Final Thesis

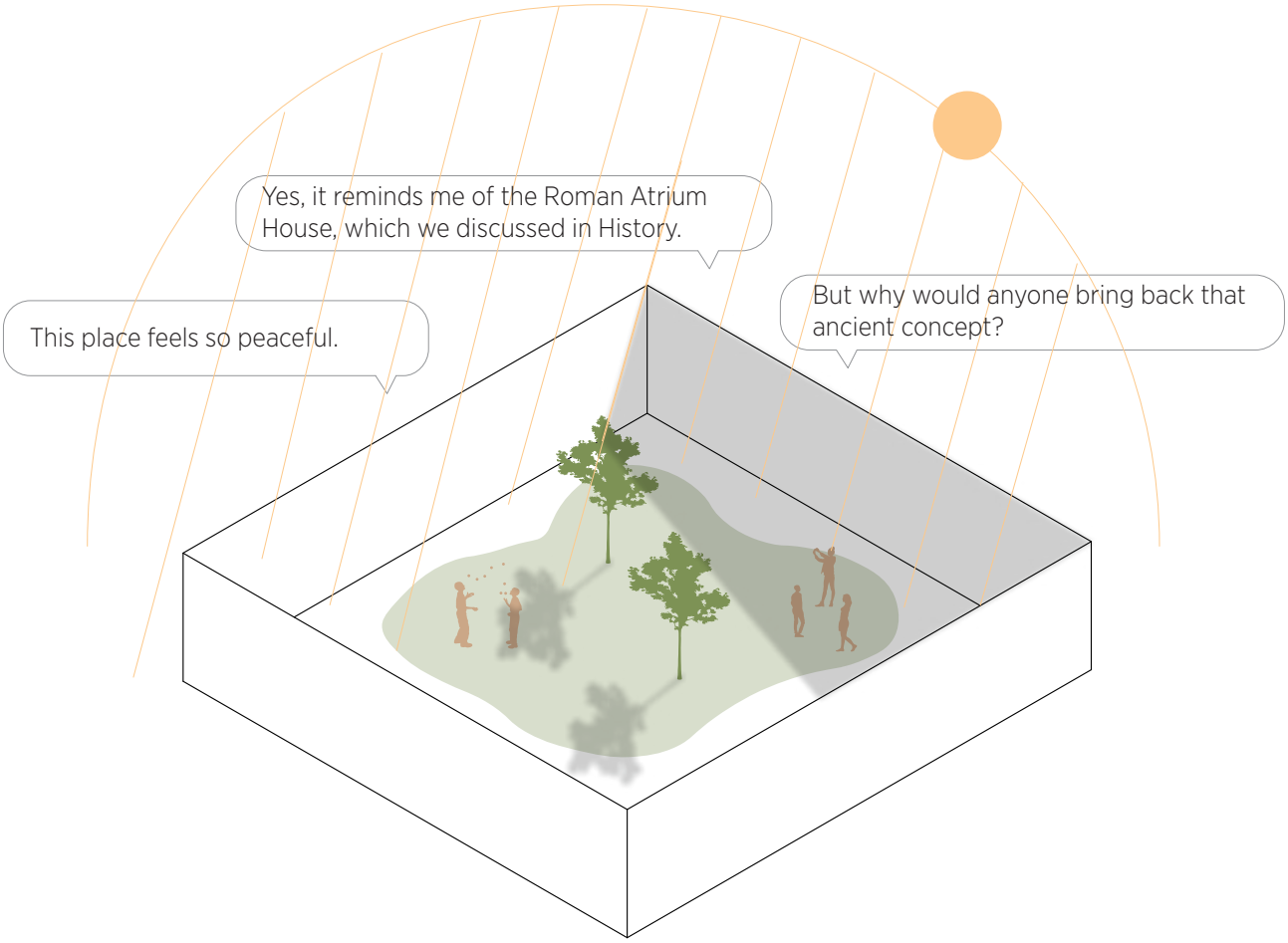
The Atrium House

A Typology of Roman Antiquity and German Modernity

2nd Semester

Course:
Architectural History and Theory
AR2A011

Seminar Group:
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1. Prologue

I am fascinated by the Atrium House. An Atrium represents a central space enclosed by walls but open to the sky. One example is the student residence in Nuremberg, see Figure 1. In this design, the Atrium is both a space to gather and an access area. Here, galleries access the individual small student apartments. The noticeable difference from conventional student residences is the feeling when entering the house. One is not greeted by a closed corridor but by a green oasis. This little oasis in the middle of the city left a lasting impression on me.



Figure 1: Nuremberg Student Housing Maxtorgraben. From Dömges, by Weber, J. , (n.d.) (https://www.doemges.ag/architektur/wohnen-hotel/architectproject/237-studentenwohnheim?next=236)

My study about the atrium continued when I worked on it during my internship. Together with a friend, we designed a building that included an Atrium. We thoroughly discussed the spatial configuration, dimension, shape and function. It was an enjoyable task, which ended in the fascination of that space.

During my study at TU Delft, Birgitte Hansen introduced the topic of "*green architects*" and the "*perception of nature*" (Hansen, 2024, p. 5), bringing to mind these previous encounters with the Atrium.

Considering the ongoing discussions about climate change and sustainability, I began thinking about Atriums[1] during different periods. In the following, I will share what I have researched.

[1]For this kind of building many different terms are used, such as Courtyard, Peristyle or Atrium. In my research I will use the term Atrium because it originates from the Latin word and has the same meaning in German. Hence, I will use Atrium throughout my work.

2 Abstract

The paper provides a deeper understanding of the Atrium from Roman antiquity and 20th century German Architecture. At first, starting with the writings of Vitruvius and the functional and social role of the Roman Domus. Then, continuing with the modern Atrium in the 20th century, with their new concept. Lastly, drawing attention to the Atrium designed by Heinz Bienefeld and his idea of using ancient concepts and combining them with a modern design.

By comparing the ancient and modern Atrium concepts, this research is going to highlight the timelessness of this typology and, of course, its change of use throughout the different time periods.

Keywords: Roman Domus, Atrium, modern Courtyard, Marcus Vitruvius Pollio, Ludwig Mies van der Rohe, Ludwig Hilberseimer, Heinz Bienefeld

3 Introduction

3.1 Object of study | Definition

The object of study is the Atrium, which has a long tradition. Brian Edwards discusses in his book that the Atrium does not belong to a specific period of history (Edwards, Sibley, Hakmi & Land, 2006), but he is confident about its widespread use as a typology in different cultures and climates. Fatma Abass[2] confirms that Atrium existed in various regions and cultures over 2000-5000 years (Abass, Ismail & Solla, 2016, p. 2557)

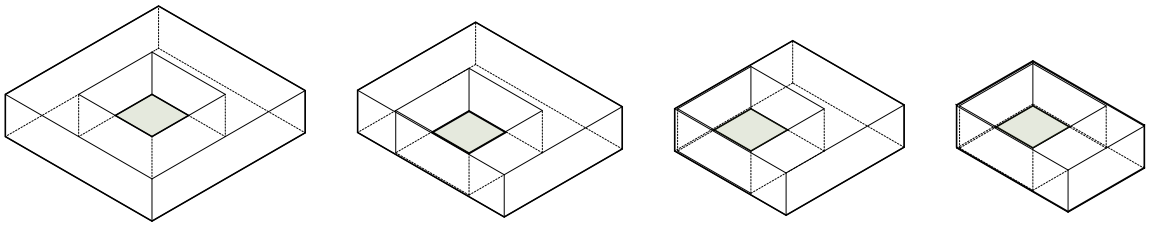


Figure 2: Atriums. From TU Delft, by Aull, Ferdinand, 2025, March 27.

The image above visually introduces the Atrium concept in a reduced sketch. An Atrium is traditionally enclosed by walls or adjacent rooms while staying open to the sky. Hasan Hachem assumes that the term Atrium could derive from the smoke-blackened roofs (Hachem, 2015, p. 9).

One key example visualised in Figure 3 is the hut from Gottfried Semper, where the evidence of the fireplace in the centre serves as one of the earliest concepts of architecture. Even Vitruvius referred to fire as the first social gathering for humankind[3].

The highlighted areas in light green (Figure 2) are usually the central space of a building. It provides the house and the dwellers with light and fresh air.

[2] Fatma Abass is an assistant Professor at University of Tabuk, her research is about different Atriums and their evolution (Abass, Abass, Fatma, n.d.).

[3] " *Therefore, it was the discovery of fire that originally gave rise to the coming together of men, to the deliberative assembly, and to social intercourse"* (Morgan, 1960, p. 38).

Historically, it has been a defensive design that protects against unwanted animals and enemies (Sanjunee & Guneratne, n.d., p. 108). Furthermore, Nasser O. Rabbat[4] raises the idea that the Atrium is a zone between *"public and private physically closed and visually accessible"* (Rabbat, 2010, Preface).

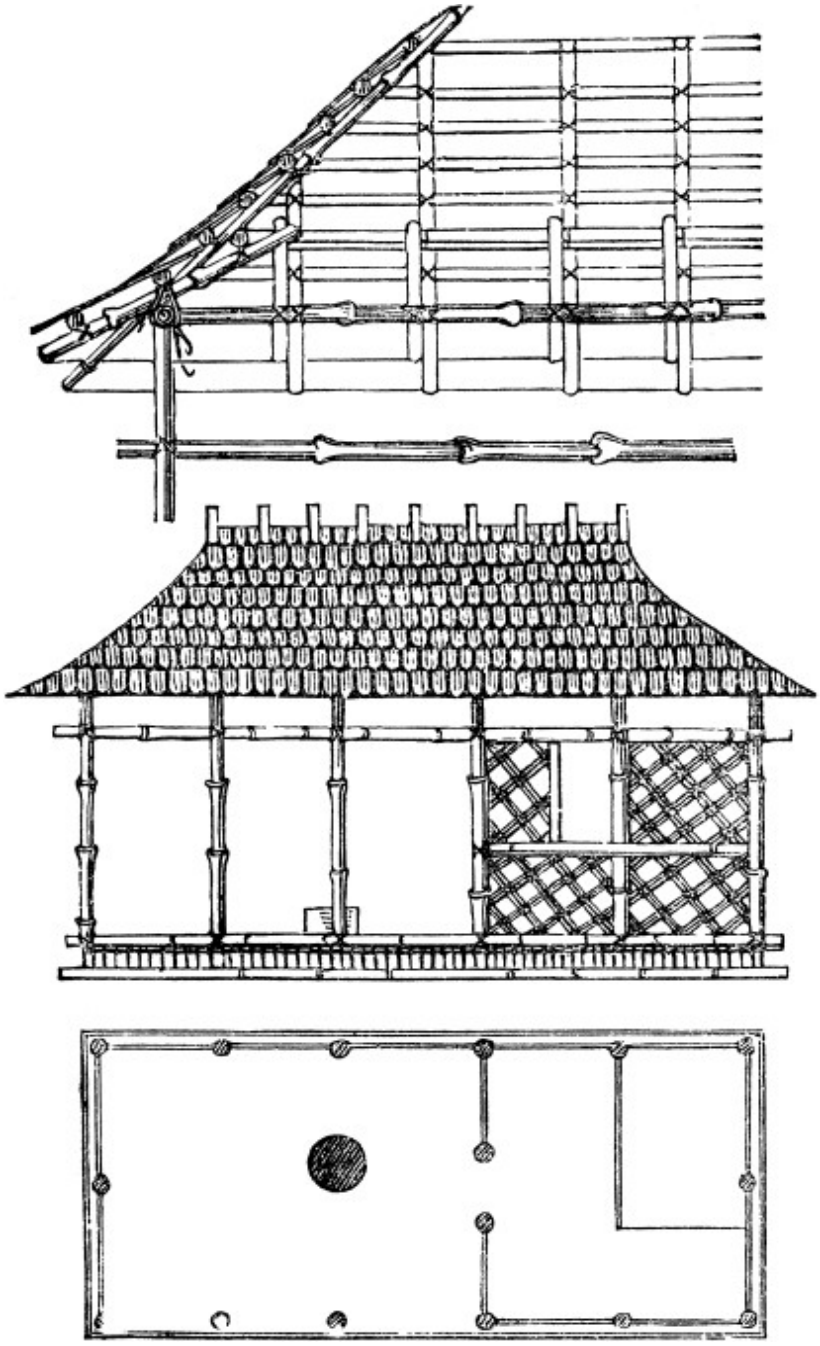


Figure 3: The Hut by Gottfried Semper. From Researchgate, by Shyqeriu B. , 2012, November 02 (10.33107/ubt-ic.2012.2)

[4] Nasser Rabbat is the Professor and Director of the Islamic Architecture programme at MIT (Rabbat, n.d.).

Many books have been written on general knowledge of the Atrium. Marcus Vitruvius Pollio, Hannah Platts, Luciana Fornari Colombo, Duncan Macintosh and Heinz Bienefeld are the main authors of interest. Marcus Vitruvius Pollio, the architect whose treatise is one of the only extant pieces of information from Roman antiquity. Additionally, Hannah Platts, a professor and archaeologist, researched in her book "*Multisensory Living in Ancient Rome*" (Platts H. , 2020) about the social history of ancient Rome.

The Atrium in the 20th century was researched and studied by Luciana Fornari Colombo, an Assistant Professor. Her research explores the Atrium from Ludwig Mies van der Rohe as a modern typology (Colombo, 2015). Nigel Coates, an English architect who still practices architecture, refers to Colombo's work while he explores the unbuilt Atriums from van der Rohe (Coates, 2016). In addition, Duncan Macintosh from the University of Michigan has conducted research on the origin and concepts of the German Atrium. He introduces some new key figures who developed the modern Atrium, such as Ludwig Hilberseimer or Hugo Häring (Macintosh, 1973, pp. 27-36). Lastly, Heinz Bienefeld, an architect, who had other ideas about the Atrium (Speidel & Legge, 1991).

3.2 History | Methodology

It is important to understand that the Atrium has a long tradition and, as a climate controller, the Atrium could introduce an ancient typology to the discourse of architecture to the present day. This research explores the Atrium from Roman Antiquity to German architecture in the 20th century. Wienke explains in his article that, with the expansion of the Roman Empire, the Atrium was introduced in a northern climate. However, the different climates have challenged the typology (Wienke, n.d.). For instance, the vast exterior surfaces, in comparison to more compact planned buildings, raise the heating and cooling problem. Despite these challenges, the Atrium reemerged as a relevant form of housing in Germany only during the 20th century.

To set the scope of this research, the central focus will be on residential buildings in Roman antiquity and in Germany during the 20th century. Due to its widespread use, the Atrium Typology can also be found in Universities, Monasteries and Palaces. In addition, many cultures have explored the concept: In Northern Africa, it is known as Nouala; in Spain and America, the Courtyards are called Patio; in the Dutch context, they are called Hofje, and not to forget the Courtyards in the Middle Eastern cultures (Schoenauer & Seeman, 1962).

To cover all Atrium variations would, however, overly extend the scope of my research. Therefore, my topic is about the return of the Atrium in Germany in the 20th century and how it can be seen as a solution for better living conditions. However, this return raises one important question:

How have the concepts of the Atrium changed over three different time periods?

Following this question and the extensive literature on the Atrium at specific times, my research addresses the following gap: A comparative analysis of the concept of Atriums from three different time periods.

The framework of my Research is based on a literature study and further explored with different case studies as primary sources. Each chapter will uncover the different concepts and interpretations found in the literature. Additionally, this research will add new knowledge through the discussion by comparing the literature and case study findings. By following the approach of Vitruvius's three principles of "Firmitas, Utilitas et Venustas" (Morgan, 1960, p. 17), this study will compare different interpretations and concepts of the Atrium according to these criteria. The chapters of this thesis are organised chronologically, each focusing on one different historical period. The first chapter discusses the Atrium in the Roman Antiquity. The following chapter is about the re-emergence of the modern Atrium in 20th century Germany. The last chapter focuses on the work of Heinz Bienefeld during the time of postmodern architecture. The Discussion is about comparing the three Atrium houses, and the conclusion mentions the importance of historical research, highlighting how one single typology can be adapted to address various challenges in different periods.

4 The Roman Atrium

4.1 About the architect Marcus Vitruvius Pollio

The architect Marcus Vitruvius Pollio lived between 84 BC and 27 AD (Lernhelfer, 2010), as seen in Figure 4. Between 30 and 20 BC, he wrote one of the only extant works of Roman Antiquity (Irizar, 2021). The work is the architectural treatise *"de Architectura,* "which includes 10 books; each book consists of different topics and formulates technical and theoretical aspects of the period. In the following, the one theoretical idea of Vitruvius, the three principles of good architecture will be mentioned with the example of the Aqueduct (Figure 5).

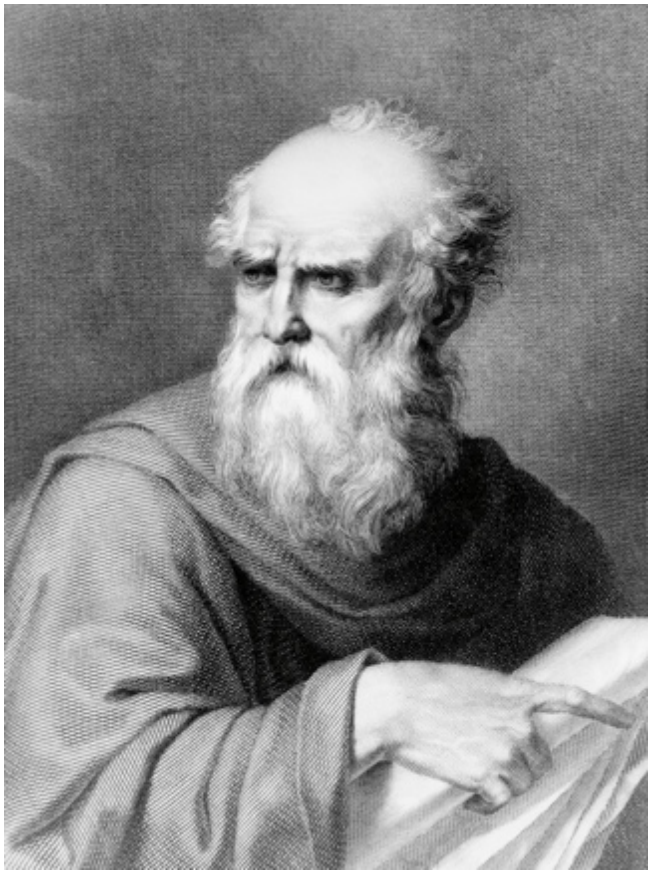


Figure 4: Marcus Vitruvius Pollio. From Meisterdrucke, n.d., (https://www.meisterdrucke.com/kunstdrucke/Jacopo-Bernardi/1107574/Porträt-von-Marcus-Vitruvius-Pollio,-bekannt-als-Vitruv.html)

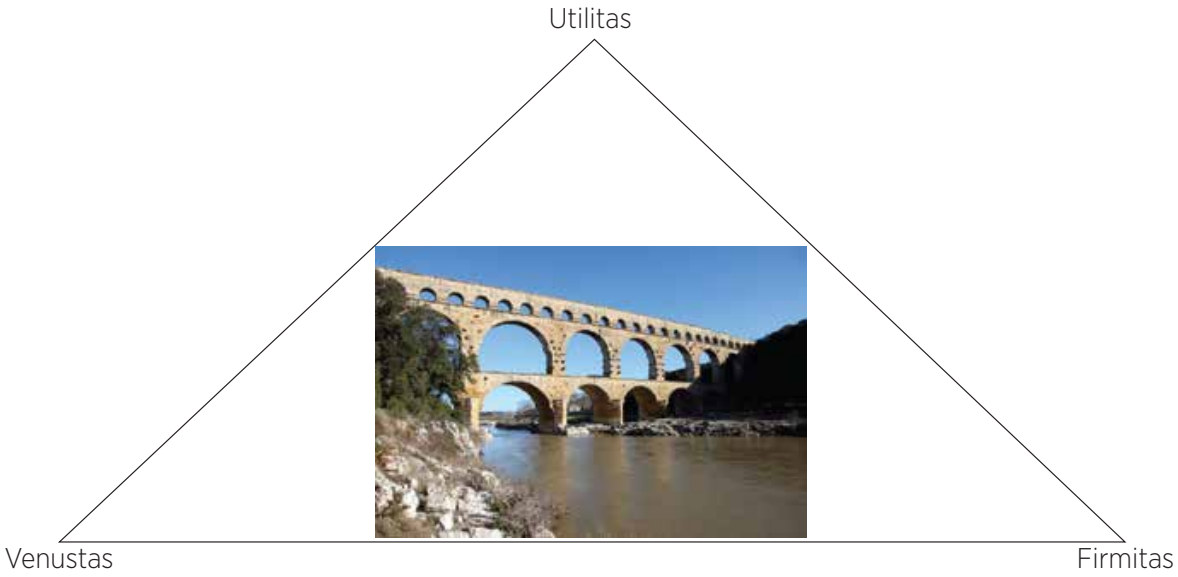


Figure 5: : Vitruvius principles & Roman aqueducts. From Nationalgeographic, edited by Aull F. , (2025, March 27), (n.d.) (https://education.nationalgeographic.org/resource/roman-aqueducts/)

In this case, Firmitas (strength) is exemplified by the Roman arch's enduring construction, which can be seen in the Aqueduct as it still stands today. Utilitas (usefulness) is proved through the structure's functional reasons, like the transportation of water to various locations. The last term, Venustas (beauty), which might be more of a subjective opinion, is clear in the aesthetic appeal of the monument.

Various role models influenced Vitruvius. By reading his book, one can argue that he also had a source of inspiration (Morgan, 1960). He mentions the Greeks and Etruscans several times, who both laid important foundations for the Roman Domus[5]. First, the roof structure of the Etruscans and, secondly, the Peristyle from the Greeks.

[5] The Roman Domus is Latin for the Roman house. It is the residence of the wealthy Roman located in a city or town. The best evidence of the Roman Domus is in Pompeii (Becker, 2015).

However, when considering the layout of the Roman Atrium, both Researchers Agnes Kirsopp Lake Michels (Lake, 1937)[6] and Kemal Reha Kavas (Kavas, 2012)[7] argue against the idealized idea of Vitruvius. for them, the Atrium is primarily derived from functional and practical influences.

4.2 The Atrium as a functional space

This chapter takes a more detailed look at the Roman Atrium. It represented a living space as a response to the climate and the functional role. Vitruvius already recognised climatic differences as an architectural factor. In the sixth book, he spoke about the climate factors:

"In the north, houses should be entirely roofed over and sheltered as much as possible, not in the open, though having a warm exposure. But on the other hand, where the force of the sun is great in the southern countries that suffer from heat, houses must be built more in the open and with a northern or northeastern exposure" – Quote by Vitruvius (Morgan, 1960, p. 170).



Figure 6: House of the Vetti. From Smithsonian, by Feldman, E. , 2023, January 10 (https://www.smithsonianmag.com/smart-news/after-decades-of-restoration-lavish-pompeii-house-reopens-to-public-180981419/)

[6] A.K. Lake was a scholar of Roman religion and daily life and lectured at multiple universities (Michels, n.d.).

[7] K.R. Kavas is a professor at Akdeniz University, and his research topic was *"A critical review of the Roman Atrium House: Regarding the Material Evidence on "Atrium"* (Kavas, n.d.).

Therefore, one can argue the climatic reason for using the Atrium in antiquity.

As mentioned before, the Atrium has not only the functional reason to protect the Romans from the heat but also, as Hans Weidinger describes it, a water collector (Figure 8). This helped the Romans not only in areas with poor water supply but also in being independent from public fountains (Weidinger, 2007, p. 8).

In his second book, Vitruvius mentions many local materials as a standard, like Brick, Sand, Lime, Pozzolana and Stone (Morgan, 1960), which can be seen in Figure 6 & 7.



Figure 7: Impluvium in the House of the Menander. From KhanAcademy, by Carole Raddato. (n.d.) (https://www.khanacademy.org/humanities/ancient-art-civilizations/roman/x7e914f5b:beginner-guides-to-roman-architecture/a/roman-domestic-architecture-domus)

4.3 The Atrium as a social space

The Atrium is an architectural space, standing for functional aspects but not to forget the implication of the social aspect.

Mark Grahame[8] goes as far as to describe the fact that the living form of an Atrium was initially reserved for wealthy citizens, which was increasingly imitated by other Roman citizens (Laurence et al., 1998, pp. 156-178). Figure 8 illustrates the floorplan of the Roman domus. Here, one can find two central spaces, both of which can be defined as an Atrium. The rooms were organised around the central space (Wallace-Hadrill, 1991). The ideal design of the domus followed an axial arrangement, which was not always possible in many urban areas, especially in densely built-up areas such as Pompeii. This led to numerous variations in size and shape. Looking at this evidence, One can argue that Vitruvius' idealised concept of an Atrium was not always put into practice due to different circumstances, such as the geographical location or the neighbouring areas in the Roman context.

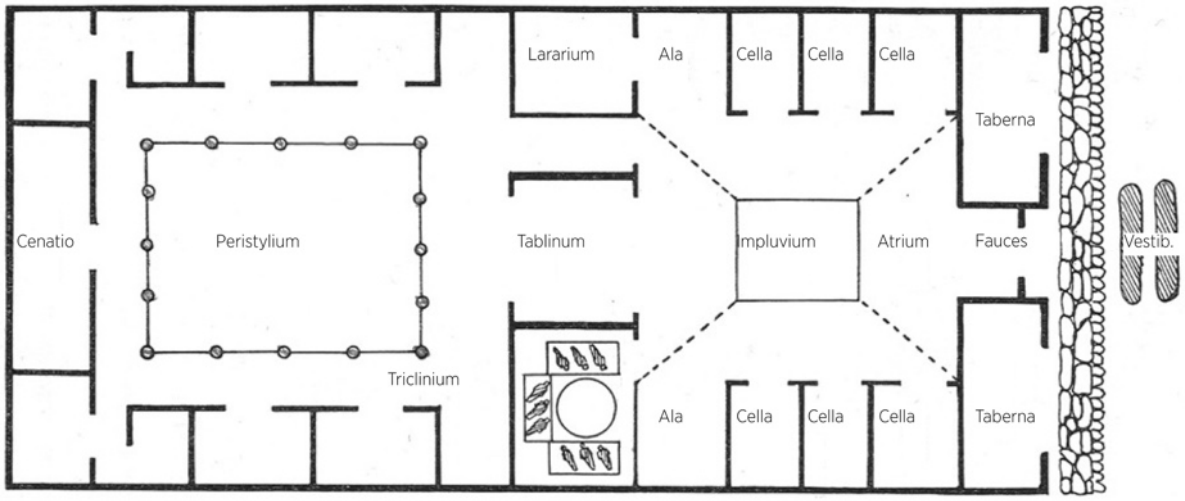


Figure 8: Roman Domus. From Rabbitforlatin, edited by Aull F. , (n.d.), (http://www.rabbitsforlatin.com/roman-daily-life)

[8] Grahame is an archaeologist, lecturer and a Member of the Chartered Institute of Archaeologists. His research is about the spatial layout of the Roman Domus in Pompeii (Grahame, n.d.).

Miko Flohr (Flohr D. M., n.d.), another Archaeologist and lecturer in Ancient History at Leiden University, supports the social role of the Atrium. He argues that the social status of an Atrium can be proven by the painted walls and their decorated Atriums (Figures 6 & 7), Which implies their social status and wealth (Flohr M. , 2011, p. 87). Not only was the Atrium a public area, but it was also an enclosed area. Platts investigated this in her book with additional details of archaeological finds. The access was regulated hierarchically; not everyone was allowed to enter. A door or curtains could regulate the degree of public access. An important function of the Atrium was the social presentation and ritual activities. Major events occurred here, such as the morning salutation, weddings and funerals. Due to this possibility of opening and closing, Platts describes the Atrium as the threshold between public and private. In addition to its representative function, archaeological finds show that the Atrium was also used for everyday activities. Some finds prove that the Atrium was used as a craft room, such as for weaving or as a storage room for tools and, among other things, as a cooking area (Platts H. , 2020, pp. 77-129). In addition, Sem van der Straaten, a fellow student at TU Delft, found out that the ancestors' shrine was in the Atrium, symbolising not only the social role but also a religious function. (van der Straaten, 2021, p. 6)

5 Atrium in Modern Architecture

5.1 Origin of the modern Atrium

During the time of the Weimar Republic, there was a notable development in architecture. After the First World War, society was traumatised; there was a shortage of housing, horrible living conditions and an economic crisis (Eckert & Völkel, 2019). Christian Eckert provides information in his book about the architectural movement and the protagonists during that time. The most innovative modern architectural movement was the so-called Bauhaus movement. Bauhaus was founded by Walter Gropius in 1919, and his idea was to unite art, craftsmanship and modern technology to develop a new architectural language (Eckert & Völkel, 2019).

Another scholar, Macintosh, mentions that architects wanted to provide Houses for the masses, like the middle classes during this time (Macintosh, 1973). Besides that, a different researcher, Colombo, claims that the Garden City movement in England, designed by Ebenezer Howard, inspired them (Colombo, 2015, p. 124). This movement was a reaction to London's overcrowded and horrible living conditions (Ionescu, 2024).

Looking at this evidence of the Roman Atrium and the modern Atrium as a typology, it is arguable that the architects during the 20th century reinterpreted the Atrium, which was already a common typology in ancient times.

5.2 Architects who worked on the Atrium

Hannes Meyer, Häring, Hilberseimer and van der Rohe worked intensively on the modern Atrium during the Bauhaus period and their time in America at the Illinois Institute of Technology (IIT) (1932-1960s)[9] (Macintosh, 1973). The following will mention the protagonists and their contribution to the Atrium.

[9] *"The Row House was part of the exercise on urban studies that Mies and Hilberseimer originally taught at the Bauhaus"* (Castillo, 2023, p. 4).

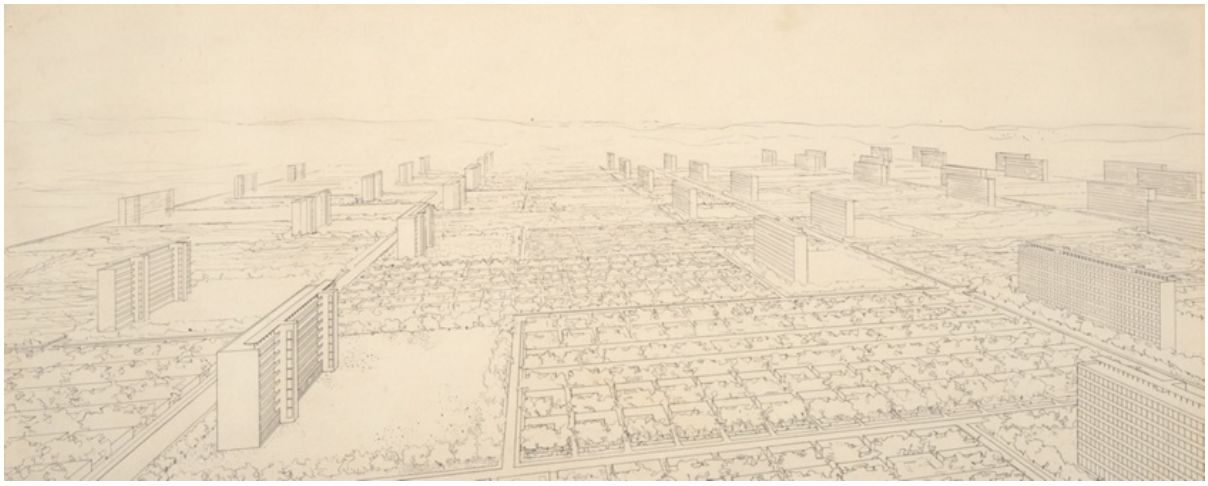


Figure 9: Mixed Housing Development (Mischbebauung), Berlin, Germany, Aerial perspective. From Art Institute Chicago, by Hilberseimer L. K. , 1925-1935 (https://www.artic.edu/artworks/101049/mixed-height-housing-development-mischbebauung-berlin-germany-aerial-perspective)

Hilberseimer was appointed to the Bauhaus in 1929. He combined research and architecture based on scientific analysis. Florian Strob, who is an architectural historian, wrote about the ideas of Hilberseimer. He mentions that Hilberseimer designed mixed housing development for cities (1919-1933) as one solution to deal with the poor living conditions in densely built cities. His approach was structural urban planning for better lighting and ventilation (Strob & Hilberseimer, 2022). His ideas can be proven by Figure 9, where Hilberseimer illustrates his idea of high-rise buildings mixed with one-storey buildings, which are the modern Atriums. The surrounding areas are generous and have a lot of green spaces. The L-shaped Atrium can be seen in Figure 10; the grid structure of multiple Atriums resembles the idea of a woven fabric, as Strob describes it (Strob & Hilberseimer, 2022). This comparison can be understood as a never-ending grid structure for the masses to connect various social classes with one another.

"From 1938 Mies and Hilberseimer taught at the Illinois Institute of Technology in Chicago, where students were still producing courtyard houses in the Miesian manner in the late 1960s" (Macintosh, 1973, p. 35).

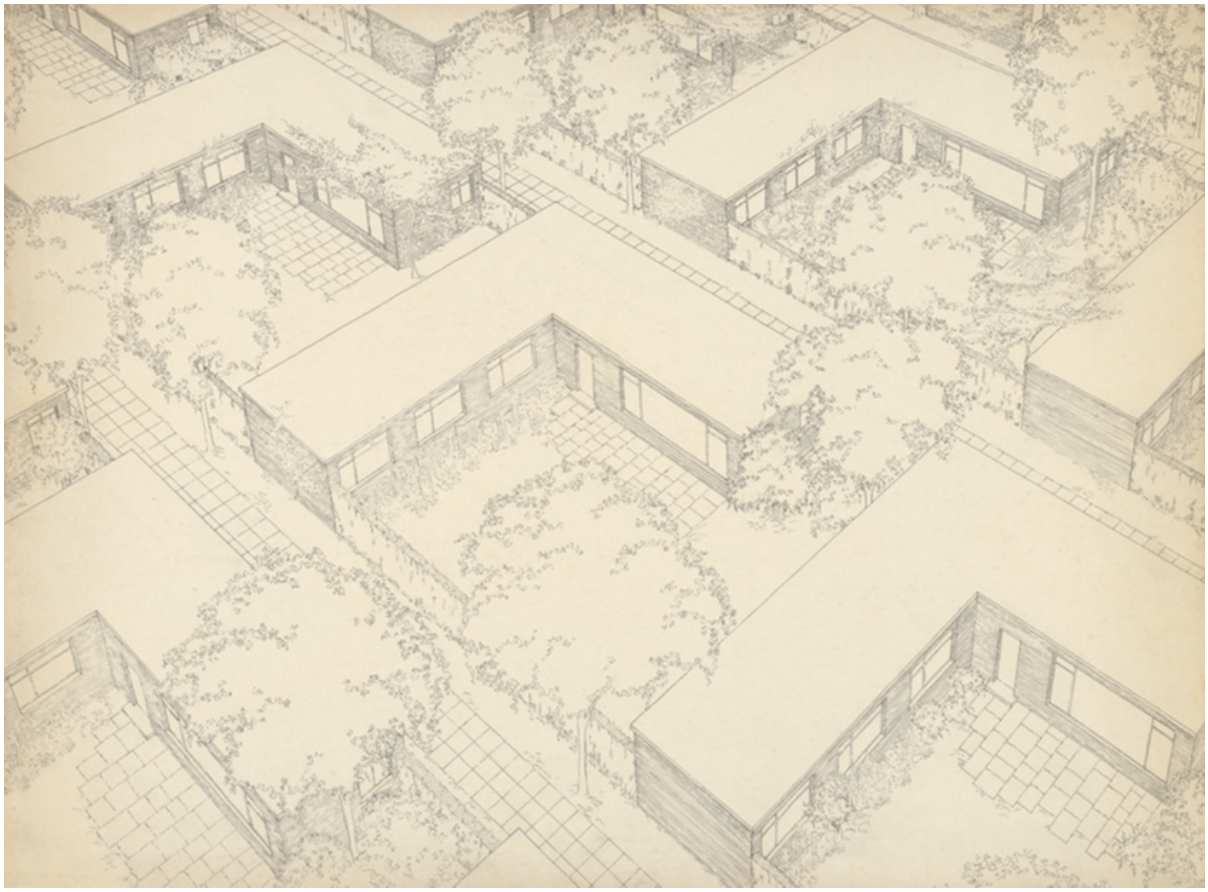


Figure 10: Settlement Units, Density Studies, View of L-Shaped Houses, From The Art Institute of Chicago, by Hilberseimer, L. K. , 1938-1948 (https://www.artic.edu/artworks/190957/settlement-units-density-studies-view-of-l-shaped-houses)

As Kim Do-sik [10] argues, these Low-Rise Houses were more of a theoretical testing field, which one can agree with since only a few types were built then. (Do-sik, Il-hyun & Won-joon, 2010, p. 1). Not only did Hilberseimer work on that Atrium, but other architects did, too. This is confirmed by Macintosh, who mentions that Häring serves the credit of the modern Atrium rather than Hilberseimer. However, not only did architects develop and reinterpret the Atrium, but some were also against this design choice. Gropius is one architect who criticised the mixed housing development. He believes that Atriums are not made for mass production, nor for higher densities or a stronger sense of community (Macintosh, 1973, pp. 27-36).

[10] Do-sik is an Associate Professor in the Department of Architecture at Ajou University in Korea (Do-sik , Il-hyun & Won-joon, 2010).

In the context of modern architecture, the Architect van der Rohe should be mentioned, who is one of the most influential architects of that time. He says:

„Order is more than organization. Organization is about purpose. Order provides a sense of meaning. "– Quote by:

Mies van der Rohe. Vortragsmanuskript (Lecture Manuscript). Chicago, ca. 1960. Library of Congress[11].

Van der Rohe developed the Atrium further, for example, regarding the open floorplan and the connection between inside and outside, as seen in his sketch in Figure 11[12]. The house Hubbe (Serra, n.d.) was one of his first designs, implementing an Atrium. As an invention, there is reason to believe that the curtain wall helped create that inside-outside interaction.

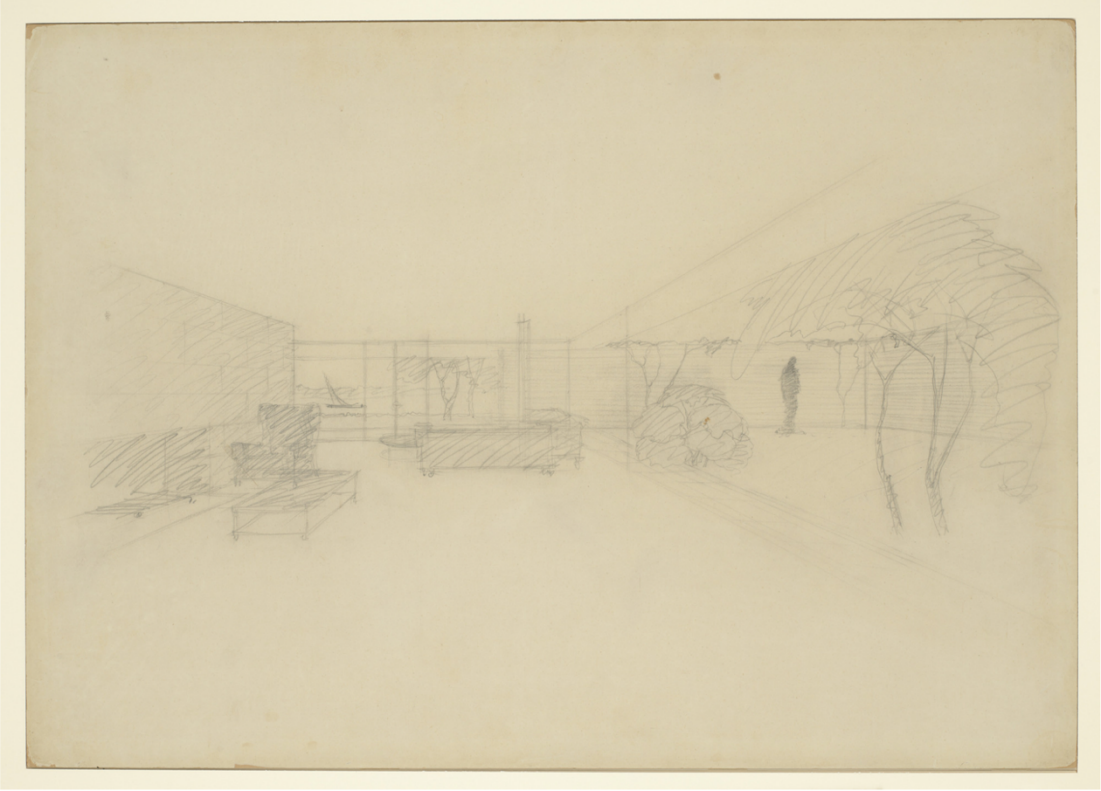


Figure 11: Connection between Inside and Outside from the House Hubbe. From MoMA, by Mies van der Rohe, L. , 1934&35 (https://www.moma.org/collection/works/744)

[11] *„Ordnung ist mehr als Organisation. Organisation ist Zwecksetzung. Ordnung dagegen Sinngebung"* (Hahn, et al., 1986, p. 25).

[12] "...within perimeter walls Mies was indeed able to articulate space, open it up and connect it to the landscape" (Coates, Regarding and remixing Mies`s courtyard houses, 2016, p. 199).

Do-sik states that the Atriums *"developed from the idea of the spatial composition for creating views"* (Do-sik, Il-hyun & Won-joon, 2010, p. 4). One can argue that he tried with the spatial quality to organise the typology[13]. While the other architects worked more on the fundamentals of this typology, such as the orientation and use in the urban context (Colombo, 2015, p. 124).

5.3 The idea of the modern Atrium

The Atrium is an introverted typology which opens towards a private garden. The idea behind the Atriums was to achieve better living conditions and improved economic efficiency, such as prefabrication standardisation (Strob & Hilberseimer, 2022). Hilberseimer showed fundamental advantages here. Firstly, the type can be adapted to Germany`s colder winter by opening the façade towards the sunny south side (Colombo, 2015, p. 124). Secondly, the L-shaped Atrium has the advantage that each room can be oriented towards the garden while offering privacy (Strob & Hilberseimer, 2022). Lastly, the architects experimented with varied materials, like wood or a flat roof, which made the construction cheap, ecological, and quicker to assemble (Bauhausbauen, n.d.). On the other hand, the typology stood for protection and security. The idea of an inward-looking living space was interpreted as the architecture of "inner Emigration." (Hahn et al., 1986, p. 19) [14]. Therefore, one could argue that the atrium was a shelter from the uncertain political situation during the Nazi Regime.

In comparison to the other typologies, the Atrium is ideal, as high-rise buildings are often criticised for their anonymity, and terraced houses show a lack of privacy. For this matter, the Atrium is a clear compromise, as Hans Weidinger[15] describes it (Weidinger, 2007, p. 10).

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[13] *"Mies further modernized the courtyard house by exploring ways to incorporate the recently popularized automobile into the domestic space"* (Colombo, 2015, p. 127).

"...within perimeter walls Mies was indeed able to articulate space, open it up and connect it to the landscape" (Coates, 2016, S. 199).

[14] *"innere Emigration"* (Hahn et al., 1986, p. 19).

[15] Hans Weidinger is an german Architect and in his book *"Atriumhäuser Hofhäuser neue Beispiele"*, he mentions several examples and explores the origin of the Atrium House (Weidinger, n.d.).

6 Atrium by Heinz Bienefeld

6.1 Why is it important to know Bienefeld?

During the research of the Atrium, the architect Bienefeld was discovered. He is not well known, but he should have a voice in this research. His Atriums do not follow the path of modernism, but he values the history of architecture. His projects show that his design approach is connected to history, where certain elements are reinterpreted into modern ideas. This discovery connects him, in a unique way, to both the Roman Atrium and the modern Atrium.

Bienefeld is a German architect who was born in Krefeld into a craftsman family in 1926 (Speidel & Legge, 1991). During his time, the architecture changed from this functional, rational, and universal design approach to something new. Heinrich Klotz, an architectural historian, argues that the CIAM in Otterlo in 1959 was a turning point in this architectural discourse. The functional car-friendly city is being called into question by Team X[16] (Klotz, 1984).

The architect Heinz Bienefeld was one of many German protagonists of the innovative approach in the 1960s (Voigt et al., 1999, p. 35). They were open to historical references; one of them orientated himself far back in time. He went back to Roman antiquity; his name was Bienefeld.

6.2 Influences of Bienefeld

Bienefeld followed his approach: *"Form is everything. Function is nothing"* (Heinz Bienefeld, handwritten entry in Sketchbook, undated)[17]. In his career, he focused on both

[16] Team X is a group of several European architects, for instance Aldo van Eyck, Peter and Alison Smithson. They developed due to the reason that they disagree with CIAMs modern, rational and functional approach. (Klotz, 1984)

"Die Forderung nach der Identität des Ortes…Nachbarschaftlichkeit…die Gegen soziale Anonymität und Einsamkeit gesetzt wurde" (Klotz, 1984, p. 108).

[17] "*Form ist alles. Funktion ist nichts*" (Voigt, et al., 1999, p. 11).

church buildings and residential buildings (Voigt et al., 1999). Wolfgang Voigt, author and architectural historian, argues that Bienefeld learned some lessons during his time under the Catholic church builders Dominikus Böhm[18] and Emil Steffann[19]. For instance, Steffann taught him the lessons about anonymity and materiality.

"Wood and stone will teach you what you cannot hear from the teacher" (Gisberth Hülsmann et al., *Emil Steffann*, exhibition catalogue. Academy of the North Rhine-Westphalia Chamber of Architects, Düsseldorf, 1981, p. 33)[20].

Already in this lesson and the architecture he built, one can argue that materiality in view of detailing and quality in terms of permanence is quite important to him (Speidel & Legge, 1991). Figure 12 shows how different elements come together, revealing his interest in detailing. He tries creative stacking methods to explore the potential of his main used material of brick, as seen in Figure 12.

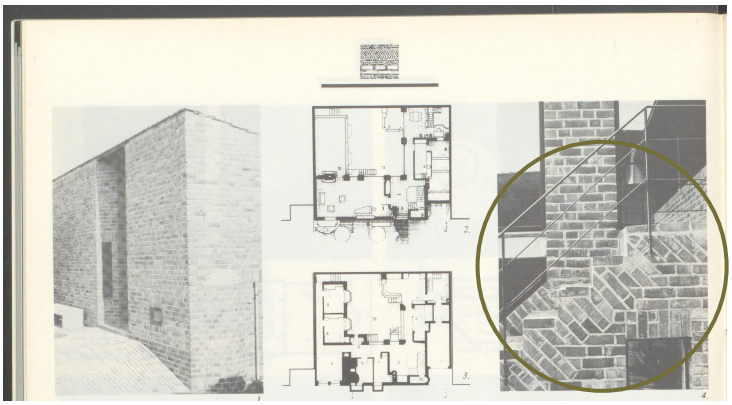


Figure 12: With Seam and Stone, From Arch+, by Bienefeld, 1986 (https://digibus.ub.uni-stuttgart.de/viewer/image/1571051867188_1986/)

Some of Bienefeld's architecture can be found around the city of Cologne, which is a city founded on a Roman past. What influence this direct connection had on Heinz Bienefeld's work can only be assumed. He saw architecture as the passing on knowledge and tradition[21].

[18] Böhm is a German architect who is known for his churches (Editors, n.d.).

[19] Steffann is known for his church buildings and monastery architecture (Helmenstein, 2021).

[20] "*Holz und Stein werden dich lehren, was du vom Lehrer nicht hören kannst"* (Hahn et al., 1986, p. 15).

He travelled to Italy to study the ancient buildings. He sketched and measured multiple buildings' proportions and examined the residential buildings in Pompeii (Voigt et al., 1999). Therefore, one can agree with the author Frank Druffner, who characterises Bienefeld as a "silent follower of Vitruvius" (Druffner, 2025, Title)[22].

Some scholars argue that Bienefeld was a postmodernist (Druffner, 2025, p. 2), but his designs suggest otherwise. His ideas have traces of classical structures and proportions, and he tried to develop these ideas further instead of only referencing them. Not only did he learn from Vitruvius, but also Palladio had an impression on him. (Meijer, 2015, p. 12). In Figure 13, the synthesis of historical references and modern ideas is clearly visible. Perhaps this can be evidence of his earlier idol of van der Rohe (Voigt et al., 1999, p. 38). In general, the typology of the Roman Domus is clearly visible as he used the ancient typology with design principles of the Roman Atrium. Furthermore, the idea of a spatial organiser (Speidel & Legge, 1991, p. 28), the Atrium, closely aligns with the previously mentioned Quote by van der Rohe. Additionally, Bienefeld's reinterpretation of the columns proves a classical idea into a modern design, which is shown in Figure 13. By looking at the detailed designed Atrium in terms of the geometry of the columns and choice of material, one could argue he has a respect for historical architecture and modern thinking.

[22] *"Vitruvs stiller Jünger."* (Druffner, 2025)



Figure 13: Holtermann House. From Ofhouses, 2020, December 13. (https://ofhouses.com/post/637361875675480064/854-heinz-bienefeld-holtermann-house)

6.3 Bienefeld and the Atrium

Bienefeld's Atrium designs served multiple solutions. Firstly, he chose the concept of the Atrium for practical reasons. On the one hand, he refers to the design, which firstly creates protection from external noise and distinguishes the building from the surrounding houses by creating a unique character. On the other hand, he designed with the "Direction of Light"[23], which was an important design element of Bienefeld (Voigt et al., 1999, p. 15)[24].

The most important reason for designing an Atrium is his preference for *"spatial organisation"* (Speidel & Legge, 1991, p. 28)[25]. Therefore, the Atrium was not just an architectural form but a tool for organising the adjacent rooms.

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[23] *„Lichtführung",* (Voigt et al., 1999, p. 17).

[24] *„Zwar verlängert das Atrium die dem Wetter ausgesetzten Fronten des Hauses…Aber zugleich schafft es Intimität und Schutz vor Lärm und Banalität der Nachbarschaft*" (Voigt, et al., 1999, p. 15).

[25] *"Raumornung*" (Speidel & Legge, 1991, p. 28).

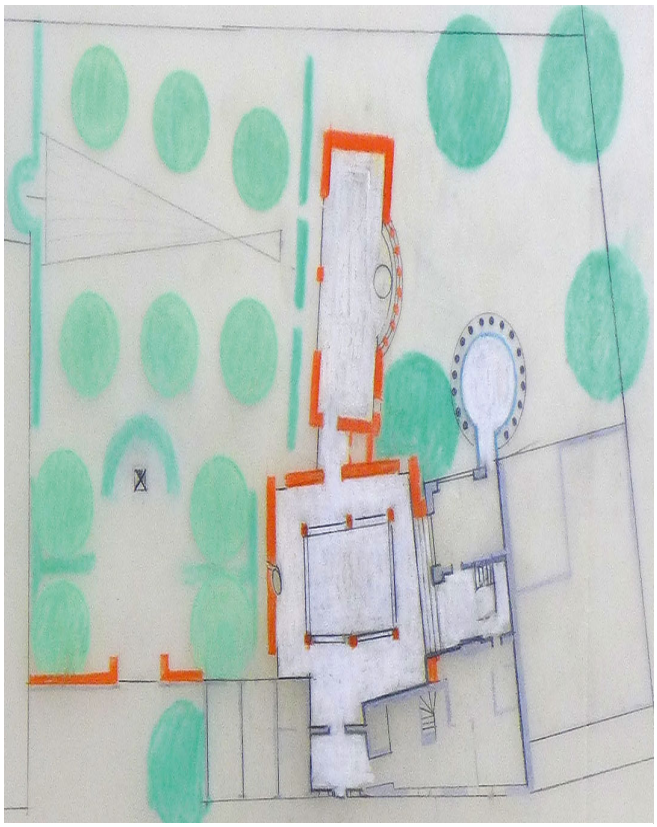


Figure 14: Sketch of House Kühnen. From Kulturstiftung, n.d. (https://www.kulturstiftung.de/vitruvs-stiller-juenger/)

He was focused on organisation and had the idea of a special space for his client. A closer look at his projects, like in Figures 13 & 16, reveals that he mainly builds detached houses for private clients. Not only that, but he also tries to develop the Atrium further by adapting to the climatic dilemma in Germany. He designs elements for the House, which can be closed or opened to use the Atrium in summer or winter (Figures 15 & 16). One could argue that Bienefeld uses an ancient typology, skillfully integrating it with modern principles and adapting it to the geographical location.



Figure 15: Heinz Bienefeld Kühnen House. From Hicarquitectura, 2024, December 23 (https://hicarquitectura.com/2024/12/heinz-bienefeld-kuhnen-house/)



Figure 16: Heinz Bienefeld Kühnen House. From Hicarquitectura, 2024, December 23 (https://hicarquitectura.com/2024/12/heinz-bienefeld-kuhnen-house/)

7 Discussion

This discussion compares the three above-mentioned Atrium types from different historical periods, providing a comparative analysis based on six different criteria. The criteria, presented in the table on the following page, are categorised according to Vitruvius's three fundamental principles, as discussed in Chapter 4. These six criteria are Social Aspect, Form, Atrium Owner, Material, Function and Layout.

Vitruv	Utilitas				Venustas	Firmitas
Criteria	**Social Aspect**	**Form**	**House Owner**	**Function**	**Layout**	**Material**
Roman Atrium	Representation	Water collection Atrium decoration	Wealthy Roman	Weather	Symmertry	Regional
Modern Atrium	Privat	Replication	for the Masses	Visual barrier	towards Nature	Wood
Atrium by Heinz Bienefeld	Privat	Unique	Individual	Noise barrier	spatial Organiser	Brick

Figure 17: Comparative table, From TU Delft, by Aull F. , 2025, April 13.

7.1 Social Aspect

In Roman antiquity, the Atrium served not only as a functional space but also as a representation space. This space accommodated salutations, weddings, funerals, and private activities. These functional aspects of both public and private are mentioned in Chapter 4. Nevertheless, given that the House owner was typically a wealthy Roman, one could argue that its primary purpose was centred around representation.

In the 20th century, the atrium reappeared, and its social aspects remained. Through reinterpretation, architects like Hilberseimer and van der Rohe reintroduced the Atrium to allow the local population to decide how and where they want to live, as discussed in Chapter 5. This idea was to create social diversity within the urban environment. Adjacent Atriums, which visually enclosed the space, contributed to the Atrium's privacy, as illustrated in Figure 10 & 11.

On the other hand, Bienefeld designed some detached houses, as seen in Figures 13 & 16; these Atriums can also be categorised as private spaces since detached houses were for a specific target group rather than a space for everyone.

7.2 Form

The inclusion of open space within the layout has been answered in different time periods for varied reasons.

In Roman Antiquity, the Form was driven by multiple factors. Firstly, as noted in Chapter 4, the Atrium was used to collect water independently, thereby reducing the reliance on public fountains. Furthermore, the Atrium served as a public purpose, with the decorative elements emphasising their wealth.

In the modern interpretation, the Atrium addressed challenges such as the housing shortage. This approach prioritised mass production, prefabrication and. The design must follow the Form Follows Function principle while being modular to allow a repetitive design which allows for a quick assembly (Chapter 5).

In contrast, Bienefeld had a different idea, emphasising more the design of an Atrium. He envisioned the Atrium as a unique design that protects itself from the uninspiring urban context, as highlighted in Chapter 6.

7.3 Atrium Owner

In the three different periods, the client's preferences change dramatically, reflecting their evolving needs.

During Roman times, the Atrium was a prestige design which not everyone could afford. Therefore, the wealthy Romans, the Elite, used the central space to display their wealth. In Chapter 4, the researcher Grahame went as far as to argue that it was common for others to copy that typology.

In contrast to the modern Atrium, the target group were the broader public rather than emphasising social hierarchy. It was not about social status, but its primary objective was to provide better living conditions for society. Therefore, Hilberseimer and van der Rohe responded to a broader, more democratic audience. This approach aligned with the concept of social diversity, as mentioned in Chapter 5.

Conversely, Bienefeld cannot easily be assigned to either one of the two. His designs are primarily for the middle class, who could afford a detached House designed by an architect. For this reason, these projects were not intended for universal use but rather for clients desiring to distinguish themselves from the masses (Chapter 6).

7.4 Material

The different periods chose various kinds of materials, which have a structural and ornamental purpose.

The structural materials in Roman antiquity predominantly used regional materials, as mentioned in Chapter 4. These can also be used to decorate the Atrium or to build the load-bearing structure, reflecting the interaction between functionality and aesthetics.

Innovations have been significant in modern times, and the Atrium was the experimental typology for that. During this period, experiments were conducted with concrete, steel, and glass. Notably, Hilberseimer experimented with wood as its being ecological and affordable, as elaborated in Chapter 5.

In contrast, Bienefeld, placed great emphasis on artisanry and precision. He stacked the Brickwork to create different patterns within the Wall, as seen in Figure 12. The ending of the elements was especially important to him. His fascination with Material can be argued

to come from his craftsman's family. His grandfather and uncle were bricklayers, and his father was a plasterer (Meijer, 2015).

7.5 Function

The Romans used their Atrium either for public or private purposes. However, the functional purpose of the Atrium was to protect the owner. For instance, from unwanted visitors and, of course, from the environmental conditions. Additionally, the Atrium is open to the sky, it can provide the adjacent rooms with light and air. This can cool the multiple façades of the Atrium and additionally provide better light conditions, as explored in Chapter 4.

In modernity, however, architects like Hilberseimer and van der Rohe reintroduced it to create an Atrium for privacy purposes. It was characterized as a space for "inner emigration" (Hahn et al., 1986, p. 19), which became particularly important during the Nazi Regime. Thus, the Atrium created a visual barrier away from the neighbours and the street (Chapter 5).

For Bienefeld, the Atrium had two functions, as outlined in Chapter 6. Primary, it improved the light distribution. Secondly, it functioned as a barrier to external noise disturbance. These two conditions were instrumental for improved lighting conditions and as a noise barrier from unwanted external noise pollution (Voigt et al., 1999, p. 15).

7.6 Layout

In Roman Antiquity, the Atrium was used as the central organising element around which adjacent rooms were arranged. The central axis allowed symmetry and functioned as the main movement within the Roman Domus, as seen in Figure 8.

Since the idea for the German Atrium was to connect the urban areas with nature, the Atrium was one solution to provide green spaces within the city. These green spaces formed the heart of the layout, with its surrounding rooms having a visual connection to that landscape (see Chapter 5).

The Architect Bienefeld used the Atrium as a spatial anchor to organise the rooms around it. This organisation was to improve its layouts, as seen in Figure 14.

7.7 Summary

The Atrium has been used for various purposes and ideas, demonstrating remarkable flexibility in both form and concept. While the Atrium served as a symbol of representation and social status in antiquity.

However, in modern times, its function has shifted in aspects such as mass production, nature within the city and the automobile. Architects like van der Rohe tried to include the car in his Atrium designs, emphasising the shifting needs. Bienefeld, on the other hand, drew from both approaches and developed his own architectural language. For him, crafting and the unique character are important.

Thus, it can be argued that each architect used the same typology while reinterpreting it to their individual idea.

8 Conclusion

One is often surrounded by historical context, for example the city of Nuremberg, with different historical layers characterizing it. The layers of Nuremberg include the Middle Ages and the Nazi Regime. To understand history, one needs to engage with it. Bienefeld's work can be seen as a symbolic engagement with the past.

The fact that a typology such as the Atrium is purposely used across generations and continents shows its timelessness. Each time proves that the Atrium is a resilient and adaptable architectural typology. Not to forget that this research only focuses on residential buildings and excludes other uses, such as monasteries or universities. These add multiple functions to the Atrium and additionally highlight its flexibility.

The Atrium is an invention that was particularly useful in hot climates. Through the lens of Vitruvius, one can understand how functional the Atrium is in ancient and modern times. Of course, history should not be a model to copy but a source of inspiration. Everything that has already been built belongs to the past, but it is possible to learn from it and, for example, avoid mistakes or develop solutions further, like the Atrium.

This approach is like a toolbox; the right tool can be found for every task. Many architectural ideas have already been realised and do not need to be reinvented. This research used the tool of the Atrium, where the researcher argued multiple solutions over different periods. But one element stays the same: the Atrium is a sheltered space open to the sky.

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