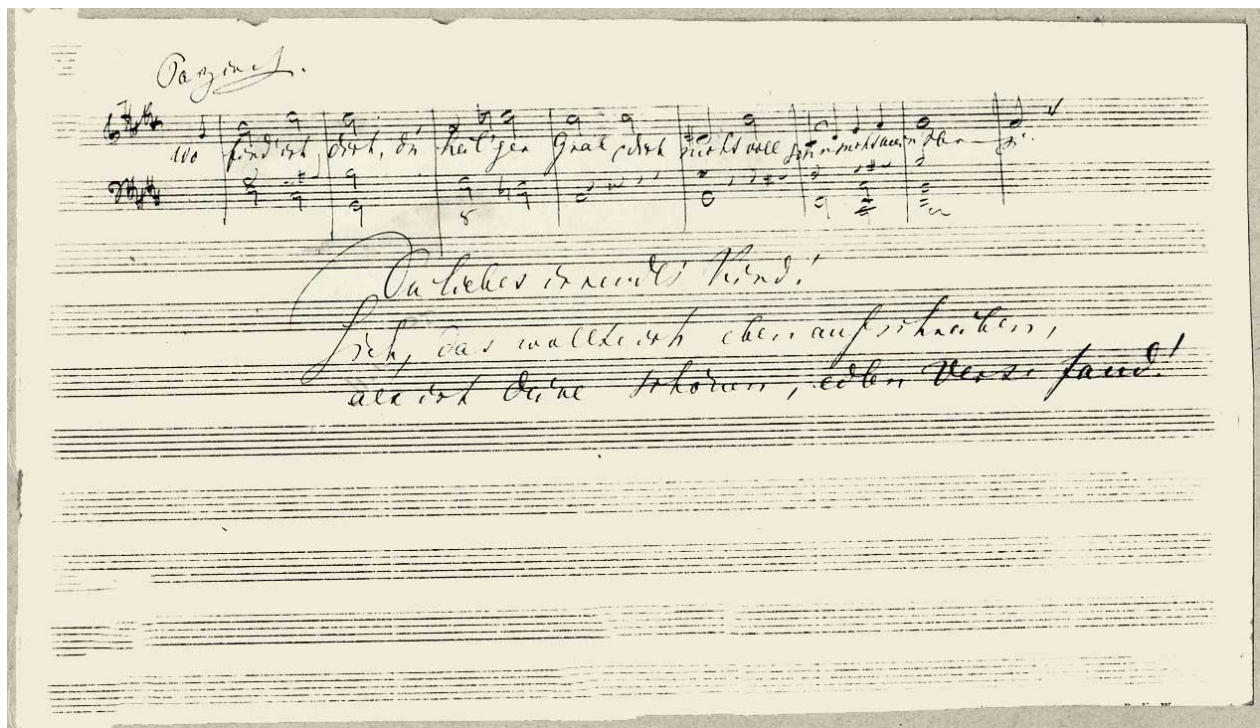


Figure III: Richard Wagner's sketch, 1882 Source: Akg-images.com

A minute is the third movement of a symphony and a slow, graceful dance.

3.0 Introduction

The previous two movements explained the integration of arts and the type of scale in architecture, music, and dance. It also pointed out that rhythm played a crucial role in eurhythm. Although it seemed that Semper designed and built the Dresden opera house, he had an unfinished project that was choreography the arts. Based on this assumption, this chapter will be conducting a performance on the stage of the second Dresden Theater with Semper's architectural drawings, Wagner's Symphony in C major, and a dancer who will be integrating the arts by using the rhythm of *Klafter* scale on the stage. Since this symphony was never played in Dresden opera house, it has been selected for this study. This conclusion was conceived as a fitting demonstration of Semper's ideal of *Gesamtkunstwerk*.

The result of this dissertation is a video that will be attached to the third chapter in order to respond to the question of how two-dimensional perception can be visualized in three-dimensions and through time. This research will be presented as the collaboration between the reader (audience), the author (artist), and the integration of arts (a video.)

In addition, as previously discussed, Semper and Wagner influenced each other as friends. It will be mentioned how Semper invited Wagner to conduct this performance on the stage.

3.1 A Baton for Wagner Designed by Semper

Wagner arrived in Zurich after having to flee Germany. He gave a concert at the city theater in Zurich in April 1853 and met a Zurich banker and his poet wife, Mathilde Wesendonck, who were

in attendance.²⁴¹ In 1856, Wagner taught music to Mathilda and although both were married once they met each other, Mathilda fell in love with Wagner.²⁴² In 1858, Mathilde arranged a concert for Wagner at her villa and earlier asked Wagner's friend, Gottfried Semper, to design and make a baton for Wagner. She said this baton is a surprise gift for Wagner as an appreciation of Wagner's works.²⁴³

Semper used natural forms driven from leaves, and natural patterns for designing this baton. It could be interpreted that Semper designed a conductor's baton and handed it over to Wagner in order to ask him to conduct his orchestra on the stage of his opera house.

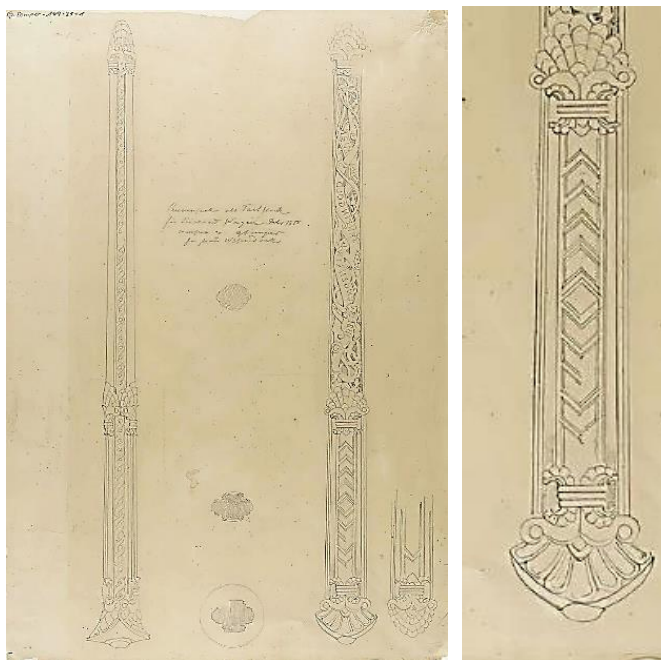


Figure 57: Wagner's baton designed by Semper in 1857

Source: GTA, Zurich University archive

²⁴¹ Wagner, Richard, and Mathilde Wesendonck. *Richard Wagner to Mathilde Wesendonck*. C. Scribner's sons, 1905.

²⁴² Ibid.

²⁴³ Orelli-Messerli, Barbara, *Vom Taktstock zur Ampel*, Symposium zum 200. Geburtstag von Richard Wagner und 210. Geburtstag von Gottfried Semper, 2013.

3.2 Dancing Architecture



Figure 58: A dancer is warming up to dance on the stage
Author's drawing

When Wagner expanded his idea regarding *Gesamtkunstwerk*, he meant to intertwine the arts. *Dancing Architecture on the Semperoper* is a dance choreographed by the author and her architecture student who is also a dancer, Emily Green, to present the relationship between architecture, music and dance.²⁴⁴ The piece displays these relationships through choreographic themes, sections, sequences, and repetition as the dancer not only dances as the architecture but also with the architecture. The dancer danced the *Klaffer* scale as she was measuring the space of the drawing and the space of the stage with her body.

²⁴⁴ Author's student, Emily Green was an architecture student at James Madison University. The author and Emily collaborated on choreographing this dance and recorded the video from January to March 2022.

3.3 The Choreographic Process with Musical and Architectural Sections

This research contains a supporting document as a video showing a choreography. It has been attached to the dissertation file. Before choreography could begin, an understanding of the context had to be established. Semper's Opera House was constructed at the height of Romantic ballet, which was extremely popular in Europe in the mid-nineteenth century. Young artists, writers, poets, and dancers of the Romantic Movement wanted to express themselves individually in a way to convey their own emotional story by their art. The movement was characterized by mood and emotion in ballet since the ballet typically came with smooth motions. Opera houses were home to the dances such as ballet. Thus, with this ballet movement being a central point of the arts at the time, choreographing a piece to Semper's Opera House has been done in a balletic language. Richard Wagner's works initiated a revolution not only in Western music but also in western philosophy. Wagner's *Symphony C major* is a beautiful example of how he uses music to tell an emotional story. This symphony was completed in 1832 and never performed in the Dresden opera house. The five-minute performance taken from the symphony travels through several sections characterized by different melodies, rhythms, tempos, and scales from barely audible to larger-than-life.

When first considering the symphony and Semper's Opera House, it was essential to establish certain themes that would thread throughout *The Dancing Architecture*. As both the music and the architecture move in various sections or stages, it was apparent that the choreography should do so as well. Thus, as the choreography progresses through different sections, it is threaded together with movement themes. The most apparent thread is established at the very beginning - straight outstretched arms which show the *klafter* measurement used by Semper. Then this theme is manipulated into a repeated movement in which one arm reaches across the length of the other. Counting in sixes is another kind of theme used throughout the piece which in turn relates to the six foot divisions of the *Klafter* and the whole tone scale.

In this choreographic process, a section refers to each unique segment of the dance separated from the rest by movement, music, and architecture. Sequencing entails a process of pulling apart musical sections and architectural sections and pairing them together. With these two elements in hand along with the two themes, creation of movement sequences within sections of the piece could begin. The dance, however, does not progress through each section leaving the previous one behind. There is an interwoven relationship between sections that would often repeat and manipulate sequences of movement just as musical themes are recalled and adapted throughout a piece. There are twelve sections of the musical intervals, which is another mechanism showing its relationship to the theme of counting in sixes.

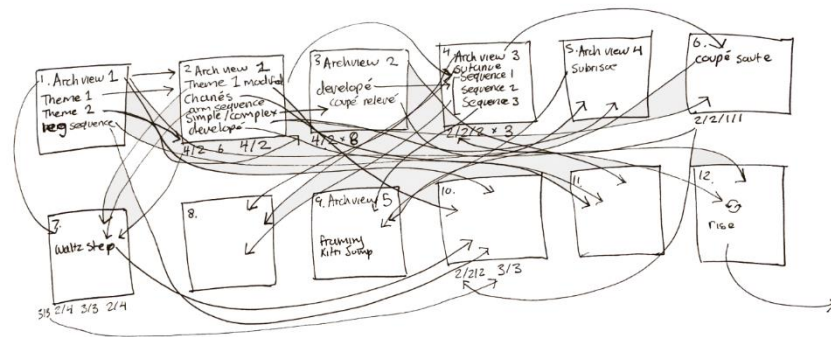


Figure 59: Architectural drawing of the dance that delineates the swinging of the compass/ *Klaffer*/ dancer.
Source: Author's drawing

Elements that were key in creating sequencing and sections were rhythm, repetition, and emotion. Sections of the music were often separated by finding the changing points of these elements. Portions of the plan drawings of *Semperoper* were also chosen by looking closely at these changes. Similarly, the movement had to be choreographed in a language of section that moved harmoniously within the music and the space of architecture.

The author, as an architect/musician with her student, Emily Green, as an architecture student/professional dancer choreographed a dance based on two-dimensional plans that overlaid on Wagner's symphony and the notion of *Gesamtkunstwerk*. Creating a piece of

movement is much like creating any piece of music or work of architecture that requires a rhythm. When practicing smaller sequences of movement, the body is able to memorize the technical aspects of dancing, performing better each time. With each repetition, the body gains more knowledge of technique that allows for artistry and emotion to fill up even the minute movements. Then, practicing the sequences together builds endurance and enables the body to iterate. The transitions between sequences were smoothed and changes were continually being made until the last movement. More changes were even being made in the moment of filming the final iteration of the piece.

Once filmed, *Dancing Architecture* was taken into a new realm of design. In a video, Semper's drawings are taken and overlaid in areas of the screen so that the body is not only dancing as the building but also dancing with the building. Finally, as the video is developed visually, the architectural drawings of *Semperoper* had been overlaid on drawings of dance to fully extrapolate and present the intertwining ideas.

3.4 Music, Dance, and Architecture in Motion

The major portion of the film focuses on the dancer's movements in relation to Semper's drawings. The dancer dances on the stage, through the spaces and finally goes out of the stage to explore various spaces in the building. The choreography has divided into 12 sections and the dancer starts to dance on the axis of the point that radial measuring lines pointing to it on the original drawings. This starting axis has been discussed in the previous chapter. The main elements of the choreography will be described for each section accompanied by diagrams and stills from the video.

1. Section one, (00:00 - 00:27) opens with a view of measurements of the floor plan of Semper's Opera House. The first theme of the stretched arms appears in proportion to the measurements in the view of the floor plan. The opening shows the length of the arms in comparison to height and to the length of the legs. Here the body begins to emulate the measurements of the floorplan.



Figure 60: Architecture becoming the dance partner. Frame exemplifying the body dancing *with* the architecture.
Source: Author's drawing

2. Section 2, (00:28 - 01:10) continues the theme of outstretched arms; however, the body begins to twist, rotate, and turn, emulating the radial measurements from the bottom right corner of the frame. The theme is manipulated to create a movement (one arm reaching across the length of the other) that is threaded throughout the entire piece. This sequence begins the second theme - counting in six - by weaving sequences together. Four repeated movements are increasing, followed by a two-count hold. Then six *chaînés* ²⁴⁵ (series of turns) turns radially around the space, followed by two counts of a more complex

²⁴⁵ BalletHub. "Ballet Terms Dictionary." BalletHub. Accessed April 5, 2022. -----
<https://balletHub.com/ballet-terms-dictionary/>.

"Chaînés is a classical ballet term that means "chains" or "links." When a dancer is doing chaînés or "chaîné turns" . . . chaîné turns" is when a dancer is performing a series of turns on both feet, picking up each foot back and forth in order to keep moving."

hold in the form of a small *Développé* ²⁴⁶ (developing movement) and 4 counts of walks. Here, the four-two and two-four bracket the flat six and have a transverse relationship in both the order of emphasis and the complexity of movement. The four-two has a complex four and a simple two, while the two-four has a complex two and a simple four.



Figure 61: Diagram for section two

Source: Author's drawing

Charcoal diagram showing timing and counts in six. Broken into four-two, six, two-four in relationship with simple-complex movement and stresses. Darker lines show more difficult or stressed movement, connected lines show stillness.

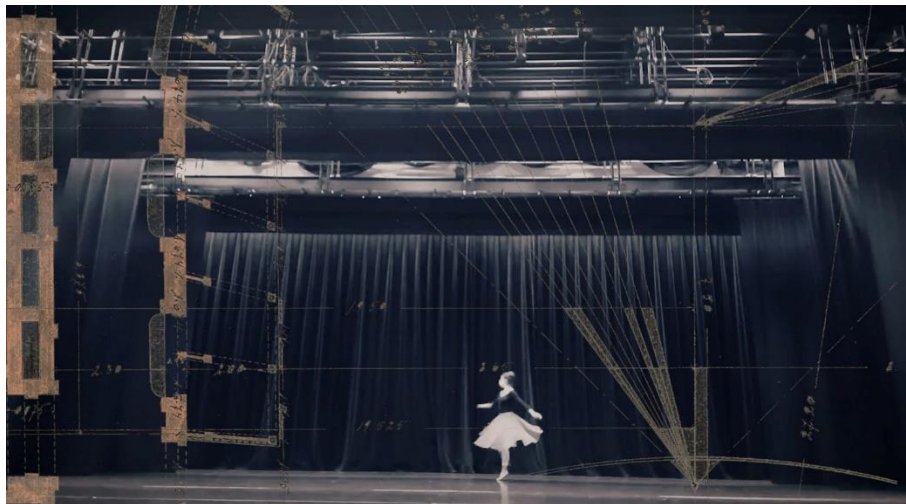


Figure 62: Mid chaînés turn as the body moves within the space and the architecture of Semper's measurements.

Source: Author's drawing

²⁴⁶ Ibid

"Développé is a classical ballet term meaning "to develop," or "developing movement." A Développé is a movement where the dancer's working leg is drawn up to the knee of the supporting leg and extended to an open position."

3. Section three, (1:11 - 1:48) begins as the plan fades to a view of columns. The body emulates the columns as they would be in each position of the space weaving through space diagonally. These weaving motions continue the relationship and play between the simple and complex, Though the steps and hold of the sequence are relatively simple, the weaving pattern throughout space is complex. Each sequence repeated for each of the columns is counted in six, again split into four-two: four counts of walks followed by two counts of a coupe relevé (raised).²⁴⁷ The arms move through a sequence of four movements showing passage through space and time. With this movement pattern, there is purposeful interaction with the body and the floor plan. The body moves throughout the eight positions on the stage but also moves in and out of the floor plan in the framing of the video again showing the duality of dancing the architectural drawings as well as dancing *with* the stage.

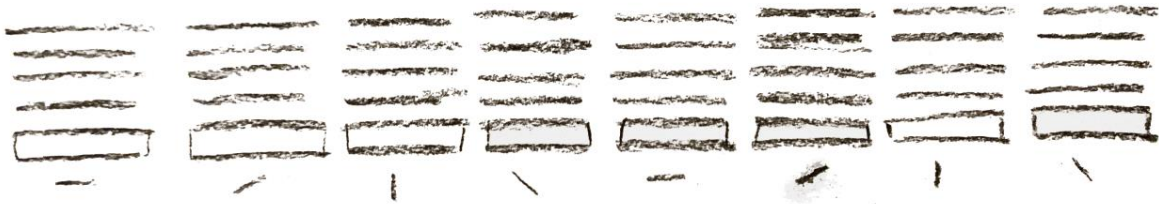


Figure 63: Charcoal diagram of section three

Source: Author's drawing

Charcoal diagram of section three showing timing and counts in six. Broken into repeated four-two relationship with similar emphasis and complexity of movement. The range of marks below each shows the sequence of change moving throughout the repetitions: first – second / third | fourth \ and again.

²⁴⁷ Ibid.

"relevé is a classical ballet term meaning "raised." It describes the action when a dancer rises up and seemingly is standing "on their toes" in a demi-pointe or a fully in pointe."



Figure 64: The body enters the space between the columns, floating in and out throughout the composition of the floor plan and negative space

Source: Author's drawing

4. Section four (1:49 - 2:39) begins with the plan again fading into a new view showing a series of three linear walls. The walls play with rhythm and repetition to the space and show the element of sixes again split into three stresses, two-two-two. Additionally, the space between each wall is different. The body moves back and forth three times to emulate this horizontal movement. Each time the phrase is repeated, it adapts and becomes a larger movement. The sequence plays with the framing of the floor plan as it begins by reaching laterally "into" the walls dancing with the floor plan, only to pull away in the opposite direction such that the floor plan becomes the dance partner. After the sequence is repeated three times, the arms return to the first theme of the outstretched arms. It is notable here that the second repetition of the sequence holds a reference to the small *développé* (developing of movement) of Section 2.

Charcoal diagram of section four showing timing and counts in six. It has been broken into two-two-two with stresses marks below showing the range of change in movement with each repetition. Small – medium / large | .



Figure 65: Charcoal diagram of section four

Source: Author's drawing

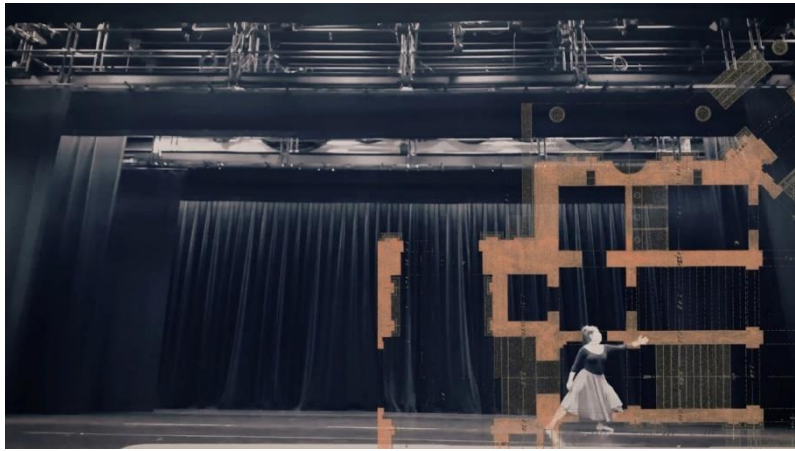


Figure 66: The body reaches through the walls and the space stretching in the lateral space.

Source: Author's drawing

5. Section five (2:40 - 2:57) begins as the plan fades to a central view that emphasizes the radial quality of Semper's Opera House. The dancer begins a sequence that is energetic and grand, much like the character of this portion of the building. As the music and architecture of this section change in scale and emotion, so must the movement. The body dances and jumps in a circular path around the stage, following the rhythms and motifs of the music. Note here how the *assemblé*²⁴⁸ (two legs joining in the air) of each repetition is a subtle reference to the *coupe relevé* (raised) of Section 3.

²⁴⁸ Ibid "An *assemblé* in classical ballet has many different variations, but the basics are always the same: two legs joining together in the air"

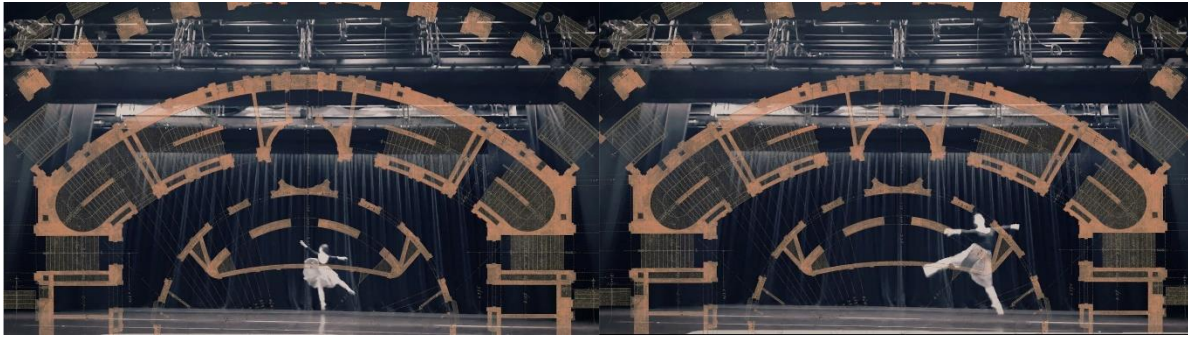


Figure 67: Two frames are taken as the movements and jump become larger and travel in sweeping motions across and around the stage.

Source: Author's drawing

6. Section six (2:58 - 3:35) begins as the plan returns to the view of the horizontal walls and the body begins another sequence of steps that are repeated to the right and left much like the movement pattern of the sequence in Section 4 to which the view of the opera house corresponds. In contrast to Section 4, however, the side-to-side sequence repetition of Section 6 contains two sets of two movements. This is another take on the simple-complex relationship. While Section 4 contains three repetitions of a similar sequence that are manipulated and increased in scale each time, Section 6 contains two repetitions of two sequences that remain the same. Additionally, the second sequence contains references to steps that have been seen in Section 5. After these four pairings of movement, a new movement is introduced that will become an important repeated step - the *coupe saute* (cutting a jump.)²⁴⁹ This repeated step is introduced halfway through the piece as the music becomes larger and grander. This is the first performance of this symphony on the stage of Dresden opera house. Thus, it is not quite a theme, but nonetheless an important

²⁴⁹ Ibid "Coupé is a classical ballet term meaning "cut" or "cutting." A coupé describes a step where one foot cuts the other foot away, taking its place. . .[sauté is] the step is performed while jumping. When used alone, it simply means 'jump'."

repeating element of the second half of the piece. Finally, running in a circular motion around the stage, the movement prepares for the next section. Once again, this sequence counts in six splits in a new form of two-two-one-one.



Figure 68: Charcoal diagram of section six showing timing and counts in six.
Source: Author's drawing



Figure 69: The architecture becomes the dance partner once again.
Source: Author's drawing

The dancer jumps high in the air while the floor plan seemingly pulls the dancer back to the right side of the composition.

7. Section seven (3:36 - 3:58) begins as the plan returns to the first view of measurements and radial lines. The first theme of one arm measuring the length of the other returns. However,

complexity is added as the body moves and turns diagonally with *pas de valse*²⁵⁰ (waltz step), and *pirouettes* (spin) through the space. As the dancing is reaching through the *klaffer*, the body also reaches through the radial lines drawn by Semper, yet another example of dancing as the architecture and with the architecture. This sequence's counting alternates between six splitting into three-three and into four-two. The four-two plays the familiar role of the complex-simple relationship in Section 2 in a *pirouette*²⁵¹ followed by a hold, and the three-three is much like the flat yet complete six of Section 2. While Section 2 contains the four-two, six, two-four sandwich pattern, Section 7 takes on the same counts and follows alternating three-three, four-two, three-three, four-two patterns. Then, the arms repeat in the same sequence seen in Section 2 where the arms repeat and exaggerate the first theme. This time, however, the pattern is set to a faster tempo. Then, the pairing of *waltz steps* and the theme are repeated. This time in a horizontal movement pattern across the stage rather than diagonally as the intensity of the music continues to increase.

Charcoal diagram of section seven showing timing and counts in six. It has been broken into three- three, four-two, three-three, four-two patterns with the stresses, holds, and movement complexity.

²⁵⁰ Ibid "Pas de valse is a classical ballet term meaning "waltz step." A dancer doing a pas de valse will extend and step one leg as the other brushes front while decorating the step with classical looking port de bras"

²⁵¹ Ibid "Pirouette is a classical ballet term meaning "spin." It describes when a dancer is turning around one leg with the other off the ground and in a position, most commonly in passé."



Figure 70: Charcoal diagram of section seven
Source: Author's drawing



Figure 71: One of the waltz steps and arm theme pairings.
Source: Author's drawing

8. Section eight (3:59 - 4:05) begins as the view of the floor plan corresponding to Section 4 comes into view. The section begins with the *sutanue* (cutting a jump) turn introduced in Section 4. Here, rather than repeating the three sequences increasing each time, each manipulation of movement of the sequence is consolidated into one sequence which changes direction once. The first step together of the first section of the first repetition is followed by the *petit relevé* (raised) of the second repetition which is repeated twice

changing direction the second time, then followed by the largest *développé* (developing of movement)

9. Section nine (4:06 - 4:28) begins as the music reaches its most intense of the entire piece, and the quality of movement follows as the sequences involve jumps that are also the largest and most theatrical. The architecture also emphasizes this theatrical and larger-than-life quality with a circle that magnifies the movement. While this is the biggest sequence of jumps, they are jumps that have been anticipated throughout the piece: *coupe soutes* (cutting a jump) from Section 6 and *assemblé* (two legs joining in the air) also from Section 6. The final jump is new and perfectly centered in the circle of the plan as a theatrical picture of this section. As the music concludes the biggest section, the body arrives at its final kneeling pose in another picture within the frame.

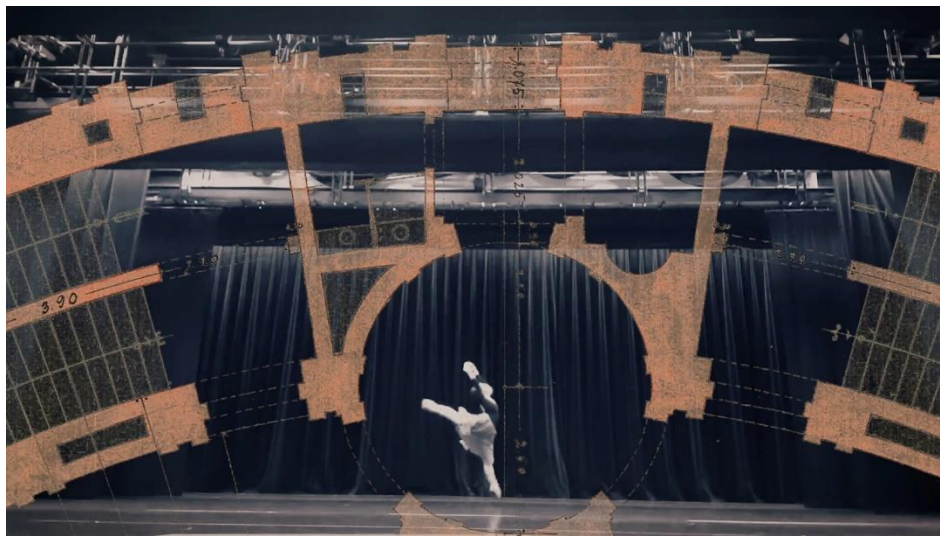


Figure 72: Frame of the largest ending jump of the section
Source: Author's drawing

10. Section ten (4:29-4:46) begins as the music becomes *diminuendo* (quiet), the mood shifts, and the plan fades to the original measurements from Section 1. The body relaxes from its framed and theatrical pose and easily comes into a standing position. As if remembering the original theme, the arm repeats the sequence from Section 2 twice before the *waltz step* pairing of Section 7 followed by leg movement referencing Section 1. The counting in

sixes is repeated here again in a two-two-two, three-three pattern. The pattern breaks down as a two-count rise, two of the theme twice through, followed by a *waltz step* in three, and leg sequence in three.



Figure 73: Charcoal diagram of section ten showing the two-two-two, three-three pattern with stresses, holds, and movement complexity.

Source: Author's drawing

Two last sections are choreographed in 10 seconds, for that reason the diagram and chorography are like section one and two.

11. Section eleven (4:47-4:57) begins as the plan fades into the eight columns of Section 3 and the body repeats the 6 *chane* turns and small *develope* of Section 2.

12. Section twelve (4:58-5:13) begins as the plan fades once again to the original measurements of Section 1. The first sequence of the legs from Section 1 are repeated in reverse. Finally, the body rises slowly and runs off stage in the last notes. This shows a continuation to explore the building. Much as the story of building and the music is incomplete, the movement is left unfinished.

3.5 Conclusion of the Third Movement

Dancing Architecture works to put Semper's architecture into movement. It interprets an architectural plan into spatial movement. Then, the choreography goes further than dancing as the movement but also to dance with Semper's Opera House. The body weaves throughout and interacts with the plans such that the drawings become a partner, a second dancer that is choreographed just as thoughtfully and spatially as the first.

Another important aspect of the choreography was repetition as rhythm to music or architecture, rhythm of themes, sequences, and steps throughout the piece created this consistency of movement. In addition to the two themes of the outstretched arms showing the *Klafter* measurement and counts of six that were consistently woven throughout the various sections of *The Dancing Architecture*, certain steps were also repeated.

This chapter presents the assumptions of this dissertation in the form of an artwork of three-dimensions. The video is the total work of arts (dance, music and architecture.) and represents the title of the dissertation - *Dance with Musical Architecture* - as a conclusion.

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