The Library
Architectural Analysis II

Dipl.-Ing. H. Apelt
Dipl.-Ing. H.H. Yegenoglu
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The method of the typomorphological analysis, which is used in the course Architectural Analysis II, combines different analytic approaches in order to understand and describe architecture in the most complete possible way. While the British approach focuses on the relationship between plot and object, the Italian approach concentrates on history and building type, the French approach on space and power. In combining these very different concerns (form - type - scale - time - social structures) the typomorphological analysis used in the course aims to develop an alternative method in understanding architecture within its spatial, historical and societal context. During the last years the tool of the drawing by which to exercise the analysis was perfected suitting domestic building types. For the first time now, the course deals with public buildings, which does not only pose new aspects of the analysis but also makes it necessary to adapt and further refine the method of drawing the typomorphological analysis.

In the current edition of the course we study the architecture of libraries. As one of the oldest public building types the library is still, or yet again (much to surprise for those who predicted the end of the printed medium) a very vital and meaningful building type that seems to adapt to different spatial and cultural conditions. We selected ten buildings in different western countries which were constructed within the past ninety years. In drawing, text and scale-model the students investigate key questions such as: What are the leading spatial themes of the building? What are the general spatial themes that seem to be consistent in the development of a building type? In what way does the public character of the building become explicit? What is the relationship between presentation and representation? Does the development of the media influence the design approach and with it the development of the building type? Parallel to the study of the architectural objects a series of general architectonic questions are investigated such as: the role of shear, the meaning of transparency, the nature of proportion and the experience of sequence. The final essay explores the relationship between the development of the printed medium and the architectonic space.
03. Transparency
Glass architecture: a chronology

The first applications of transparency in the building industry date from the nineteenth century and were initially named ‘glass architecture’. The precursors of glass architecture were the early 19th-century passages and shopping galleries that appeared in the Parisian neighborhood of the Grand Boulevards. At that time Paris was considered to be the capital of residence of the world which enabled the development of those luxurious passages and galleries. Initially the material was applied for functional purposes, to allow the public to commerce in an excellent condition. The proponents of those passages is the Galerie du Palais Royal (Fig. 2) that was built in 1786. This structure was a large glass canopy that created a covered area with stores and opened up to one side. The oldest real passage, indoor shops on both sides, was the Passage du Caire in 1799 (Fig. 3).

Due to technical progress in the 19th and 20th century, materials like cast iron, wrought iron and cast plate glass became available for building purposes and consequently enabled innovative transparent applications in architecture. The first extensive application of large amounts of glass is seen in greenhouses. Also in this case the application was purely functional considering the thermal advantages and the possibilities to showcase exotic and exotilish vegetation; at the time evidence of great wealth. One of the earliest examples of the typology is the Palm House in the Botanic Gardens in Kew (1848) (Fig. 4). More famous is the Palm House in the Royal Botanic Gardens in Kew (1848) that showed the first large-scale structural use of glass and created the ‘space-time concept’. Gropius’ Bauhaus building from 1926 is described by Giedion as the “first building of its kind which was a complete crystallization of the new space concept” and consequently shows similar overlapping spatial planes when compared to the aforementioned cubist painting.

The aforementioned theories that are reflected on the term 'space-time concept' will be discussed more elaboratively in this essay by providing a chronological development of transparency in relation to architectures, and consequently provides a strong foundation for the analysis of two distinct Shrinkage. The Vitrine Library (1935) and Reinica Rare Book and Manuscript Library (1941) are two different examples that are described by Giedion as the “only large building of its kind which was a complete crystallization of the new space concept” and consequently shows similar overlapping spatial planes when compared to the aforementioned cubist painting.

Fig. 1. Architectural Analysis, Theo van Doesburg(1922)
Fig. 2. Galerie du Palais Royal, Paris (1786)
Fig. 3. Passage du Caire (1799)
Fig. 4. Palm House Botanic Gardens, Kew (1848)
Fig. 5. Crystal Palace, Joseph Paxton (1851)
Durchdringung and the Space-Time Concept: The German term ‘Durchdringung’, literally meaning ‘interpenetration’, originates from Hungarian painter and photographer László Moholy-Nagy. His theoretical work ‘The New Vision in Architecture’ (1929) had a major influence on new transparent space concepts, and was precisely on the concept of Durchdringung. Giedion used Moholy-Nagy’s Durchdringung as a key expression to describe the qualities of the new architectures and did this in three different contexts, of which the most important would be the description of spatial configurations. Some examples would be spaces that are created by the penetration of volume by volume, smaller ones, the spatial effects caused by partial absence of floor and ceiling slab as it would be in a Moholy-Nagy painting, where partially transparent formal elements hover between floor and ceiling slab, and that also enabled dynamics, focusing on the movement of objects and attempting it in painting.14 These features were brought together with a plentiful of glass - a material that according to Giedion15 was primarily used because of its dematerializing properties and which had the effect of making interior and exterior spaces appear to interpenetrate, creating the sense of a movement in space that seems to be frozen.16

Durchdringung interpenetrates as an interpenetration of volume and the total connection of interior and exterior. The Space-Time Concept considers transparency as the continuity of the experience of the buildings spatial composition which allows an uninterrupted coexistence of internal and exterior spaces. These two themes where the metrics for Rowe and Shumsky to make an exploration translations. They interpreted the concepts and evolved them into the Literal and Phenomenal transparency. The dynamics of the building are described as follows: “The eye cannot see this building complex, it is necessary to go around the building to view all sides... This gives the same impression as the glass staircases in the exhibition building by Gropius from 1914-1915 in a movement in space that is used and put down”.17

Literal and Phenomenal Transparency: Cohn Rowe and Robert Shumsky created the theory of Transparency in his essay Transparency - Literary and Phenomenal. Rowe was an architectural historian, critic and theorist. Shumsky was a painter and art teacher. Their approach to transparency seems to be heavily influenced by Sigfried Giedion’s Space-time concept. Rowe and Shumsky test new methods for teaching and developing architectural design skills. Through their explorations of the historical context of modern art and architecture they identified and elaborated on the concept of transparency as a fundamental principle of spatial organization, beyond the curtain wall. Their essay provided the theoretical and didactic foundation, exemplified and illustrated by Le Corbusier’s villa at Godarz and Wright’s Broadacre City in Dornum.18

Rowe and Shumsky establish a basic distinction in the transparencies phenomenon: “transparency may be an inherent quality of substance, as in a glass curtain wall, or it may be an inherent quality of organization. For this reason, one can distinguish between a literal and a phenomenal transparency.” Their theorizing is that literal transparency seems to derive from two sources whereas phenomenal can be designated to one specific source from cubist painting and from what is usually designated as the machinic aesthetic. Phenomenal transparency probably derives from cubist painting alone and a cubist canvas of around 1911-1912 would serve to illustrate the presence of both colors, or kinds, of the transparent.19

Rowe does not define the two kinds of transparency, but after analyzing several cubist paintings he acknowledges and describes the difference between the two terms: “Literal transparency tends to be associated with the transeptal effect of a transeptal object in a deep, monumental space. Phenomenal transparency seems to be found when objects are freely displayed in a shallow, rectangular space.” In plain words, Literal transparency refers to transparent properties of materials like glass, the condition of non-epiphenomenal, whereas phenomenal transparency is the result of spatial ordering. It occurs at the simultaneous perception of different spatial locations within the same space, like in an optical illusion. Just as in Cubist paintings, the observer defines what is to be seen.20

In general, architectural critics usually acknowledge associate transparency with transparency of materials. Rowe argues that literal transparency can easily be applied in architecture, but that phenomenal transparency is harder to achieve. According to Rowe the Bauhaus, his example for literal transparency, contains a succession of spaces that lacks a coherency of spatial division. He defined the literal transparency from their beliefs he is confident transparency doesn’t render here: “They may enjoy the situation of looking through a glass wall and thus perhaps be able to see the interior and the interior of the building simultaneously, but they will also be conscious of few of that superficial sensations which derive from phenomenal transparency”. Thus Rowe has sought to find the spatial relations in which phenomenal transparency becomes possible. To define these relations he makes an analysis of Le Corbusier’s entry for the competition for the Palace of the League of Nations in Geneva in 1927. To experience the layers of phenomenal transparency the observer has to make a ‘prescriptive architecture’ through the complex. These stratifications, devised by means of which spaces become constructed, organized, and articulated, are the essence of that phenomenal transparency which has been noted as characteristic of the central post-cubistic traditions. They have never been noted as characteristics of the buildings of Le Corbusier and Gropius. They merge the concept of Durchdringung, which seems to be the fundamental to a new architecture theory.
to inspire new architectural developments and realize cultural change. Colin Rowe notes upon Giedion and finally summarizes the development of transparency in the 20th century in two basic principles called Literal and Phenomenal transparency, in his work “Transparency”. In doing so he is referring to the original ideas of Siegfried Giedion described in his book “Space, Time and Architecture”. Now, 50 years after these developments, we are still referring to and building upon these same principles.

Social and Cultural Context of Transparency

According to Hoyers, Durchdringung has many meanings associated with the word and as a result a solution is created between the new concept and the social environment: “Durchdringung stands for the weakening of historical models on all levels – social as well as architectural. Architecture is no longer concerned with representative façades; instead, its aim is to design new relationships based on structural logic.”

Giedion states that there is a gap between thought and feeling in the present state of culture that can be associated with the word and as a result a relation is created between the new concept and the social environment. The concept of transparency is introduced concepts ‘Durchdringung’ and ‘Space-Time’, which originated from the social ideal of alienation of the population. Yale University is a private institution but it can be regarded as the capitalist counterpart. The Beinecke Library is founded to manage a large collection of rare books and manuscripts. The building is not open to the public, only students and university employees have access to the collection.

The social aspects of transparency in architecture are explored by Walter Benjamin in the 30s of the 20th century. “Benjamin continued that this architecture of steel and glass fulfills the promise that is inherent in modern society, because it is an aesthetic expression of the ‘present’ that is typical of this civilization, thus foreshadowing the realization of a transparent and clashless society.”

“Transparency’ in Aalto’s Vipuri Library and Bauhaus’s Brunhilde Library

The spatial concept of Aalto’s Vipuri library and Bauhaus’s Brunhilde Library is based on the idea that modernity is determined by the opposition between capitalist civilization and its cultural, modernist counterpart. “This discussion of modernity is inseparable bound up with the problem of the relation between capitalist civilization and modernist culture”.

Architects speculate in both realms: it is a cultural activity, but it can be realized only within the world of power and money.”

The contradiction between capitalist and culture plays a role in the founding of these two libraries that were subjected to our analysis. The Vipuri Library was created as a public institution that was accessible to everyone. Obviously the intention was the emancipation of the citizens, which originated from the socialist ideal of alienation of the population. Yale University is a private institution and may be regarded as the capitalist counterpart. The Beinecke Library is founded to manage a large collection of rare books and manuscripts. The building is not open to the public, only students and university employees have access to the collection.

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Conclusion

The notion of transparency is extensively manifested by theorists like Giedion and Slutsky. The formerly introduced concepts ‘Durchdringung’ and ‘Space-Time’, are used by the latter to define two more or less similar expressions. ‘Transparency’ as literal transparency is a kind of an analogy of the visual aspects of Giedion’s ‘Durchdringung’ and Slutsky’s phenominal transparency is strongly related to Giedion’s Space-Time-Concept. Both authors used the same examples to explain their ideas. The cabinet paintings, Gropius’s Bauhaus building and Lu-Corob’s design for the Palace for the League of Nations. As Giedion wrote in his book 15 years before Slutsky, it’s evident that Giedion is the key player in the architectural discourse of transparency. The typology of libraries has evolved over centuries and thousands of libraries are built over the world according to this type. However, due to technical changes, knowledge is no longer printed on paper but stored on digital memory devices, and therefore books will be replaced by computer science in the near future. It is obvious that this compelling development induces a radical change in the present development of the library typology.
Books


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Viipuri Library, Alvar Aalto  
Typo-morphological analysis
Public building types: The library

1. Project description

1.01 General information

The Finnish architect Alvar Aalto won the competition for the Viipuri Library design in 1927 with a strongly classical proposal. A delay in the design and building process was caused by an economic recession. During his design he had several different approaches due to the changing architectural context. It was, at the time, a transitional moment in architecture in establishing a new architectural style, International Modernism. Eventually, Aalto turned the building into a representation of this new style International Modernism in 1933.

The library has undergone a varied history in which its ownership and way of use drastically changed. The changes of ownership were caused by the 2nd World War which redivided the land and made Viipuri part of the Soviet Union instead of the former Finland. A differing political system and adjusting public morals and values translated into a overall neglect and abandonment of the building. It got stripped and repainted, in doing so losing its original elegance and charm. Nowadays it is undergoing a renovational process to reestablish this character.

1.02 Axonometric projection

As can be seen clearly in the axonometric drawing, the library consists of two rectangular volumes, that gain different architectural expressions and functions within the total composition. The higher volume contains the reading rooms and book storage, and has a strong introverted character.

Fig. 1 Lecture room
Fig. 2 Main entrance
Fig. 3 Main library hall

1.03 Viipuri Library & Beinecke Library
The Viipuri Library building is located in Vyborg, originally located in eastern Finland, though as a result of World War II, the city was ceded to the Soviet Union in 1944. The library forms the main part of the path that makes a swing in the grid structure of the city. This park follows the strong city grid and connects north and south. After WWII, the building was abandoned for a decade and nowadays the building is being renovated gradually.
2. Context

2.03 Morphology

The structure of the different components that are added to each other to create the urban pattern, is shown on this page. For this purpose, a subdivision is made into ‘street pattern’, ‘site pattern’, and ‘building pattern’, of which the street and site pattern both show clear orthogonal grid. Aalto designed his building, as all other buildings, on these city axes and in this way embedded it into the park and city pattern.

2.04 Relation

The relation map clearly shows the way Aalto decided to follow the present plot and street grid. The building was placed in the existing park. The chosen position for the library building can be seen as an important one in the urban context.

For the building volume, it is assumable that Aalto directly related the library to the neighbor church. The centrelines and different radiuses intersect the library and church at fixed positions; the entrance at the north façade refers to center point of the church, whereas the main staircase and elevator shaft - the heart of the library - refer to the main church entrance.

Currently this relation vanished, since the church has been demolished in the period after WWII by the new Russian ‘owners’.

City plan | S 1:5000

Site plan | S 1:2000

Building pattern | S 1:10000

Street pattern | S 1:10000

Site pattern | S 1:10000
2. Context

2.05 Access

The building plot contains different directions of approaching, due to organically organized routes through the park. Consequently, different entrances were created by Aalto.

3. Exterior

3.01 Volume
Aalto designed four entrances, placed on every side of the building. The main entrance connects to the main spaces of the library, which are the entrance hall with wardrobe and toilet, the lecture rooms on ground floor, and the reading and lending rooms on higher floors. Two other public entrances connect to the children’s library and a book shop, which is placed alongside the street. A fourth entrance is considered as a private entrance that connects to the administration rooms on the first floor, and is also used as a fire exit.

For all entrances Aalto designed an in-between space between inside and outside, to provide a smooth transition. This will be explained in depth further on.

3.02 Access

Aalto clearly distinguishes between primary and secondary entrances; not only programmatic but also architecturally. They form the point of entering the building at which a psychological effect begins to be produced; visitors are guided through an entrance zone, instead of merely entering another space through a door.

While the children’s and main public entrance are both aligned on the horizontal axis, they do not connect. Also primary and secondary spaces and routing are clearly separated.
3. Exterior

3.04.3 Façade composition | Symmetry

The symmetrical elements of the façade seem to originate from the strong axes on which the building was designed. First we can see that the lower rectilinear volume programmatically and architecturally ends at the horizontal axis. From the outside the remaining space which contains the staircase is separated by making it completely transparent. In this way the façade as we see in the upper elevation on the right is entirely arranged along with the different transparent surfaces.

For the main volume of the library the boxes that are shifted introduce a symmetry in the façade that is amplified by attaching a ‘box-like’ entrance. Also in other direction there seems to be a hidden symmetry.

The aforementioned symmetries have an equal ‘weight’ on both sides of the centrally placed axis.

3.04.4 Façade composition | Depth

Due to the use of different volumes, Aalto created different layers of surfaces. Consequently, the building looks very different when approached and viewed from different directions.

The resulting depth of the building is clearly read by people that approach the building and enhances the different entrances that are formed by the smallest volumes, though the nearest surface.
3. Exterior

3.04.5 Façade composition | Transparency

The drawings below show the transparent elements in the façade of the library, whereas Aalto designed no windows in the façade of the main library hall, the lecture room, and children’s library were made extremely transparent to the outside. With a long glass wall in the lecture room, he attempted to emphasize the link with the park. The windows in the children’s library are placed on such a height that both children and adults are not able to see the horizon when looking through; they only show the surrounding sky.

As explained in subtopic 3.04.3, one of the walls of the stairwell of the library was made almost entirely out of glass, allowing transparency in a literal way and concerning the understanding of the design.

3.05 Façade materials

The main material that is used in the façade is white plaster. Covering almost all of the building surfaces, it strengthens the approachers’ awareness of different materials. For instance, the main entrance is cladded with natural stone and in this way gets more attention and a special character. The windows of the building are metal-framed and designed as refined as possible.

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3. Exterior

3.06 Ornaments

If we consider ornament as a decoration that is added to embellish something, the main entrance should be considered to be an ornament. It is clad with natural stone and in this way gets more attention and a special character, though has no structural meaning.

Another clear example of an ornament would be the ventilation shafts that Aalto embedded in the composition of the façade, placed alongside the main street.

4. Interior

4.01.1 Routing axes

Aalto organized the library clearly along two orthogonal and perpendicular axes. The library hall program, which is divided by changes in level and curtains into a lending and reading room, is organized around the intersection pivot of the axes, the pivot. The vertical service core links the spaces internally and penetrates every level.

Rotated around the pivot on those levels, Aalto designed different routing areas that physically connect spaces. The most obvious axis would be the space between the main entrance and children’s library entrance.
4. Interior

4.01.2 Routing

Aalto clearly distinguishes between primary and secondary entrances, not only programmatic but also architecturally. While the children’s and main public entrance are both aligned on the north-south axis, they do not connect. Instead, the main circulation path turns sharply west underneath the main book room and rises through a sunken reading well into the skylit space. Also primary and secondary spaces and routing are clearly separated.

4.02.3 Public / Private

Aalto made a clear distinction between public and private characterized spaces. An important element that enables this separation would be the central cylindrical axis, which is connected to both the book storage at basement level and the main reading hall.

The private rooms are only accessible for employees, whereas the public rooms are intended to be used only by visitors. From the drawings below it becomes clear that he used strong thresholds between both types of rooms.
4. Interior

4.02 Logistics

The axonometric drawing shows the three entrances through which books pass when being delivered or returned. Internally, the aforementioned pivot with its stairs and elevator enables the connection between book storage and lending or reading rooms. The children's library too is connected to the storage room through a door that can only be used by employees.

Distribution of books

Structural elements

4.03 Construction

The roof of the auditorium, with its span of 17.6 meters, is of reinforced concrete and is supported by steel columns. A total of 57 roof windows of a diameter of 1.8 meters illuminate the library space. Each of these windows is a hollowed out concrete cone, on which a piece of unframed glass rests.

The walls of the higher library wing are traditional 75-cm solid brick wall. All floors are concrete slabs. Thanks to massive carrying walls free spans are possible in the public functions.
4. Interior

4.04 Use of spaces

The main hall of the library should be mentioned as the most crucial part of the building, to which different additional spaces are attached. This upper level of the main volume supports spaces for searching, reading, and studying. The lower level is more divided into smaller areas with additional functions, such as storing and meeting.

The rectilinear volume that is attached to the main one, gives rooms to administration at first level and listening, meeting, storing, refreshing on the ground floor.

4.05 Types of spaces

The main hall of the library is clearly the most crucial part of the building, to which different additional spaces are attached and interpenetrated. This upper level of the main volume supports spaces for searching, reading, and studying. The lower level is more divided into smaller areas with additional functions, such as storing and meeting.
4. Interior

4.06 Sequences of spaces | 2d

The strong interpenetration of the volumes and spaces has a strong influence in the perception of it. The approach of the building is already dividing the different streams of visitors. To make a more abstracted way of the conception of the surrounding space the following drawing was made. It consists of the sequence of the sightlines in sections while approaching the final destination (a room or function in the building). Several different characteristics can be analyzed in this graph such as: the space in relation to a person, the time of every section, the time to reach the destination, the sequence of scales of spaces etc. All these aspects are important characteristics in buildings but hard to combine in a single drawing. But when combined they give a quick overview of the atmosphere of approach.

Sequences of spaces | 2d

Sections | S 1:1000

4.06 Sequences of spaces | 2d

The urban approach is through a residential area along to a public parc. The second fase is still through a high residential area. The third is through a large public parc. The transparency of this space suit the final destination and is an addition to the atmosphere of the building.

Fourth, the first decisive moment in the routing to approach the building. Either one goes towards the childrens library, the adult library or the shop.

Childrens Library
Five, through a public and open parc.
Six the physical entry, means total enclosure.
Seven, one passes through a somewhat larger space.
Eight, Full overview of the end function and decision moment to go either to the lending library or the reading room.

Reading room
Nine, the reading rooms, which offers outward views.

Lending Library
Nine, the lending library, which offers outward views.

Shop
Five, one passes a public and open parc.
Six, A door to enter the building.
Seven, The function has been reached and also delivers outward views.

Adults Library
Five, six, and seven, by passing through a parc and moving up slightly one remains views over the building and starts approaching.
Eight, the pathway narrows down and allows the penetration of the facade.

Nine, decision to go either to the Lending and Reading room or the lecture hall (while remaining outward views)

Lecture Hall
Ten, passing a normal internally focused corridor.
Eleven, The lecture hall has been reached and outward views remain possible.

Lending and Reading room (closed circuit)
Ten, small and narrow stairs going upward.
Eleven, corridor offers either lending or reading room entrance.

Reading room
Twelve, the reading room opens up and shows a large scale space.
Thirteen, upward narrow stairs offer possibility to go to Lending library.

Lending library
Thirteen, narrow corridor without outward views.
Thirteen, upward narrow stairs connects with internenous floor.
Fourteen, in between floor which offers views over concert space.
Fifteen, upward stairs allow to connection with the lending library.

Overall it is hard to define individual volumes in the continuous space. For additional concluding remarks, in the conculsional chapter the Viipuri and Beinecke library are compared.
Public building types: The library
4. Interior

4.07 Threshold between spaces

Aalto designed the building entrances in such a way that visitors are guided through an entrance zone, instead of merely entering another space through a door. In this way the choreography of different rooms should be considered in a continuous journey. Furthermore, since he interpenetrated different volumes instead of creating an excessive agglomeration, smooth transition zones are created in a natural way. The clearest example would be the transition between entrance hall, wardrobe and lecture room.

Although the staircase to the administration office should be considered as a hard transition zone, it is made transparent both when approaching from the outside as when entering the entrance hall. When standing in the entrance hall, visitor will instinctively proceed to enter the main library hall by going up the stairs, due to its strong inviting character.

The section through the main library space shows that different levels with different purposes float into each other and form a smooth transition between spaces.

4.08 Order of spaces

The library has a repetition grid structure (A), on the second floor is this different. The walls of the smaller rooms diverge from this grid, a rhythm arises. On the first floor the big volume is divided in two exactly the same surfaces, with the main staircases as center point.
4. Interior

4.09 Spatial hierarchy

Aalto made a clear distinction between served rooms and serving rooms. The axes mentioned in the routing analysis are also recognizable in the way the served rooms and serving rooms work. The hybrid space on the second level functions more or less as an in-between and in this way gets an ambiguous character. In this room books are stored, but there are also tables where people can read a book.

4.10 Daylight access

Natural lighting is an important concern when designing libraries. Allowing only indirect illumination ensures that the library books are not damaged and visitors are not disturbed when reading and studying. The lighting of the library space seems to be anachronistic in the Finnish climate. Consequently, the daylight access in the main library space was designed in such a way, using conical penetrations, that dispense the light, that shadowless and diffused illumination was provided for the readers. A total of 57 roof windows of a diameter of 1.8 metres illuminate the library space.

The large windows in the upper parts of the children’s library’s walls let in daylight, but provide no direct view to the exterior surroundings. In this way it has only an illumination purpose.

The flow through the building is also held by contrasting dark and bright spaces; e.g., the transition between the entrance area and the lecture room.
4. Interior

4.10.1 Reverberation time and cladding

To determine the reverb time in the different rooms of the library, we used the formula that was introduced by Wallace Clement Sabine: $T_{60} = \frac{V}{6A}$. When taking into account the reverb time within the most essential spaces of the library, it can be said that spaces for presentation purposes were made less reverberant compared to spaces for reading and studying.

Since the reading room is in general a quite room, Aalto did not directly consider the acoustics of this room. Own calculations showed us that the reverb time is about two to three seconds.

Opposed to this room, the lecture room is an excellent example of how to deal with acoustics within a space that refers to its use. In the long, rectangular lecture room Aalto created an acoustically perfect space for lectures and discussions, established by a curved acoustic ceiling that was made out of narrow strips of pine wood. This ceiling enables a reverb time in the room of half a second to one second. From the floor behind the speaker, the pine wood strips sweep upward and continue to curve in an irrational way along the glass wall.

4.11 Interior elements

Interesting and characteristic for Aalto’s architecture is that he not only designed the building, though also designed the furniture in a detailed way. The used wood was not only suitable for production in big numbers, though at the same time pleasing to touch.

In his design for the lecture room, Aalto placed armchairs (1) in the front of the room and tree-legged stools (3) to the rear. This encouraged people to sit as near the front as possible.

Permanent furniture

Temporary furniture
4. Interior

4.1.2 Architectonic details

The different rooms of library house are characterized by a variety of their detailed finish. Examples for this are the frame-like structure to open the entrance doors, the moulded wooden handrail along the stairs, the acoustic wooden ceiling in the lecture rooms, and the circular roof windows in the reading room. In the drawing below the moulded handrail and its precisely detailed section are shown.
Aalto organized the library clearly along two orthogonal and perpendicular axes. The library hall program, which is divided by changes in level and curtains into a lending and reading room, is organized around the intersection point of the axes, the pivot. The vertical service core links the spaces internally and penetrates every level.

5.2 Volumes and entrance hierarchy

An interesting way of designing is how Aalto not just combined different rooms into one building, ‘excessive agglomeration’, though uses volumes which are penetrated in such a way that different spaces are created, ‘informed simplicity’. In this way, Aalto created a fluidity of the building’s spaces. The different parts penetrate one another as volumes of different size and height, and the internal spaces open both vertically and horizontally in a clear way.

This low, northern block is distinctly offset to the west from the major mass to the south, yet both are linked by a shared axis of circulation.

While the children’s entrance and the main public entrance are both aligned on this north-south axis, they do not connect. Instead, the main circulation path turns sharply west underneath the main book room and rises through a sunken reading well into the skylit space. The vertical axis of the service core links the spaces internally; wrapping around a book elevator, it penetrates every level. At the top of this core is the control desk for the main reading space; the base of the core serves the basement stack area.

Excessive agglomeration
12 elements required to create 12 spaces

Entrance hierarchy
4 elements combined to create 12 spaces

Informed simplicity
12 elements required to create 12 spaces
5. Conclusive drawings

5.3 'Gesamtkunstwerk'

A strong characteristic of this particular design by Aalto is the way he designed it. Since he considered all present scale levels to be important in his design, he basically oversaw the building's totality and made a 'Gesamtkunstwerk' out of it. As shown on the left, four different levels were used: urban structure, building mass, interior elements, and furnishing. In this way, Aalto additionally shows his ability to fit the building in its context and his craftsmanship skills.
Public building types: The Library

Beinecke Library, Gordon Bunshaft Typo-morphological analysis
1. Project description

1.01 General information

In the autumn of the Yale university campus in New Haven, Connecticut, a rare book and manuscript library is located, called the Beinecke Rare Book and Manuscript Library. The building was designed by Gordon Bunshaft, who at the time was partner at Skidmore, Owings and Merrill. With a total of 11,637 m², it is the largest university rare book library in Northern America and attracts annually more than 50,000 visitors.

The design and built process was capricious to say the least. The intentions of the client, advised by the Dean of the Yale School of Architecture, Paul Rudolph, was to host an invited design competition. Four firms were selected and approached, Eero Saarinen, Ed Stone, an unknown office, and the office of Gordon Bunshaft. But Gordon Bunshaft refused to participate, as can be read in an interview by Betty J. Blum in 1989. He strongly believed it was not the way to produce good buildings. “you’re given a two- or three-page program of what the building is to be, and from that, without talking to any of the people who are going to use it, you produce a solution” (Blum, B.J. 1989, Gordon Bunshaft interviewed. p2.) He was highly unfavorable over this contextual approach for the neglect of the users. The buildings winning preliminary design would thus be altered after interviewing the users. Simply because the architect would realize it wouldn’t work. These alterations made the ultimate design a compromise and this, he believes, is not the ideal way of producing architecture. This extensive argumentation upset Paul Rudolph. Consequently, Gordon Bunshaft consulted the Provost of the university who after asking the Beinecke brothers reassigned the project to Bunshaft.

In the design the love for books is expressed by realizing a exposition type of library, a treasure house. The client loved his ideas and doubled the total initial investment of four million dollars. His attention to detail is clearly shown in his hunt for the ideal material. A process that took about two years in total, a tedious process with countless setbacks. In the end thin marble was the chosen material. He wasn’t completely satisfied with the eventual result because of the cold and severe atmosphere it radiates. But he also finds this an intriguing aspect due to the contrasting interior and exterior. The realized great space is dramatic and evoke emotion and that is one of his greatest accomplishments. “it’s going to be there a long time. I don’t know if that means it’s great, but in the long haul a building becomes important by the judgment of future generations.” (Blum, B.J. 1989, Gordon Bunshaft interviewed. p2.)
1. Project description

1.03 Plans

Plan level -1 | S 1:500
Plan level 0 | S 1:500
Plan level 1 | S 1:500
1. Project description

1.04 Sections and elevations

Cross section | S 1:500

Southeast elevation | S 1:500

Southwest elevation | S 1:500

Northwest elevation | S 1:500

Northeast elevation | S 1:500

2. Context

2.01 Situation

The Beinecke Rare Book and Manuscript Library (1963) is incorporated in the University campus of the Yale University. Yale University (1701) is located in New Haven, Connecticut where it moved to in 1716. In the map shown, the total impact of the campus to the city is clearly visible. The city centre consists mainly of Yale campus buildings.

The library is located in the part 'Cross Campus' area is surrounded with solely university campus buildings to the Woolsey Hall, Memorial Hall, the university Dining Hall (Commons), and Woodbridge Hall all erected between 1901 and 1902. Across the street we find the Sprague Hall, Harkness Hall, Berkeley College North, Sterling Memorial Library and Law School.
The form and scale of the building differ but relate to the context. There is a strong diversity in scales, heights and shapes present in the surroundings. Due to variety of the surrounding the building cannot be considered an exception nor strongly related.

The relationship concerning the specific site is more precisely implemented. There is a strong relation between the scale of the square, the building and it’s surrounding. The shape of the building is strongly rectilinear and therefore referring to the urban Grid structure. The surrounding buildings follow the same rule but with minor exceptions or ornamental additions.

2. Context

2.02 Plot structure

The morphological composition is composed out of three layers: the street pattern, the site pattern, and the building pattern. All these layers have a strong correlation and are strongly dependent.

The street pattern surrounding the library is on a pivot point in the fabric of the city. A rotation in the city Grid structure is found near the building.

The site pattern is closely related to the street pattern. Both can be considered each others consequence. The site structure can, in this case, be considered as the inverse of the street pattern.

On the other hand the building pattern is executed in different ways in the city. Some are building blocks, some are placed individually and lots of open public space(s) are visible.

The library is placed in an openness on the inside of a building block(composed of three sites) The building is placed on a square surrounded by high buildings.
2. Context

2.04 Relation
When zoomed in on the surrounding site, the relation between the morphology and the plot structure becomes clearer. The basic shape of the building looks derived from the urban grid structure. The visible and physical position of the building is placed on a plaza surrounded by large structures.

The façade of the building is setback from typical alignment of the city. This allows for a subtle approach and an additional layer. This additional layer is the border of the plaza, which divides the space into two public spaces, the street with a boardwalk and the plaza.

The purpose of the building is to serve as a center of research for students, faculty, and other scholars (Yale-affiliated or not). Therefore, the building is semi-private and has a consequent routing. The primary access of the building can be considered to be the only public entrance. There are several more doors present but these all serve a different purpose, emergency exits. There is a second entrance present but that is an underground connection with the Sterling Library which is across the street. This entrance cannot be considered public.

But this building has a gradual approach and therefore a broader conception of the concept entrance. Therefore, we believe you enter the building in the urban space instead of the revolving door. First one walks the street, second one enters the plaza, third one passes between the border and the patio and fourth is the actual entrance. But it doesn’t stop here, the spatial layout of the building is based on layering, the architect added borders inside the building of urban proportion and therefore more entrances can be assigned.

2.05 Access

Primary access
Emergency exits

City plan | S 1:2000
Site plan | S 1:500
3. Exterior

3.01 Volume
3. Exterior

3.02 Access

As mentioned before, the conception of the entrance is broader than a specific door. This drawing shows the internal entrance of the building and possibility to penetrate all layers. The first border is a ramp, the second border is a tightening of space. The third border is passing underneath a massive volume. The fourth border is a solid revolving door which penetrates a transparent layer and then we enter ‘inside.’ From here on we penetrate either the floor, the transparent tower, or the floating volume.
3. Exterior

3.03.1 Distant threshold

The building knows two clearly different thresholds. Both depend strongly on the distance of which the building is observed at. From a distance the floating volume can be considered as a very strong border, it is not inviting to say the least. Also the other borders applied are marginal considering as an urban context.

3.03.2 Close threshold

When one has approached the building, the massive floating volume seems to cultivate the precious books inside and it makes it more inviting. Therefore the hard urban threshold evolves in a smooth one. Now the revolving door becomes the new hard threshold because of its closed character. The massive appearance is a strong sluice to filter the passing visitors.
3. Exterior

3.04.2 Façade composition | Transparency

At first glance the marble and granite volume are the only visible elements of the façade. These are closest to the viewer and contain a subtle relief. Carrying this hard border are two consecutive columns. Behind this hard layer the transparent layer is to be found. Held up with small columns and a revolving door in its center. Then the furthest layer is the plaza surrounding border.

3.04.1 Façade composition | Depth

At first glance the marble and granite volume are the only visible elements of the façade. These are closest to the viewer and contain a subtle relief. Carrying this hard border are two consecutive columns. Behind this hard layer the transparent layer is to be found. Held up with small columns and a revolving door in its center. Then the furthest layer is the plaza surrounding border.

[Diagram of façade composition with layers indicated]
3. Exterior

3.04.3 Façade composition | Repetition

The façade is highly repetitive on all sides. It is interesting to see how the repetition can be perceived in different ways.

Considering the entire façade it is obvious how the architect framed all translucent sheets. The massive block is then capped with and resting on a massive slab which finishes this volume. On the corner large columns are found to support the previous layer. Thus, at the transparant façade with a repetitive column structure is found. This typical composition is found identical on all four sides of the building.

If we zoom in on the individual elements which define the composition of the massive volumes we believe different approaches are possible. First the individual squares element will be recognized, a thin translucent marble sheet with granite borders. But when taking a closer look it is possible to recognize the individual element. The granite spatial shape which, when put together, forms the entire façade and allows the infills.

The composition of the façade can also be read as the collection of a four legged star. Which in itself is also constructed out of four individual granite elements.

### Façade composition | Symmetry

As already explained the four sides of the building are identical (except the amount of horizontal repetition). Due to the repetitiveness of the façade it is also completely symmetrical over a vertical axes. But in the urban situation it is even symmetrical over two axes, both vertical and horizontal considering the transparent layer will not be perceived.
3. Exterior

3.04.5 Façade composition | Variation

Variation in the buildings façade is kept to a minimum. There is only one concrete example of this phenomenon and that is the spacing of the columns and the transparent layer. This offset indicates the importance of one specific side.

3.05 Façade materials

The façade materials can be divided into two groups: the massive volume and the transparent layer.

The massive volume, as mentioned, composed of a granite structural truss and translucent marble plates. Also the carrying corner columns are constituted out of pyramid shaped granite.

The transparent layer is obviously comprised of glass panes. These glass panes are held up by bronze windowframes. The vertical balusters are kept to a minimum to maximize transparency. Of course columns are needed to support this layer and these are, for the reasons of transparency, placed behind the façade.
3. Exterior

3.06 Ornaments

The composition of the façade seems to be ornamental due to the exactness of the spatial properties of the material. The basic shape has been transformed to form a structural truss. Therefore the material has been shaped into the ideal composition. In the joints of structures the most mass is needed and therefore the architect applied this theory in his composition. Also for the benefit of light they have been avoided. The supporting columns also fulfill the same purpose. Again, in the joints the most mass is needed so that what the architect designed the individual elements for.

The drawing underneath explains the building’s ornamental properties at first sight.

3. Exterior

3.07 Architectonic details

As explained the architectonic details have a strong relationship with the whole. The individual element which, when combined, forms the entire composition. The preciseness of the shape is related back to the structural properties of the complete truss. The infill of translucent marble thanks to its natural properties, has a very varying appearance. The ever changing properties during the originating of the material lead to individual distinctive plates. Thanks to this individualistic character the entire composition doesn’t look dull, but remain interesting.

The translucent capacity and the natural properties make the experience and journey through the building an emotional enterprise.
4.01 Logistics

The main storage of the books is found in the glass book tower (160,000) and the storage rooms in the underground part (700,000) of the Library. Due to the private character of these spaces it is obligatory for the employees to assist the visitors in collecting the books. The logistical distribution is performed by elevators and stairs in a private core of the building. These facilities connect all layers necessary for the functioning of the building.

The private underground tunnel connects the Sterling Memorial Library to the Beinecke Library. This allows for internal and external transportation of the books. In addition to this, it’s forbidden for visitors to take the rare books outside the Beinecke Library.

Concluding, in the building two circulations are possible. Vertical circulation is to retrieve and collect books for visitors and horizontal circulation underground to actually utilise the rare books in reading rooms and offices.
4.02.2 Routing

The internal routing begins on the plaza as explained before. After completing the first part of the ‘route architecturale’ one accesses by a revolving door. After consulting the reception desk it is possible to either go upstairs and enter the massive volume, the formal part of the building, or go down into the functional part of the building.

Upon arrival in the cellar a second distinction was made which divides public and private. Reading rooms, offices and storage. Visitors are allowed to enter several reading and studying rooms. But the employees have an additional routing, a circular routing centred around offices which are all adjacent to a central courtyard. A third layer of privacy is the service core behind the second reception desk which gives employees the possibility to have an easy connection between the different floors.
4. Interior

4.02.3 Public / Private

The division and gradual incline of privacy is due to the implementation of several urban scaled layers which are all to be considered as façades. This gradual approach allows for a natural routing and feeling whilst分段 the functions of the building. There are several nuances to be made in this approach which allow the gradual approach. Consequently, The city, the plaza, the glass core, the bookstorer and the cellar and finally the storage rooms.
4.03 Construction

A building's construction begins with its foundation. This building is constructed from a concrete underground box. The floors are supported by a concrete grid of columns and the stability is performed due to the principle of being underground and a structural core that contains routing. Above ground the windows have their own supporting steel columns as does the glass booktowe. The massive floating box is supported by large pyramidal columns and the structural core that penetrates the ground. The facade of the building functions as one big truss to achieve the total span.
4.04 Use of spaces

The use of a space is strongly related with the type it is intended. In this case the use is more relevant than the type. In analyzing the plans a clear distinction became apparent between above and under ground. Above ground can be considered to be the formal part of the building. Underground the more operational and informal activities take place, the system part of the building.
4.05 Types of spaces

As explained above, the types of spaces support the findings of the distinction between formal and informal/supporting spaces.
The strong layering of the building and the introduction of several facades has a strong influence on the perception of space. A lengthy introduction and approach makes for an incline in formality of the building. To make a more abstracted way of the conception of the surrounding space the following drawing was made. It consists of the sequence of the sightlines in sections while approaching the final destination (room or function in the building). Several different characteristics can be analysed in this graph such as the space in relation to a person, the time of every section, the time to reach the destination, the sequence of scales of spaces etc. All these aspects are important characteristics in buildings but hard to combine in a single drawing. But when combined they give a quick overview of the atmosphere of approaches.

**Formal**

Nine, when arriving upstairs the entire volume is still visible. The full scale in comprehensible and adds to the formality of the space.

Ten, passing by the booktower, the endgoal.

Eleven, passing the narrow bridge which connects the formal space with the book tower.

Twelve, the scale of the space is drastically reduced and one is completely surrounded in the books.

**Functional, Public**

Ten, the reading rooms can be reached
Eleven, entering the plaza (not public)

For conclusive remarks, in the conclusive chapter the Viipuri and Beinecke Library are compared.

**Functional, Private**

Ten, a large corridor to connect the offices

Eleven, the individual office, the first function which allows direct outward views and has an outward focus.
4. Interior

4.06 Sequences of spaces | 3d

To be more concrete and make the drawings even more understandable, these perspective drawings are added to show the sequence in the space. These perspectives follow the same routes as before but are now less abstract.

The clear application of the ‘route architectural’ and the introduction of the several façades can be considered as a type of phenomenal transparency.
Public building types: The Library
4. Interior

4.07 Threshold between spaces

In this analysis the physical boundaries have been portrayed to show the thresholds when entering the building. In this case the stairs have been shown as hard thresholds. Also the boundaries which are set up because of the different facades are present. In the end the building has fairly smooth thresholds in the formal part of the building. But to cover the functional parts and the book tower the thresholds are much stronger to prevent unauthorized people from entering.
4.08 Order of spaces

All the spaces in the building are strongly related to each other due to the comprehensive application of the Grid system. Every room and space is related to the bigger conception of the building thanks to this fact. The more formal spaces are larger in outlay in comparison to the functional parts of the building. Noteworthy is that every visitor has to pass the gigantic formal scale before reaching the destinations.
4. Interior

4.09 Spatial hierarchy

Again this analysis proves the hypothesis that above ground the formal functions are allocated whereas the under ground parts are more destined to serve the function. The book storage can be considered the serving rooms, these rooms actually allow the functionality in the building, served rooms.
4.10.1 Daylight access

The daylight is very intricately handled because of the preservation of the rare books. The massive volume allows indirect daylight to reach the books, thanks to the choice of material. The ground floor is the only floor that allows all sides to be penetrated by direct daylight. In the cellar, the patio allows light to penetrate all the supporting central functions.
4.10.2 Reverberation time

The reverberation time of rooms indicates the ability to converse. Indirectly this is also an indication of formality of space. Look at churches for example, the echoing reverberation time (makes people whisper because of respect for the place). This analysis indicates the ability to hold normal conversations and is based on the material and the volume of the space.

Again, the separation between functional underground and formal above ground is easy to distinguish. The workability of the spaces underground demand respectable reverberation times.
4. Interior elements

The furniture elements in the building are partially designed by the architect. This permanent furniture is solely devoted to house bookcases and display cases. The temporary furniture on the other hand allows the reading and studying of the books i.e. it allows the building to function.
4. Interior

4.12 Architectonic details

The detailing of the building culminates in the floating volume. As mentioned before the architectonic details have a strong relationship with the whole. The inside and outside are detailed almost identical. With the same individual element which, when combined, forms the entire composition. The preciseness of the shape is related back to the structural properties of the complete truss. The milling of translucent marble, thanks to its natural properties, has a very varying appearance. The ever changing properties during the originating of the material lead to individual distinctive planes. Thanks to this individualistic character the entire composition doesn’t look dull, but remains interesting.

The contrasting appearance internal and external is made possible due to the translucency of the element. Where the outside look cold and shift the inside is warm and exciting.
5. Conclusive drawings

5.1 Sequences

To make a more abstracted way of the conception of the surrounding space the following drawings were made. It consists of the sequence of the sightlines in sections while approaching the final destination (a room or function in the building). Several different characteristics can be analysed in this graph such as: the space in relation to a person, the time of every section, the time to reach the destination, the sequence of scales of spaces etc. All these aspects are important characteristics in buildings but hard to combine in a single drawing. But when combined they give a strong overview of the atmosphere of approach. With these combined drawings a lot of principal differences and similarities can be explained.

Sequential experience Aalto

Sequential experience Bunshaft

The approach of the urban context shows strong differences concerning the scale and urbanity of the location. Bunshaft is clearly part of a large city whereas Aalto is placed in the middle of a public parc. Also the number of entrances is very different. Where Aalto introduces three entrances, Bunshaft includes just one to have full control.

Very similar is the way they condense space before physically entering the building. The approach is always a sequence of large areas which slowly condense into a very small entrance. The routing inside the buildings are very different from each other. Aalto has 3 different routings of which one is a closed circle whereas Bunshaft is more like a tree structure, also this enables the user to have control over its visitors.

The borders put up by Bunshaft are much more present than in Aalto’s library. Bunshaft strongly emphasizes this aspect whereas Aalto’s space is much more fluent due to the interpenetration of spaces.

Where the orientation in Bunshaft’s library is always internal and focusing on the ‘exhibited’ books, Aalto decides to make external views possible in his routing.

It is striking to see the time it takes to reach the destination if compared to Aalto’s library, this has a strong relation with the formality of the space of Bunshaft. The size of the spaces is very different. Aalto is much more modest in the scale of his building because it is public. Bunshaft on the other hand emphasizes the importance by enhancing every public aspect.
5. Conclusive drawings

5.1 Sequences

In the Beinecke library we believe there are three striking analysis which would describe the spatial and relational context the host.

Firstly we found that Gordon Bunshaft has introduced not one traditional but at least 5 present façades in his building. First he introduces a plaza which is partly submerged and walled, the first visible urban façade of the building. Secondly, the most prominent both inside and outside, the massive floating volume which contains the formal part of the building. At first glance one would conclude this layer as being the dominant and primary separation between inside and out. Interestingly he makes no difference in material inside or out which makes his architecture more elementary. The third façade a visitor would encounter is the glass façade which gives view to the plaza. Because of the transparency of this layer he allows an unobstructed view over the plaza which essentially minimizes the floatation of the massive volume. This floatation again is enhanced by placing strong pillars in the corners of the building. The fourth layer in the building, which in itself also becomes two layers. Namely the glass, climatisation layer, and the actual bookcases for rare books. Inside this volume there is also a structural core which allows routing inside the volume. The last visually present façade is the patio. The façade is also partially visible from public space but reveals itself in total only from the cellar of the building. This principle can be summarized as a box-in-box-in-box-in-box-in-box.

In the drawings to the right every single façade has been analysed for its primary characteristics to be able to make the previous comparisons.
This analysis shows the individual elements of which its repetition allows a certain visible transparency. Every aspect of the building is, in this case, related to the whole and therefore makes the complexity much more understandable.

5.1 Book typology

Yale’s book collection stored in the library is a mixture of German, American and Western Americana literature. This specific collection was previously housed in the Sterling Memorial Library Rare Book Room which overtime ran out of space. A part of the entire collection was donated by the financiers of the building, the Beinecke brothers and their families (Edwin J. Beinecke (Yale 1907), Frederick W. Beinecke (Yale 1909) and Walter Beinecke (Yale 1910) (Pinnell, P. 2004, The building). Not only were they the primary investors in the building they also donated a large amount of their personal collection. Medieval manuscripts and materials related to Robert Louis Stevenson (Turner, F. 2008, Meditations on the Beinecke Rare Book and Manuscript Library), Western Americana literature and subsequent generations of Beineckes contributed to the donations. The total amount of volumes is 780,000 and therefore makes it one of the largest buildings in the world solely devoted to rare books and manuscripts. The booktower contains about 180,000 volumes and in its underground bookcases it contains about 600,000. Also display cases are placed to house extreme rare books. Annually four expositions are organized. The continuous exposition is placed in the display cases and the oval bookcases.
## Literature

### Books

### Magazines

### Figures
1. Cuito (2002), Viipuri City Library
2. Cuito (2002), Viipuri City Library
3. http://picasaweb.google.com/th/photo/6RoG5jpPCCUF0tgQ7G8w