

**Alvar Aalto's Way to Design:
Interaction Between Furniture and Architecture**

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Abstract

This thesis presents a study of common design elements and interactions in the Finnish architect Alvar Aalto's (Hugo Alvar Henrik Aalto, 1898–1976) design process for architecture and furniture. As the first doctoral thesis from Japan on Alvar Aalto, this work represents an original contribution to the established field of international Aalto scholarship. The thesis is a unique composition of initial research from Japan, combined with experiences during an extended stay in Finland for conducting fieldwork and archival research.

In the first chapter, previous international research on Alvar Aalto is summarized. The basic approach of the thesis is introduced, including the use of unpublished sketches and drawings from the Alvar Aalto Museum archives. The thesis focuses on three case studies, with the initial goal to illustrate and analyse Aalto's way to design architecture. The projects include Seinäjoki, Vuoksenniska, and Wolfsburg Church.

The second chapter outlines a broad engagement with existing literature, reviewing how the thesis presents a novel yet straightforward methodology for organizing and sorting Aalto's undated sketches and drawings. Through careful comparison and analysis of Aalto's design sketches and drawings, an overview timeline and visual representation of the architect's design process is established for each church. A subsequent comparison of the design process for the three churches shows Aalto's tendency to repeat or reprise common design elements between all three projects, such as trapezoidal plans, and fan-shape and bentwood forms. Despite the significant similarities in the early design sketches for all three churches, each case could still develop into a distinct architectural project, highlighting the open-ended and non-determinate nature of Aalto's design process. From the three cases examined, Vuoksenniska Church also showed a noticeably higher degree of development and complexity compared to the relatively simple projects in Seinäjoki and Wolfsburg.

In the third chapter, a closer analysis of the design process for Vuoksenniska Church reveals how Aalto began the project with simple repetitive lines, and variations for folding and sliding partitions in the church. Prioritizing the church's ability to be divided into three separate spaces for either religious or social purposes was an important issue and concern for Aalto. A basic plan and section involving trapezoidal, fan-shaped, and bentwood forms were established quite early on, where the latter bentwood form was borrowed explicitly from sketches of Aalto's bentwood experiments. Throughout in the design process, the church still underwent considerable development with sketches, including a massive bentwood structure drawn in the section of the church, and consideration mainly in plan for the acoustic reflections from sound and speech radiating from the pulpit during a sermon. Whereas in design sketches for the church's section, Aalto primarily considered the natural lighting conditions of the church interior, with numerous iterations for the church's main skylight and clerestory windows. With a structure inspired by organic metaphors, and by repeating design elements throughout the church's plan, section, bell tower, and interior details such as lighting, Aalto designed the church as a complete and coherent work of architecture.

In chapter four, the thesis lastly investigates the broader collection of Aalto's experimental wood reliefs and sculptures, with the aim to clarify why Aalto's sketches of bentwood forms played an important role in the design of the examined churches. Focusing on Aalto's bentwood as 'the little sister of architectonic column', the relationship between bentwood reliefs, furniture, and architectural work is explored. As technical models and design prototypes, the wood reliefs have been closely associated with Aalto's furniture designs and patents, involving new ways of forming, moulding, and bending wood. Yet as Aalto's wood reliefs and sculptures gradually increased their formal complexity, they were not suitable for mass-produced furniture but still played an important formal and interactive role for several architectural projects, including specific examples from the 1950s churches already examined. In particular, the bentwood reliefs reflected some of Aalto's important lectures and theoretical ideas regarding rationalism and elastic standardization in furniture and architectural design. These small experimental models therefore represent a mutual interaction between Aalto's broad design activities and architectural theories, as a common element forming a close connection between furniture and architecture in Aalto's design process.

Chapter five of the thesis summarizes the thesis results and offers an outlook for future work.

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Chapter 1. Introduction

1.1 Alvar Aalto as architect and designer

Finnish architect Alvar Aalto (1898–1976, Fig. 1.1) engaged in all scales of design throughout his career, from a wide variety of furniture and interior products, such as lighting and glass items, to buildings, cities, and large regional plans. Aalto maintained that design activities such as regional and city planning, architecture, and interior and furniture design should be closely related and considered with respect to one another. For example, while discussing his approach to designing churches in a 1955 lecture entitled 'Art and Technology', Aalto notes the diverse aspects of a project that need to be carefully considered.

The quality of the soil, the geography and site, the materials used for the walls and roof, the heating systems, ventilation, lighting, surface treatment, and innumerable other factors; basically these are mutually independent considerations. As parts of a church building, they may even be mutually contradictory, and yet we must generate harmony from them.¹

Resolving contradictions was an important part of Aalto's design process, and a necessity when developing a proposal to address a brief. This thesis investigates Aalto's design process for cases of both architecture and furniture, and considers the architect's ability to work across different scales and areas to produce complete and convincing proposals.



Figure 1.1. Finnish architect Alvar Aalto. The Alvar Aalto Museum, Finland.

As a visiting researcher in Finland, starting in the Alvar Aalto Academy in 2011, I had the opportunity to see and photograph over 50 Aalto buildings in Europe. Furthermore, I participated in the majority of recent conferences on Aalto, attended the most recent Aalto exhibitions in Europe, and interviewed people who used to work with and knew Aalto. Through contact and a direct engagement with current authors in this research field, I also gained access to a rich body of literature that has been largely inaccessible or overlooked by previous Japanese research studies on Aalto. The opportunity to stay in Finland over an extended period of several years further allowed me to learn Finnish and gain insights to Finnish culture and the country's background; an important prerequisite for not only studying

various archival documents for research purposes, but more importantly, understanding first-hand the place of Aalto's life and practice. Learning Finnish also proved valuable while conducting interviews for this doctoral research. The following thesis therefore offers a unique and original perspective on Aalto, starting with an initial broader view from Japan, combined with somewhat more personal research experiences from Finland.

In the general historiography of modern architecture and design in the twentieth century, Aalto's work is commonly associated with general themes such as nature, organic design, and humanism. Although firmly rooted in the twentieth century and influenced by both the immediate Finnish and broader European contexts, Aalto's architecture and furniture (Fig. 1.2) still continues to inspire new research, international exhibitions, and designers worldwide. Aalto furniture is also still mass-produced and distributed globally by Artek, the design company founded by Alvar and Aino Aalto, Maire Gullichsen, and Nils-Gustav Hahl in the 1930s. Since the time of starting this doctoral research, there have been numerous international exhibitions and conferences on Aalto, alongside various peer-reviewed journal articles, books and exhibition catalogues published internationally. These research activities are only recent additions to an already well-established body of literature, which will be summarized and briefly discussed in the next section. As Frampton has recently argued, Aalto's broad range of design work is still highly relevant today and open to ongoing debate and discussion.² Before outlining the scope and methods of this thesis, however, it is important to offer a basic overview of existing literature and establish the academic and intellectual context of the current research contribution.



Figure 1.2. Architectural details in an early secretaire desk by Alvar Aalto. The Alvar Aalto Museum, Finland.

1.2 Background and literature review

1.2.1 Finland

Aalto's various lectures, presentations, and articles are commonly referenced in previous research. They have been collected, organized, edited, and published by Göran Schildt, a Finnish art historian who was one of Aalto's close friends.³ Schildt's major presence in Aalto literature is firmly anchored; he was also Aalto's official biographer, authoring three volumes covering the so-called early,⁴ definitive,⁵ and mature years⁶ of Aalto's life. At the same time, however, more recent research by Suominen-Kokkenen has noted Schildt's tendency to overemphasize Aalto's contributions, without due credit given to collaborators, especially Aalto's first wife and design partner Aino Aalto.⁷ Compared to peer-reviewed academic publications, Schildt also did not always offer clear references, or any guidance, for example, on ways to find and reexamine important archival materials and evidence. Since the time of Schildt's contributions, academic literature from other Finnish writers and researchers has nonetheless expanded the research field in different directions.⁸ Due to Schildt's personal relationship and position in Aalto's circle of friends and artists, he still offers an exceptional introduction and rare view of Aalto and his work, which is why Schildt is still duly cited in almost all Aalto research today.

Juhani Pallasmaa and his subsequent writings, interpretations and promotion of Aalto's work have assumed a special place in the literature. Pallasmaa remains a prominent figure in contemporary Finnish architecture, and was also active during Aalto's mature years. Connah and others, however, maintain that when starting out, Pallasmaa was actually one of the leading architects of a younger generation who commonly criticized Aalto and called his achievements into question.⁹ In the eyes of younger Finnish architects in the post-war period, Aalto's architecture and design work was seen as inappropriately individualistic and irresponsible.¹⁰ This issue regarding Pallasmaa's earlier position is neither resolved nor confirmed, but it nonetheless reflects a fairly widespread tendency in Finland. The more Aalto became increasingly established as an internationally renowned architect, the more he faced growing criticism and rejection at home in Finland. This contradiction and duality continues today, as Aalto's work is arguably still valued far more internationally than by Finnish people.¹¹ In many ways the work and extensive publications of the Alvar Aalto Foundation are addressing this discrepancy, with both introductory brochures and much more detailed, scholarly books written in Finnish and English on many of Aalto's buildings and design work.¹²

1.2.2 UK and USA

Aalto's work has had a substantial impact in the UK and USA and has been the subject of a number of important architectural books and research papers. For example, multiple generations of American and British architectural writers have either focused on Aalto's work in detail, or included instances of Aalto's architecture and designs as illustrative examples in support of new critiques and understandings of modern architecture. Frampton,¹³ Quantrill,¹⁴ St. John Wilson,¹⁵ Porphyrios,¹⁶ Weston,¹⁷ Ray,¹⁸ McCarter,¹⁹ Stewart,²⁰ and Menin and Samuel²¹ have all completed books either including a substantial amount of Aalto's work, or focusing on Aalto exclusively. The Museum of Modern Art's major 1998 retrospective exhibition catalogue entitled, *Between Humanism and Materialism*²² also stands out in Aalto literature as an important work from the time of Aalto's centenary. In these and many other works from England and America, Aalto's architecture and design represent a critical position in twentieth-century modern architecture, one that has had lasting and continued impact on architecture today.

1.2.3 Switzerland and Germany

Aalto was a fluent German-speaker and member of the *Congrès Internationaux d'Architecture Moderne* (CIAM). He established many influential contacts in Germany and Switzerland, and also completed several commissions there. Several young Swiss architects were employed in the Aalto Studio in Helsinki, with some eventually writing about their experiences when working with Aalto.²³ For example, Claudia and Eduard Neuenschwander completed an early book showing unpublished design drawings and sketches, presumably from the projects they worked on while in the Aalto Studio.²⁴ Karl Fleig also later coordinated a more extensive and authoritative three-volume catalogue of Aalto's projects.²⁵ Sigfried Giedion, the influential Swiss art historian and general secretary of CIAM, was still perhaps the most well-known promoter of Aalto's work. In the 1954 expanded 3rd edition of his seminal *Space, Time, and Architecture*, Giedion included an extensive chapter dedicated to Aalto.²⁶ It was Giedion's original visual juxtaposition of an aerial photograph of a Finnish lake, together with Aalto's glass vases that continues to encourage a somewhat limited, formal reading of Aalto's work based on ideas of the Finnish landscape.²⁷ Giedion nonetheless positioned Aalto's place in the discourse of international modern architecture as a progressive, and distinctly regional and organic development, with seemingly irrational and natural design elements fused into functionalist architecture, all in the service of a humanistic approach.²⁸ Since the time of Giedion's book, Teppo Jokinen and Bruno Maurer have more broadly outlined Aalto's influence in Switzerland, while Arthur Rüegg has highlighted the influential model of Giedion's Wohnbedarf design company for Artek in Finland.^{29,30}

In tandem with these Swiss contributions, researchers in Germany have also published several books on Aalto's work, especially around the time of Aalto's centenary in 1998. For example, Brülls³¹ focused on Aalto's churches, while Tuomi³² addressed seven of Aalto's most well-known buildings including Vuoksenniska Church from 1955. Perhaps the most notable study on Aalto from Germany, however, was Susanne Müller's doctoral thesis and later book on Aalto's Wolfsburg projects.³³ Müller conducted extensive research in the Aalto archives in Finland, examining the letters and documents written in German between Aalto and client representatives, such as Pastor Erich Bammel in the case of the Wolfsburg Church project from 1958. Müller's research offers valuable insights into how Aalto's design process could interact and respond to the suggestions and needs of clients. Müller, however, did not examine Aalto's design sketches and drawings in detail, as they were deemed too difficult to sort and coherently organize.³⁴ In many ways the current thesis addresses this challenge directly by taking Aalto's design sketches and drawings as its main source. At the same time, the approach taken here involving Aalto's sketches and drawings aims to use a complementary research methodology with regards to existing studies, and build upon previous research findings.

1.2.4 More recent academic contributions

More recent academic contributions on Aalto include the doctoral theses, books, and articles by Eeva Liisa Pelkonen and Harry Charrington. Pelkonen's research aimed to examine Aalto's intellectual milieu, and proposed an understanding of Aalto's life and career in terms of parallel developments in art and Finland's unique geopolitical situation in the twentieth century.³⁵ Pelkonen argued that it is the quality of ambiguity in Aalto's work that allows it to maintain a prolonged relevance today, leaving it almost permanently open to new reinterpretations.³⁶ Charrington, on the other hand, was an architect who worked in the Aalto Studio in the 1980s during the time after Aalto's death, with the studio under the direction of Aalto's second wife Elissa Aalto. Charrington's research emphasized the collaborative nature

of the studio's production process. For example, using interviews with numerous former staff members of the Aalto Studio, Charrington focused on general design tendencies, and also went on to examine Aalto's buildings in Seinäjoki, Finland as a detailed case study.³⁷ Charrington's work tends to offer readers a more balanced view of Aalto from the perspectives of an architect and architectural historian. Even more recently though, in 2016, Charrington was also part of a selected number of authors in the well-received exhibition and publication, *Artek and the Aaltos*, based at the Bard Graduate Centre in New York and edited by Nina Strizler-Levine and Timo Riekko.³⁸ This exhibition and contribution addressed Alvar and Aino Aalto's design work and how Artek interacted with the Aalto studio in many projects.

1.2.5 Japan

The influence of Japanese architecture and culture on Aalto's work is a prominent research theme in some recent studies from researchers based outside of Japan.³⁹ Some Japanese writers and academics have also examined more general aspects of Aalto's architecture. Because of language differences and the proximity away from Finland, however, the number of research studies from Japan on Aalto's architecture and especially furniture has tended to be limited. Instead, Japanese publications on Aalto have often aimed at a more general, rather than an academic readership. For example, there are several publications related to Aalto's architecture in the format of photography books by Yutaka Saito and Takashi Koizumi.^{40,41} After working for some time in the Aalto Studio, Akira Muto also wrote a biography on Aalto, including a general overview of Finland and of Aalto's key architectural projects. These contributions provide a Japanese reader an introduction to Aalto's architecture and encourage readers to visit Aalto's buildings in person.

In terms of academic contributions in Japan, we can also find some short conference articles and reports on Aalto, often as either introductory or Masters' level studies.⁴² Such studies have commonly analyzed Aalto's architecture formally, for instance, by seeking to establish an understanding of Aalto's varied use of a fan-shaped form.⁴³ As an example of more detailed Aalto research from Japan, Tadanao Maeda's analyzed several houses by Aalto including the Aalto House (1935-36), Aalto's Experimental House, *Koetalo* (1952-54), and the Villa Mairea (1938-39).⁴⁴ Maeda produced somewhat abstract diagrams to represent Aalto's architectural ideas and spatial thinking, and considered previous work from the Alvar Aalto Foundation, Aalto's published lectures and presentations, Schildt's biography of Aalto, and published architectural plans.⁴⁵ Here we find a common aspect of both academic and more general Japanese publications, with a tendency to consider Aalto's plans as representing the design process in its entirety, even though Aalto commonly drew and designed plans and sections together. Furthermore, despite the numerous European and American studies previously outlined in this brief review, Japanese research on Aalto has far too often failed to consider or reference previous research results from outside of Japan. This trend leads to relatively few connections between Japanese and European research on Aalto, with Japanese studies having little impact in the broader body of Aalto literature worldwide. This thesis addresses these issues by engaging and learning from the broader Aalto scholarship and research already noted. The previous review though is not intended to be exhaustive, and when discussing specific examples of Aalto's architecture and furniture later on, additional relevant research references will also be given proper consideration.

1.3 Research materials, methods, and scope

1.3.1 Design sketches and drawings for architecture

In contrast to approaches in architectural research that start from outside the field of architecture, such as in literature or philosophy, the primary source material for this doctoral thesis is Aalto's own original architectural sketches and drawings. In general, the Alvar Aalto Museum has electronically scanned and catalogued a significant amount of Aalto's sketches and drawings. This archival material contains design sketches from early conception stages, to completed drawings, often with many furniture and interior details. Construction and utility drawings are also usually included for each built project. Aalto's archival drawings and sketches are therefore an important reference source for conducting research. In the case of Aalto's important work in the 1950s, however, the process of sorting and cataloguing Aalto's design materials has only been completed in recent years. Garland's extensive publications of Aalto's sketches and drawings only cover the early work of the Aalto Studio, up to and including projects until 1939.⁴⁶ In general though, the archives of Alvar Aalto Museum contain roughly 100,000 sketches and drawings, representing the collective output of Aalto's practice and studio. The archived sketches and drawings for some of Aalto's most seminal projects after 1939 have not yet been studied in detail or previously published. The increasing availability of Aalto's drawings and sketches means that they can be better used to their full potential in research.

Each Aalto sketch or drawing from the Alvar Aalto Museum is identified with a unique catalogue number. It is important not to assume a catalogue number, however, corresponds to its relative order in the design process. The Alvar Aalto Museum staff have assigned catalogue numbers and attempted to order Aalto's sketches and drawings in a roughly chronological way.⁴⁷ Yet in some cases, dated design drawings are also grouped together and catalogued by theme. For example, in the case of Wolfsburg Church, there are several dated design drawings for the church's bell tower that are grouped together, yet they are sorted and catalogued after from the initial, intermediate, and final drawings for the church building itself. The dates of these bell tower drawings nonetheless correspond to intermediate stages of the design process, occurring before the final construction drawings and execution plans of the church. The archival cataloguing process therefore does not lead to a chronological order representing the design process, but should be thought of more as simple reference numbers as they were intended. A sequential numbering and linear flow of development similarly does not reflect Aalto's design process, as researchers have previously noted how Aalto would draw different plans and sections simultaneously.⁴⁸ A detailed discussion on methods and how to sort and reconstruct Aalto's design process with archival sketches and drawings will be presented in the next chapter.

Examining the entirety of Aalto's design activities lies outside the scope of what is possible in a doctoral thesis. This thesis first examines Aalto's architectural work in the particularly important decade of the 1950s, when the Aalto Studio was able to realize many more commissions than in the past. Several of Aalto's major works were completed around this time, such as Säynätsalo Town Hall (1949-52) and Koetalo (1952-54). Several notable churches were also completed during the 1950s, including churches in Seinäjoki, Vuoksenniska, and Wolfsburg (Fig. 1.3). Vuoksenniska Church is often regarded as one of Aalto's most accomplished works in previous literature, but understood in rather indefinite terms of ambiguity and plasticity.^{49,50} As the archival drawings for these important works are now available, this thesis takes three of Aalto's well-known churches in the 1950s as illustrative examples; Seinäjoki, Vuoksenniska, and Wolfsburg Church have been widely studied and are considered to embody and exemplify Aalto's fundamental design ideas

regarding space, harmony, humanism, and organic themes in modern design and architecture.⁵¹ To expand and clarify the meaning and significance of these three churches from the 1950s, Aalto's design process will be examined in detail through the presentation and discussion of the drawings, thinking, and intentions behind the buildings and their development.



Figure 1.3. Exterior views of Seinäjoki (left), Vuoksenniska (middle), and Wolfsburg Church (right). Photographs by author.

1.3.2 Wood reliefs and sculptures in relation to furniture

Aalto approached furniture design as a natural extension and part of the whole architectural design process of a particular project.⁵² For Aalto, a chair leg is simply 'the little sister of the architectonic column'. The architectural design of a church could establish a context and starting point for the design of the church's furniture; or in other words, architecture could exert a strong influence on Aalto's furniture designs. Some of Aalto's early design sketches and drawings for churches in the 1950s, however, include clear illustrations of various curved wooden elements, not unlike those used in earlier Aalto wood furniture (Fig. 1.4). Both Weston and Menin and Samuel have also briefly noted how the structures of Wolfsburg and Vuoksenniska Church were inspired by Aalto's bentwood furniture and wood reliefs from around the 1930s and 1950s.^{53,54} The relationship and influence of Aalto's furniture and wood reliefs on later buildings, however, has not yet been examined or studied in detail and remains an open issue to resolve. This thesis therefore lastly investigates the origins and development of Aalto's wood furniture and wood reliefs, emphasizing how such developments were highly relevant for designing architecture, including Aalto's 1950s churches.



Figure 1.4. Design sketches of bentwood forms in Wolfsburg Church. The Alvar Aalto Museum, Finland.

Some design sketches and drawings for Aalto's wood furniture can be found in the Alvar Aalto Museum. Yet there are relatively few design sketches compared to the numerous archival photographs of Aalto's wood reliefs and sculptures that were first made starting in late 1920s and continued until the mid 1950s. Several of the original wood reliefs have been saved and preserved in the museum. These wood reliefs are commonly described in literature and exhibitions as Aalto's material studies, experiments, and constructions for furniture.⁵⁵ Just as Aalto's design sketches and drawings will be used as primary research materials to investigate architectural projects, the wood reliefs can be similarly studied to clarify the design and development of the architect's wood furniture. While previous studies and exhibitions have tended to only consider a limited number of wood reliefs, usually just one or two, this thesis offers the first comprehensive review of Aalto's wood reliefs as a more complete body of sixteen works related to both furniture and architecture. As prototypes and working design models, the wood reliefs are complementary to Aalto's sketches and drawings in both contexts of design and research.

1.4 Aims and objectives

The aim of this thesis is to clarify Aalto's design process architecture and furniture, and to show how the two areas of design were interrelated and often interdependent, leading to an interaction between the two areas of design. To achieve this aim, I developed a practical methodology for working with Aalto's sketches and drawings, which is used to visually reconstruct and represent the design process for the three case study churches already noted. With a clear overview of Aalto's design process for three examples, common aspects of Aalto's design process for the different projects are identified and discussed, including how Aalto's bentwood forms and experiences influenced these architectural projects. Specific details seen in the design sketches for the most complex case of Vuoksenniska Church will also be addressed in greater detail. A subsequent analysis and consideration of Aalto's wood reliefs will then bring this work to an appropriate close, and lastly show how Aalto's wood furniture and architecture were closely related and interacted with one another.

1.5 Overview of thesis

Chapter one of the thesis has provided an introduction to Alvar Aalto, with a brief review of literature and research materials, and an overview of the principle aims and objectives of the thesis.

Chapter two outlines the main methodology and process for sorting and organizing Aalto's design sketches and drawings. A brief background is presented for the case study churches in Seinäjoki, Vuoksenniska, and Wolfsburg, followed by the resultant visual representation of the churches' design processes. Common features and elements in the design processes for the churches are discussed, including examples of Aalto's bentwood forms.

Chapter three presents a more detailed investigation and discussion of the design process for Vuoksenniska Church, as the project's inherent complexity is evident based on the comparison and discussions from the previous chapter. The architecture and design process of Vuoksenniska is discussed with regards to previous literature, emphasizing how Aalto's sketches and drawings can reveal new insights into the architecture of this specific project.

Based on the various design sketches involving Aalto's bentwood experiments and forms encountered during the previous work, chapter four finally investigates Aalto's wood reliefs and their dual relationship with architecture and furniture. In an analogous way to working

with Aalto's sketches and drawings, the reliefs are organized and sorted chronologically, and then discussed as technical and formal models for both furniture and architecture.

Chapter five concludes the thesis and offers recommendations for future research.

Notes for Chapter 1

¹ Alvar Aalto, *Alvar Aalto in His Own Words*, ed. Göran Schildt, (New York: Rizzoli, 1998).

² Kenneth Frampton, *Alvar Aalto and the Future of the Modern Project*, (Toronto: University of Toronto, February 2013).

³ Aalto, *Alvar Aalto in His Own Words*.

⁴ Göran Schildt, *Alvar Aalto - the Early Years*, (New York: Rizzoli, 1984).

⁵ Göran Schildt, *Alvar Aalto - the Decisive Years*, (New York: Rizzoli, 1986).

⁶ Göran Schildt, *Alvar Aalto - the Mature Years*, (New York: Rizzoli, 1991).

⁷ Renja Suominen-Kokkonen, *Aino and Alvar Aalto: a Shared Journey: Interpretations of an Everyday Modernism*, (Jyväskylä: Alvar Aalto Museum, 2007).

⁸ Pekka Korvenmaa, "A Bridge of Wood: Aalto, American House Production, and Finland," in *Aalto and America*, ed. Stanford Anderson, Gail Fenske, and David Fixler, (New Haven: Yale University Press, 2012), 94–111.

⁹ Pekka Suhonen, *Alvar Aalto and Helsinki*, (Porvoo: Werner Soderstrom Oyj-WSOY, 1999).

¹⁰ Roger Connah, *Aaltomania*, (Helsinki: Rakennustieto, 2000).

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¹⁴ Malcolm Quantrill, *Alvar Aalto: a Critical Study*, (London: Secker & Warburg, 1983).

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¹⁸ Nicholas Ray, *Alvar Aalto*, (New Haven: Yale University Press, 2005).

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²³ Louna Lahti, *Alvar Aalto - Ex Intimo: Alvar Aalto Through the Eyes of Family, Friends & Colleagues*, trans. Roger Connah and Tomi Snellman, (Helsinki: Building Information, 2001).

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- ³¹ Harry Charrington, "The Makings of a Surrounding World: the Public Spaces of the Aalto Atelier" (The London School of Economics and Political Science, 2008); Holger Brülls, *Alvar Aaltos Kirchen*, (Wolfsburg: Hinz & Kunst, 1999).
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- ⁵⁰ Weston, *Alvar Aalto*.
- ⁵¹ Reed, *Alvar Aalto*.
- ⁵² Juhani Pallasmaa, ed., *Alvar Aalto Furniture*, 2nd ed., (Helsinki: Museum of Finnish Architecture, 1984).
- ⁵³ Weston, *Alvar Aalto*.
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Chapter 2. Methodology and representation of Aalto's design process

2.1 Research methodology and framework

In this thesis, I aim to examine Aalto's sketches and drawings with fresh eyes; not as old visual artifacts from an archive, but instead as actual working drawings in an architectural design process. Before examining Aalto's sketches and drawings in detail, however, it is first necessary to organize, sort, and visually represent the archival material for a given project. For example, in the case of Vuoksenniska Church alone, there are approximately 800 sketches and drawings for the project available in the Alvar Aalto Archive, including plans, sections, perspectives, and construction details. Furthermore, there are approximately 600 and 370 archival design sketches or drawings for Seinäjoki and Wolfsburg Church, respectively. Taken all together, the sheer volume of this visual research material can be somewhat overwhelming to consider, especially without a sound approach and structured research methodology. A careful process of comparing and sorting sketches and drawings is needed to retrace Aalto's way to design, as many of Aalto's sketches are undated, especially initial concept sketches. This section outlines such a process for my research with Aalto's sketches and drawings, taking the three churches already noted as illustrative examples: namely, Seinäjoki, Vuoksenniska, and Wolfsburg Church. After applying the methodology and establishing a useful overview of the design process for each church, Aalto's common elements and design tendencies in all three projects are briefly discussed, before proceeding with more in-depth analysis.

When beginning to work with Aalto's sketches and drawings, it is important to keep in mind not only some of the general Aalto literature previously noted in Chapter 1, but also additional, more detailed studies and academic analyses. Compared to introductory texts or general literature, more focused Aalto research studies have an important role to play when sorting and organizing Aalto's sketches and drawings, beyond serving as basic precedents or passive background information. For example, Walker's research on the natural lighting conditions in Vuoksenniska Church highlights an important design issue to investigate in Aalto's design sketches.¹ Walker basically compared numerous photos of the church interior at different times of day and in different seasons, describing the quality of the natural light in the church; based on this lighting study, and with the project's archival sketches and drawings available, a series of research questions naturally arise. For instance, how did Aalto represent natural light in the design sketches for the church, and how did Aalto use the process of designing to develop the natural lighting conditions that Walker observed? Existing research actively informs and helps to formulate these kind of relevant research questions regarding what design issues and features to specifically look for in Aalto's sketches and drawings. An understanding of previous research therefore encourages a more focused investigation when dealing with Aalto's sketches. As previous Aalto research from Japan has not thoroughly engaged existing literature, this research approach further closes a critical gap between European and Japanese tendencies to studying, researching, and understanding Aalto's architecture and way to design.

2.1.1 Approach to sorting and organizing Aalto's design sketches and drawings

I follow a general approach involving four main steps to sort Aalto's undated sketches and drawings. First, I begin with a broad review of all of the sketches and drawings for a given project, and identify a few hundred of the most significant sketches and drawings for further examination. Second, within this initial selection, I list and sort Aalto's dated drawings chronologically, including both plans and sections. By beginning with Aalto's dated plans and sections, we can identify the intermediate stages of the design process with confidence; they serve as reliable signposts to understand the major developments and general direction and iterations of the design process. Third and partly in parallel with the initial sorting processes, other research documents and literature like those previously discussed are reviewed. Relevant examples and discussions from previous research regarding specific Aalto sketches and drawings are noted. The specific sketches in question are set aside for more careful

review later on. For example, Menin and Samuel's discussion on Vuoksenniska Church included a pair of Aalto's design sketches that were used to illustrate parts of their argument.² Figures 2.1 and 2.2 show these specific design sketches for Vuoksenniska Church, illustrating how Aalto imagined the church's main rear-wall behind the altar area as a fibrous wood structure. Menin and Samuel³ interpreted Aalto's idea for the curved wall of the church as a large extrapolation of a bentwood sculpture, even though the church was later built in reinforced concrete. Such insights, however, are somewhat limited and lack meaning without understanding the context of these sketches and the associated design decisions in the overall design process. A visual overview of the design process is ultimately needed to see how important and relevant these sketches were in the design process of the church.

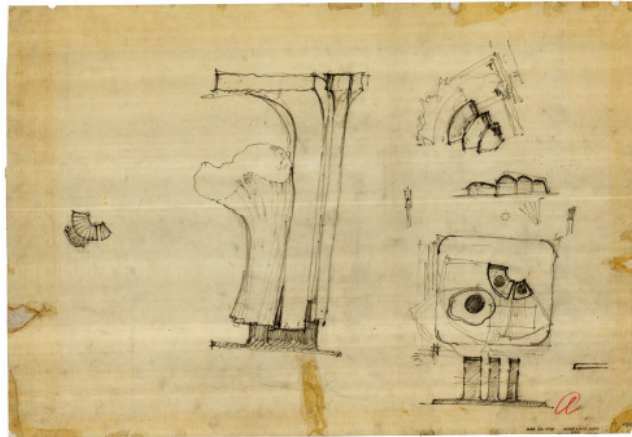


Figure 2.1. Aalto's sketch of a bentwood sculpture for Vuoksenniska Church. The Alvar Aalto Museum, Finland.

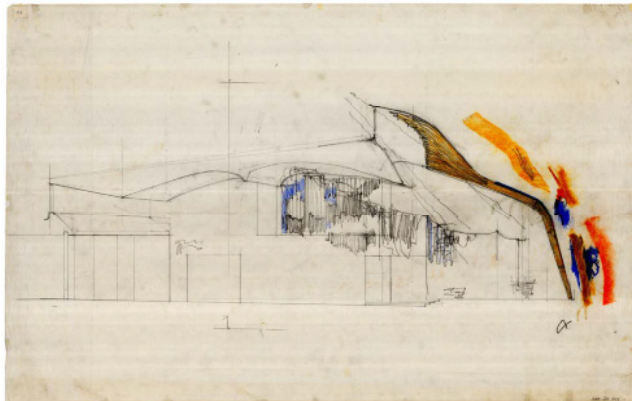


Figure 2.2. Early section sketch for Vuoksenniska Church with the church's curved wall drawn as fibrous wood. The Alvar Aalto Museum, Finland.

To complete the overall organizing and sorting process, Aalto's undated design sketches are lastly compared with one another, and also compared to intermediate dated drawings. Figure 2.3 shows one example from the design process for Wolfsburg Church, where Aalto sketched directly over an intermediate dated drawing, defining a skylight for the church's baptismal area (Fig. 2.3a). An undated sketch (Fig. 2.3b) also shows more details of the skylight, and how Aalto could communicate visually with studio staff to guide the design process for the project. The subsequent dated drawing (Fig. 2.3c) in turn includes the church's skylight, showing how it was carefully rendered and drawn into the church's roof. Aalto's design sketches, when examined in relation to one another as shown in Figure 2.3, can provide more detailed insights into the flow of the design process, in-between intermediate design stages. They can also illustrate key turning points in the design process, or different and even competing streams of ideas that were considered in parallel. Another straightforward example can be seen in Figure 2.4 in the case of Vuoksenniska Church, where the church's characteristic faceted rear wall was only sketched and designed after Aalto saw

intermediate drawings with a plan having smooth circular walls (Fig. 2.4a). Based on a simple design sketch (Fig. 2.4b), which considered the acoustics inside the church, subsequent dated drawings (Fig. 2.4c) showed how the church's rear wall was faceted, and updated with a rough form according to Aalto's sketch. The interaction between rough sketches and more careful architectural drawings is clarified after sorting and organizing Aalto's most important undated design sketches and intermediate drawings. As seen in these initial examples, organizing Aalto's sketches and drawings affords opportunities to study and clarify Aalto's design process and architecture.

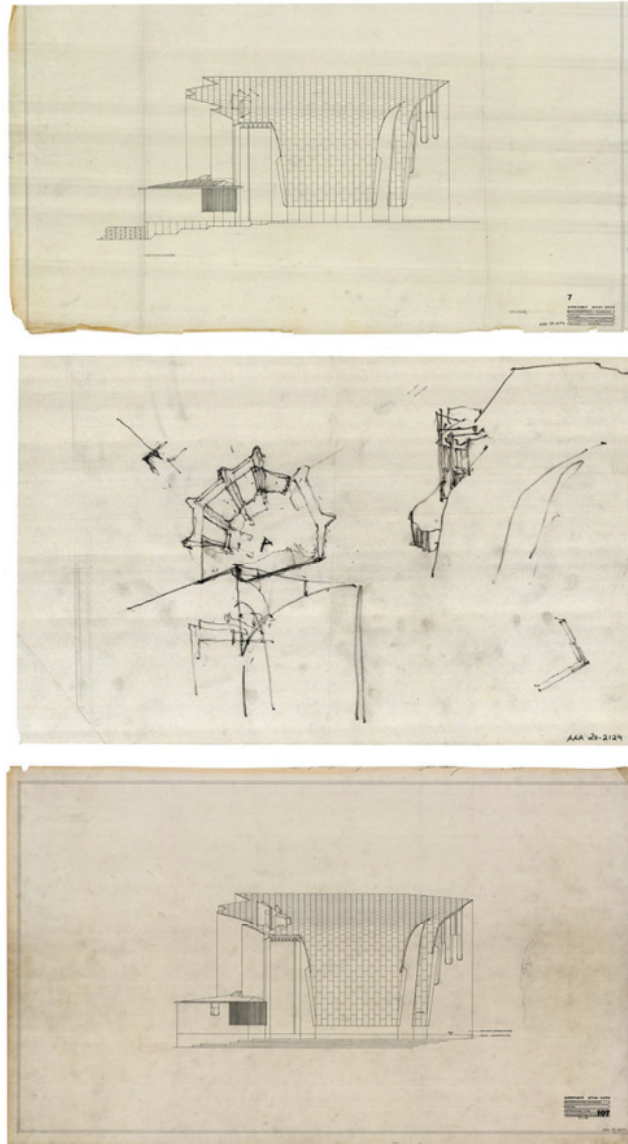


Figure 2.3. (a, above) A dated elevation drawing for Wolfsburg Church showing Aalto's sketched correction, (b, middle) a corresponding detailed but undated sketch, and (c, bottom) the updated drawing. The Alvar Aalto Museum, Finland.

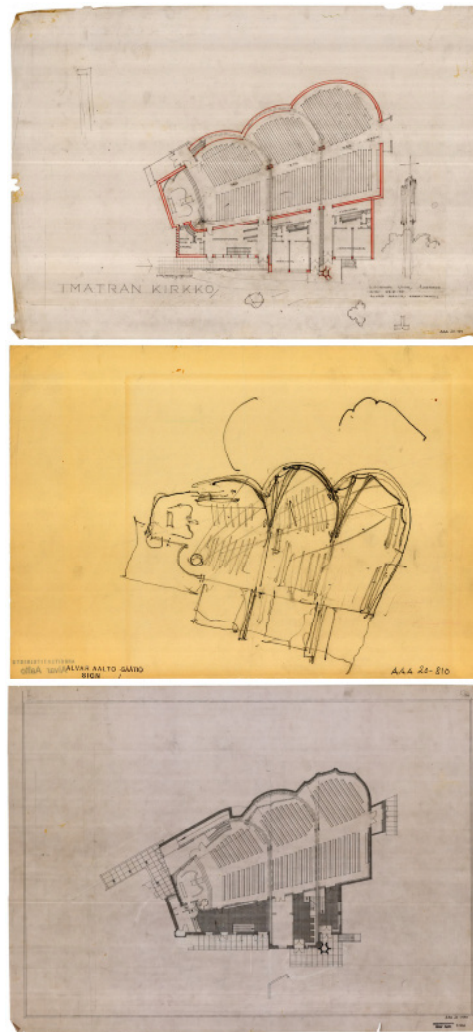


Figure 2.4. (a, above) An intermediate plan drawing, (b, middle) undated sketch, and (c, below) final plan in the design process for Vuoksenniska Church. The Alvar Aalto Museum, Finland.

2.1.2 Representing Aalto's design process

With Aalto's sketches and drawings for a project approximately sorted and organized, an overview or visual representation of Aalto's design process is needed to support further examination. For clarity, in each project the most significant and important sketches and drawings are selected to represent the essential intentions, decisions, and developments in Aalto's design process. These sketches and drawings usually came to total of around thirty individual items from the archives. After analyzing each of these sketches and drawings, the design process for each project is divided and organized into four terms: the first term involving basic concepts, ideas, and forms; the second and third terms showing important updates and subsequent modifications, and the fourth and final term comprising the completed drawings before construction. Kim and Blundell Jones⁴ followed a similar approach for their study on the earlier Villa Mairea, and also made computer-based models for each design stage of the project. In contrast, I have proposed a simple timeline format, consisting of a single page visual summary of the design process for each church examined herein. As seen later on in Figures 2.5 – 2.7, with this timeline format we can quickly grasp the design process for each church, and the entirety of the design process, and broadly compare different sketches and design issues. These layouts make the progression and parallel strands of the design apparent, allowing the examination of ideas and relative elements as represented through drawing in the design process. The starting point of a design can be identified, along with catalysts and moments of synthesis in the design's progression with changes in both plan and section. Aalto's sketches and drawings offer a vital understanding of

a project's design process in its entirety. The architect's sketches illustrate his own particular way of synthesizing space, form, and structure in architecture.

The general methodology and approach outlined so far in the present chapter can now be applied directly to the three illustrative examples of Aalto's 1950s churches. Before presenting the resultant visual representation of the design process along a timeline for each project, each church's background is briefly discussed, highlighting how the churches' origins were closely related to one another. For example, in the broadest sense, the churches share a common aspect as they were all realized during times of general urban expansion and growth following World War II. The unique but interrelated nature of the three projects' origins, however, foreshadows how early ideas in the design process for each project could also be interrelated and connected. With these timelines, the various sketches and different processes can be seen in relation to one another, and also in relation to Aalto's dated drawings for each project's intermediate and final design stages. The key themes, motifs, and ideas for each design are discussed later on to highlight their significance for each project. The interrelated aspects in Aalto's design process for different projects are finally noted, before summarizing the methodology and results of the thesis thus far.

2.2 Aalto's design process for three churches in the 1950s

2.2.1 Seinäjoki Church

The three churches examined in this study are all Lutheran churches, but have different contexts, backgrounds, and origins in their realization. For example, Seinäjoki Church, located in western Finland and officially named *Lakeuden Risti* (Cross on the Plains), began as a competition entry in 1951.⁵ Aalto began the design process for Seinäjoki Church with simple sketches of a girl (Fig. 2.5). The girl's outline was represented in plan with three basic trapezoidal forms side-by-side. This three-part plan was then adapted to a simpler trapezoidal plan. With the building oriented roughly along an east-west axis, the trapezoidal plan was then further developed with a general courtyard layout (Fig. 2.5). Repeated spaces were then defined along the axis of the entire church space (Fig. 2.6). At the same time as these initial repetitions in plan, the vaulted section and unique side windows of the church were also sketched and repeated (Fig. 2.6). Although not achieved in the final building, the original design intention was to open the back wall to extend the church space into the courtyard for open-air ceremonies.⁶ A trapezoidal plan is well suited to this design intention, as the plan's form can be inherently repeated or extended to larger scales. Apart from a change in the church's facade material, from black granite to white plaster (Fig. 2.7), no other significant changes can be seen in the church's overall design (Fig. 2.8) after the first term of the design process and initial competition. The church's interior, as seen today (Fig. 2.9), closely resembles the original interior perspective drawing from the 1951 competition. Despite being almost completely designed in 1951, significant time was needed to raise funds and organize donations after the initial competition, so the Seinäjoki Church project was actually built much later from 1957-59, including parish hall facilities and a prominent bell tower.⁷

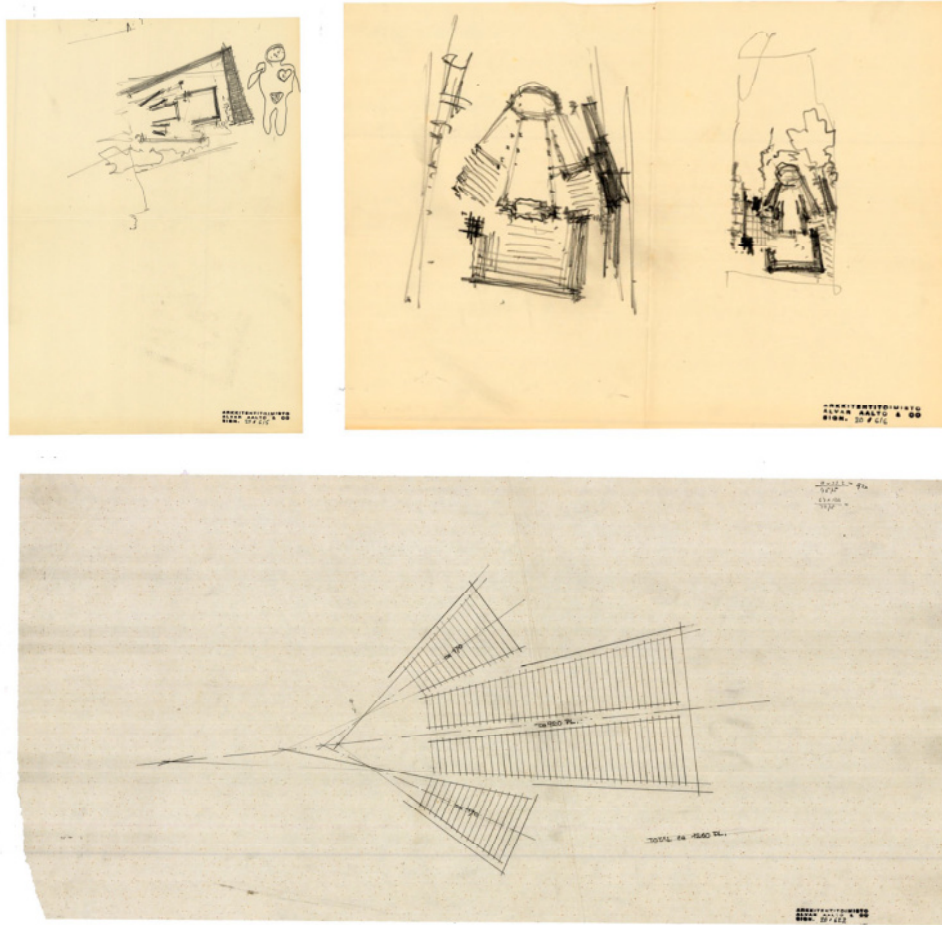


Figure 2.5. Design sketch for Seinäjoki Church showing the initial three-part plan for the church based on the simple outline of a girl. The Alvar Aalto Museum, Finland.



Figure 2.6. Design sketch for Seinäjoki Church showing a single trapezoidal form with repetition in both plan and section. The Alvar Aalto Museum, Finland.

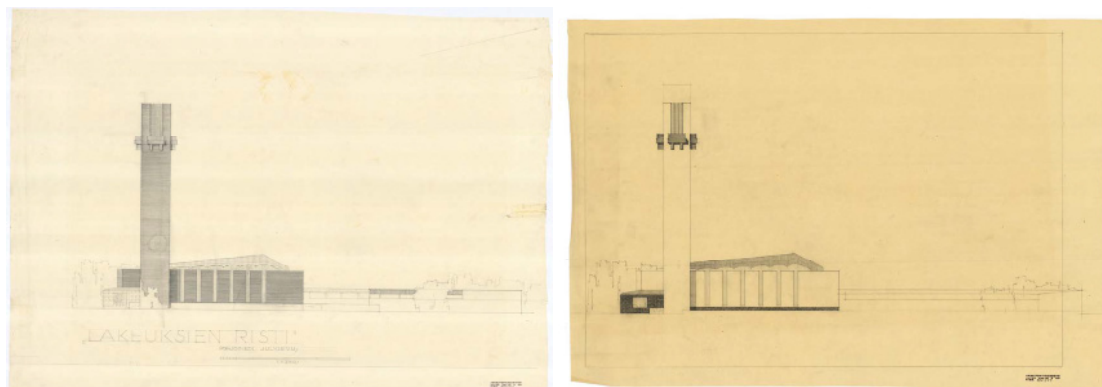


Figure 2.7. Design drawings for Seinäjoki Church for different façades in black granite and white plaster. The Alvar Aalto Museum, Finland.

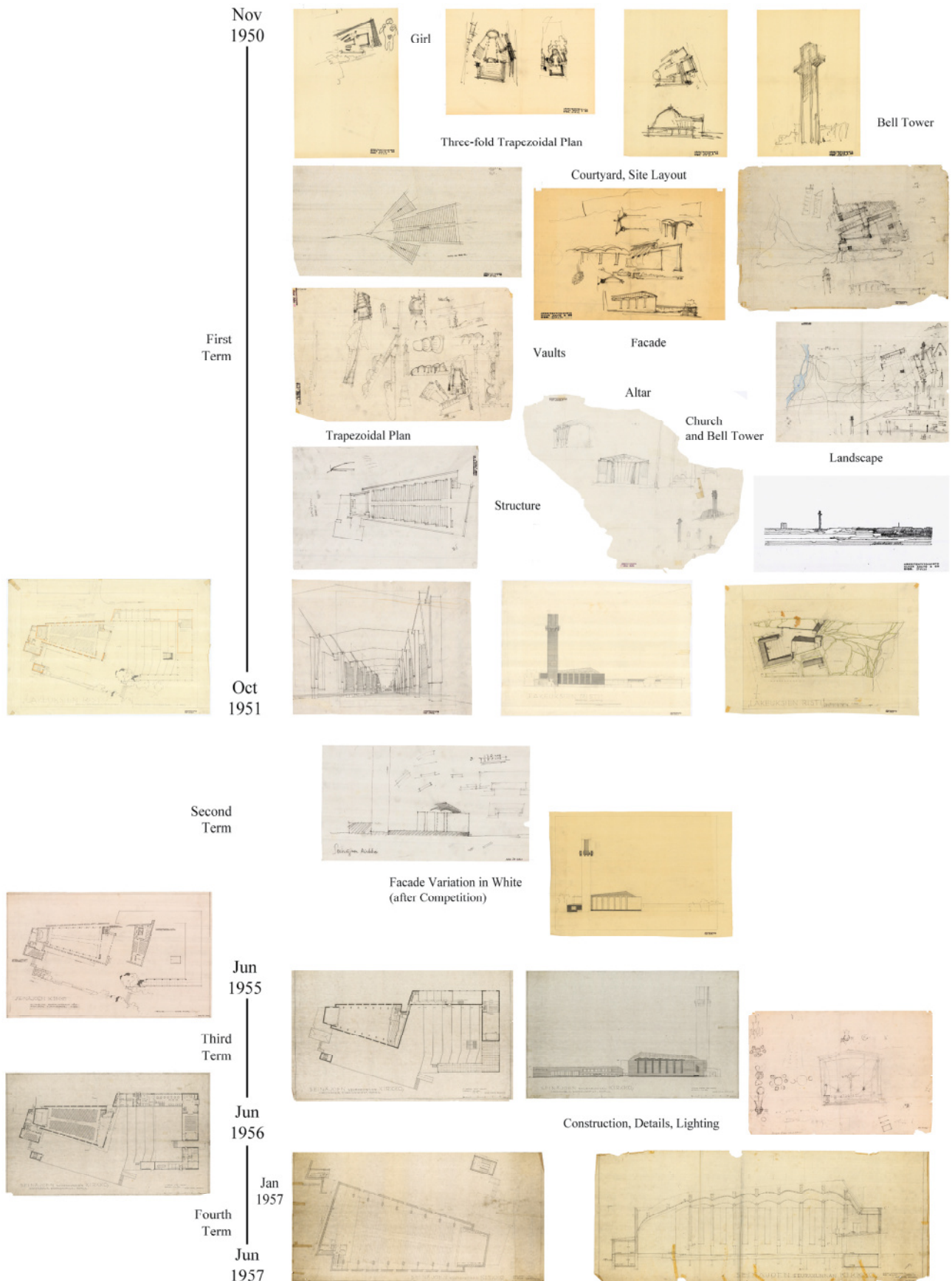


Figure 2.8. The approximate timeline of the design process for Seinäjoki Church showing Aalto's most important sketches and drawings. Original sketches and drawings courtesy of the Alvar Aalto Museum, Finland.

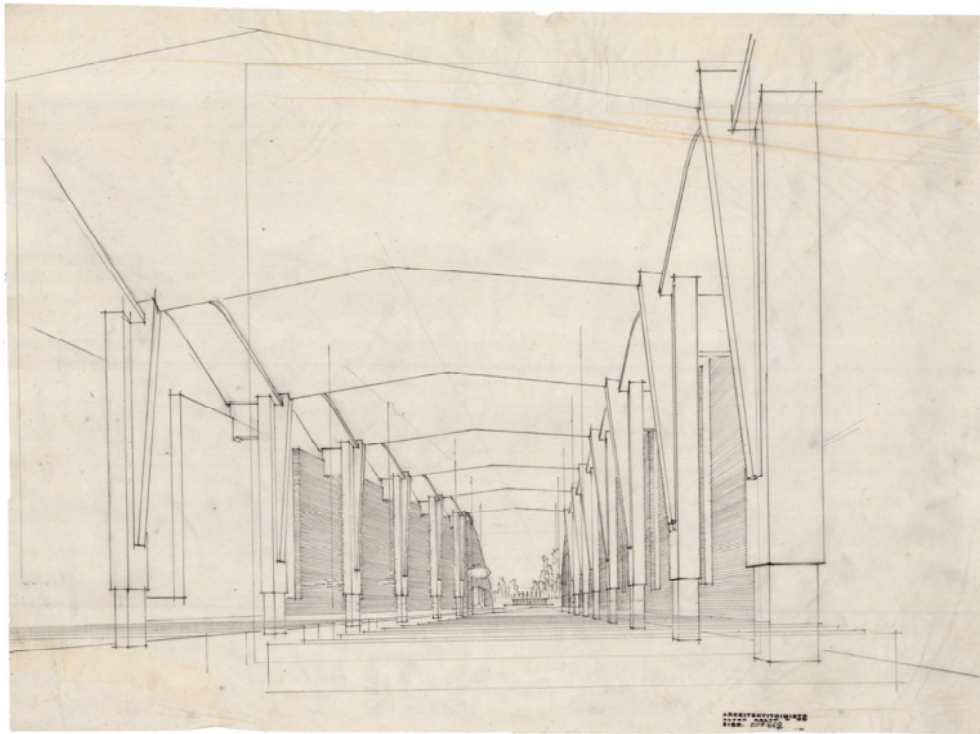


Figure 2.9. (above) Interior perspective sketch of Seinäjoki Church from 1951, and (below) interior photograph from 2012. (above) The Alvar Aalto Museum, Finland, and (below) photograph by author.

2.2.2 Vuoksenniska Church

Vuoksenniska Church or *Kolmen Ristin Kirkko* (Church of the Three Crosses), was commissioned as a subsequent project after the Aalto Studio developed a masterplan for the region around Imatra in eastern Finland. Vuoksenniska Church, its bell tower and nearby vicarage were designed from 1955-56, and built thereafter from 1956-58.⁸ Vuoksenniska Church was therefore designed after, but constructed and completed before Seinäjoki Church. Like the final design for Seinäjoki Church, Vuoksenniska Church began with an early site drawing involving a simple trapezoidal plan (Fig. 2.10). And just like the early sketches for Seinäjoki (Fig. 2.6), the trapezoidal plan for Vuoksenniska was also repeated threefold, but later combined with curved, fan-shaped elements (Fig. 2.10). Although Seinäjoki and Vuoksenniska Church share these common trapezoidal plans in their earlier design stages, the latter project continued to be refined and underwent a much more gradual development in the second and third terms of the design process. For example, as discussed later on in greater detail, the threefold repetition of elements in Vuoksenniska Church was coherent throughout the church and its design process, from the church space, bell tower, and interior details such as lighting fixtures. Throughout the design process, acoustics were also often checked with quick sketches (Fig. 2.11) of sound rays radiating from the pulpit. As the church is roughly oriented along a north-south axis, section sketches showed several variations for the southern-facing skylight, with sketches of natural light focused directly on the altar area (Fig. 2.11). Due to its inherent design complexity in terms of its plan, section, lighting, and acoustics, especially relative to Seinäjoki and Wolfsburg Church, Vuoksenniska Church demands far greater consideration and more detailed discussed, which will be offered in the following chapter.

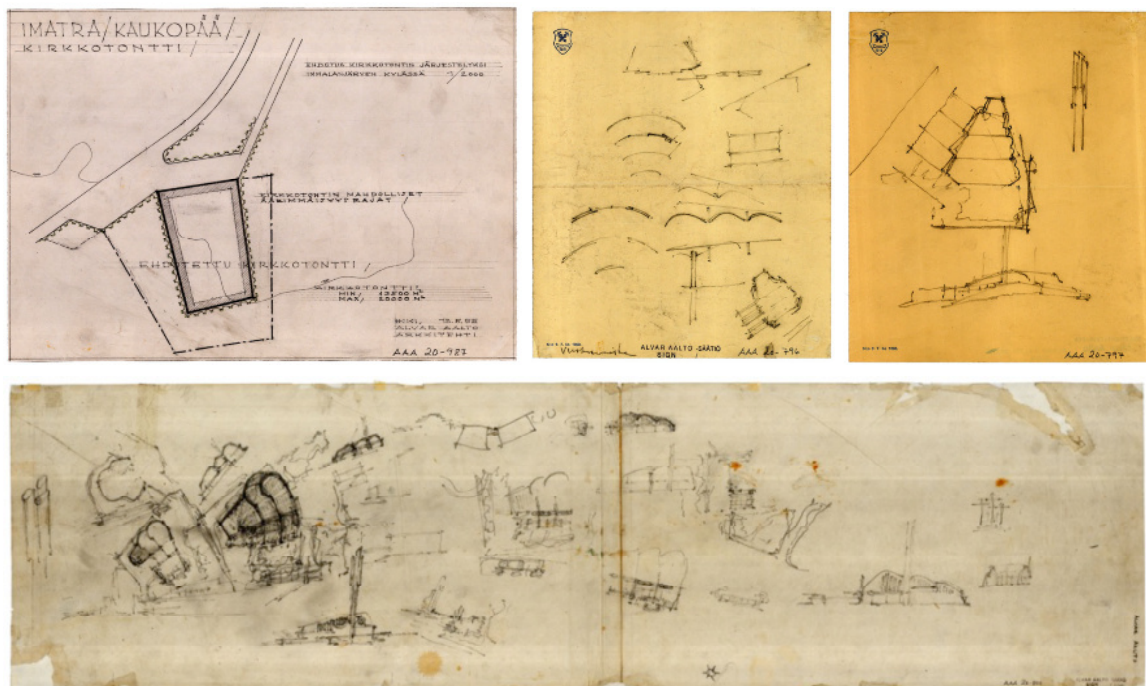


Figure 2.10. Early design sketches for Vuoksenniska Church starting with a trapezoidal form, repetitive elements, and a combined trapezoidal and fan-shaped form, repeated in plan and section. The Alvar Aalto Museum, Finland.

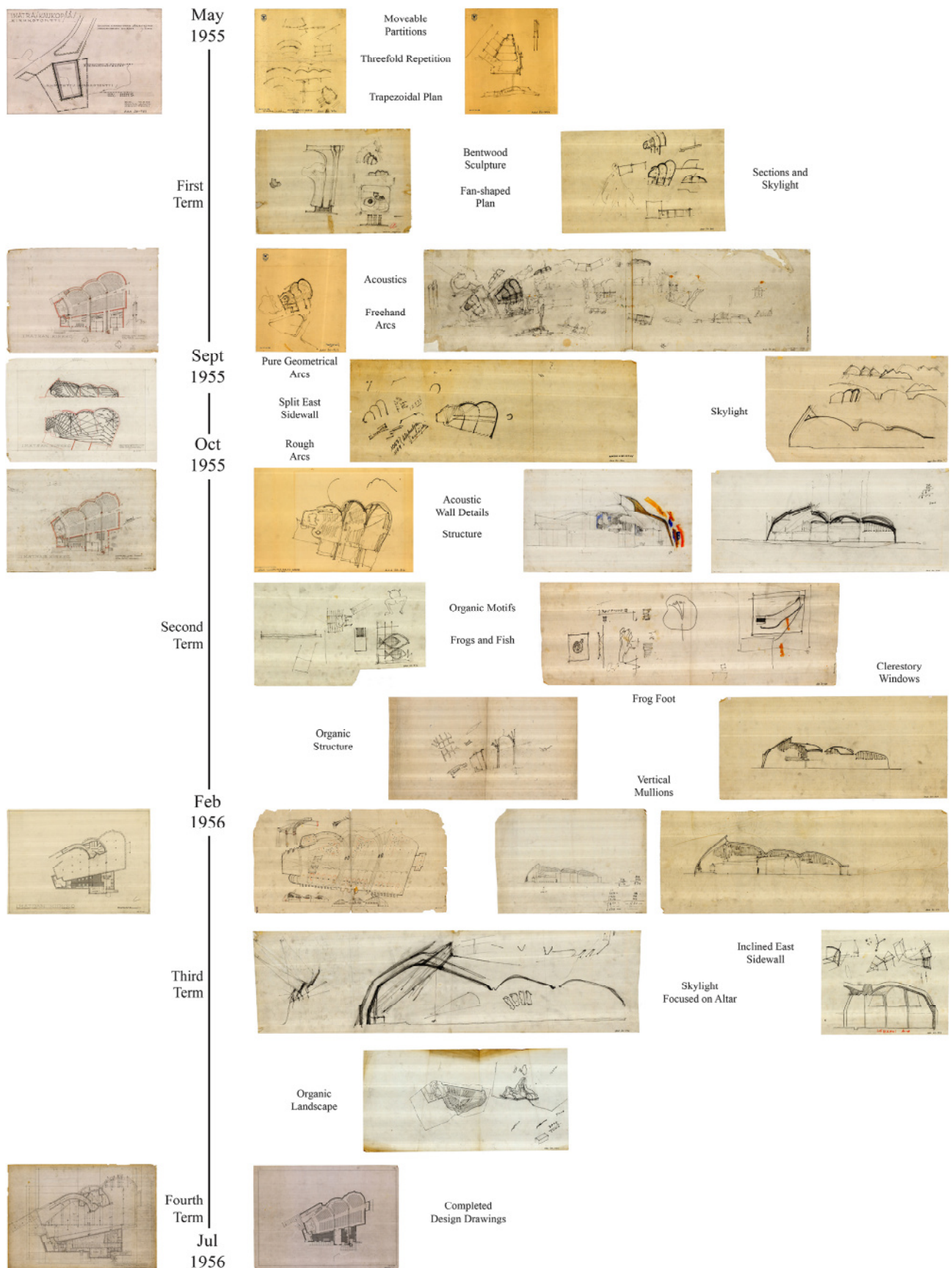


Figure 2.11. The approximate timeline of the design process for Vuoksenniska Church showing Aalto's key sketches and drawings. Original sketches and drawings courtesy of the Alvar Aalto Museum, Finland.

2.2.3 Wolfsburg Church

In the case of Wolfsburg Church in northwestern Germany, which is officially named *Heilig Geist Kirche* (Church of the Holy Ghost), Pastor Erich Bammel of Wolfsburg contacted Aalto personally in the summer of 1958 after seeing the recently completed church in Vuoksenniska.⁹ The design process for Wolfsburg Church spanned from 1958-61, including the church's bell tower and town hall buildings. Construction also started in 1961 and lasted until the official opening in 1962. Aalto started to design the church with a fan-shaped form in plan (Fig. 2.12), and a section strongly influenced by bentwood forms, not unlike the early plan and section sketches for Vuoksenniska Church. For Wolfsburg Church, Aalto's early sketches show a key concern in plan for both the aisle location and baptismal area. Aalto sketched several variants for the aisle location again and again, including both symmetrical and asymmetrical plans (Fig. 2.12). At the same time, just like in Seinäjoki, a courtyard site layout was also planned for outside of the church (Fig. 2.12). Inside, the baptismal area was defined in the vicinity south of the altar (Fig. 2.12), instead of the customary location near the church entrance. Following on from the first term of the design process, only the layout of the adjacent town hall buildings was reworked from initial variations with linear blocks to a radial cluster of spaces (Fig. 2.13). Apart from an articulated skylight over the baptismal area and minor structural changes, the overall design process (Fig. 2.14) for Wolfsburg Church mirrored the limited development in Seinäjoki. At the end of the first term of the design process, Pastor Bammel and the church committee members simply accepted Aalto's design proposal. Major changes were not needed to the church building itself, and only the layout of the surrounding buildings and bell tower were updated.¹⁰



Figure 2.12. Design sketches with symmetrical and asymmetrical fan-shaped plans and bentwood sections for Wolfsburg Church. The Alvar Aalto Museum, Finland.

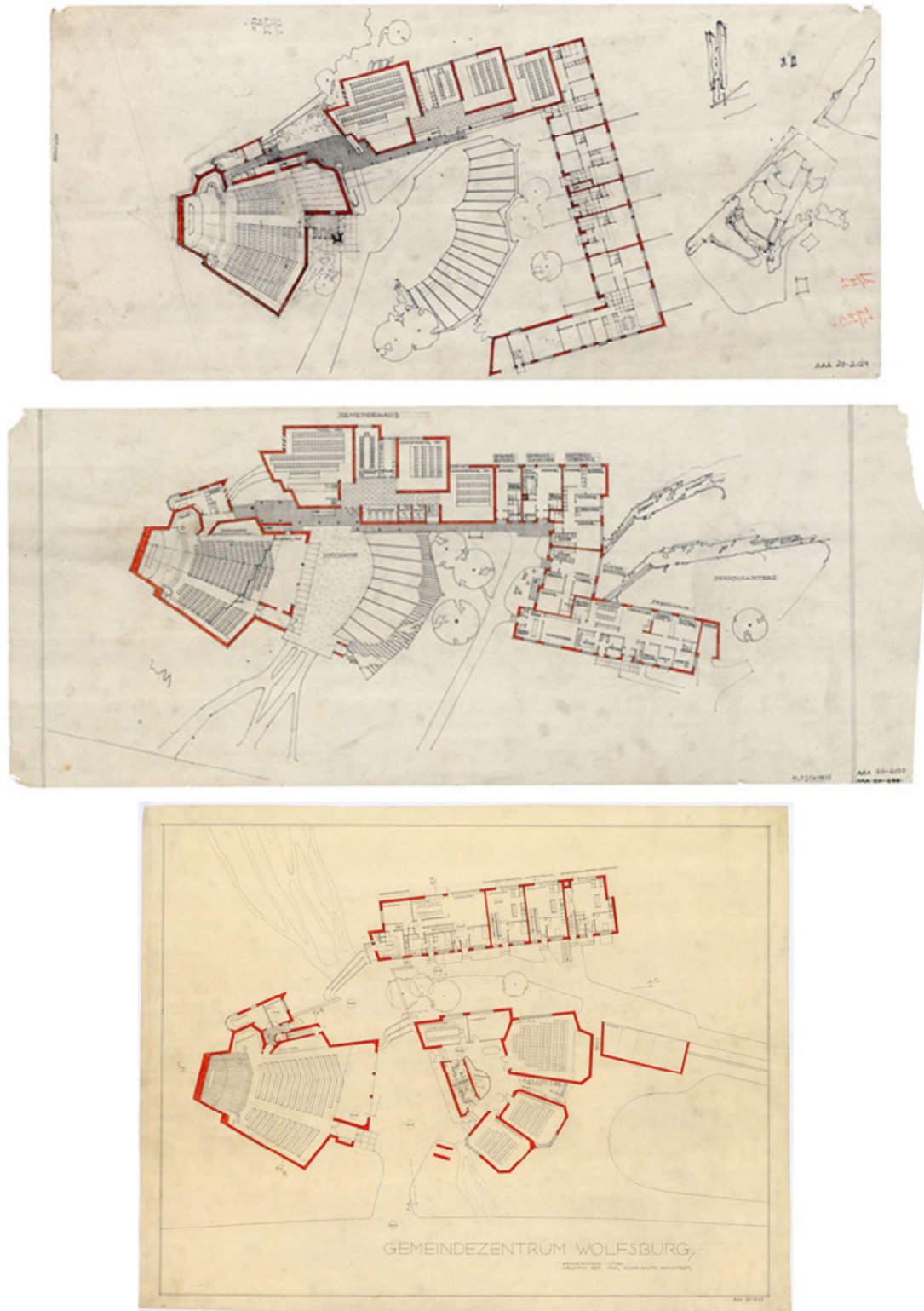


Figure 2.13. Site layout drawings of Wolfsburg Church with linear and radial arrangements for the church's surrounding town hall buildings. The Alvar Aalto Museum, Finland.

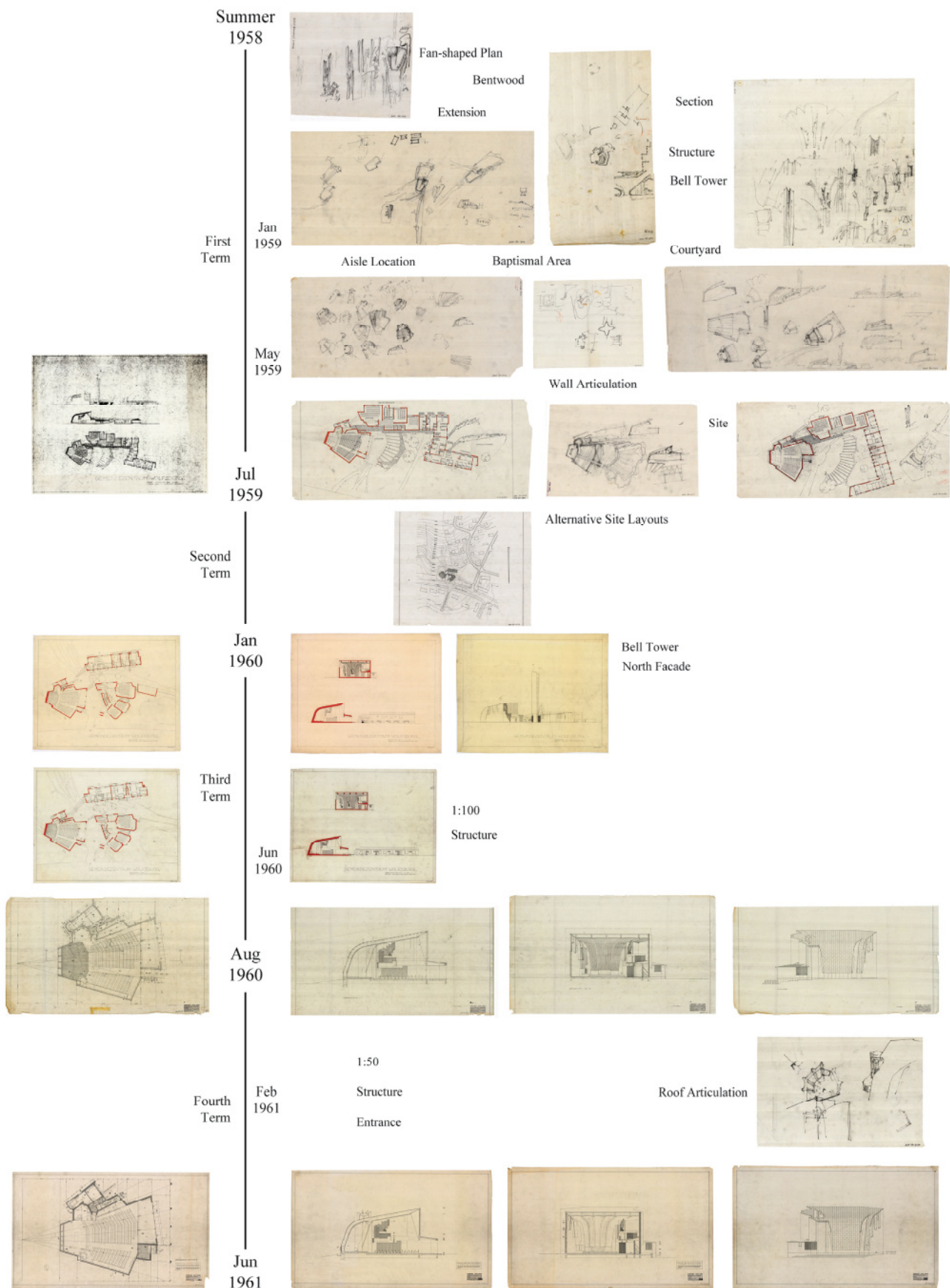


Figure 2.14. The approximate timeline of the design process for Wolfsburg Church showing Aalto's significant sketches and drawings. Original sketches and drawings courtesy of the Alvar Aalto Museum, Finland.

2.3 Reprise and Continuity

Comparing a selection of Aalto's early sketches from each project in relation to one another (Fig. 2.15) reveals noticeable similarities. For instance, Aalto's early sketches from each project could be almost exchanged for each other, with any single sketch belonging to any of the three separate design processes. In the three church projects examined, Aalto's sketches display a consistent tendency to reprise and repurpose similar trapezoid and fan-shaped elements in the early stages of a design process. These elements could be modified, repeated, or adjusted in scale, without constraining or predetermining the end result of the design. Their reprise in the early stages of Aalto's design process establishes continuity across the three distinct projects. These elements also represent a common point of departure that could later open up new possibilities in Aalto's way to design.

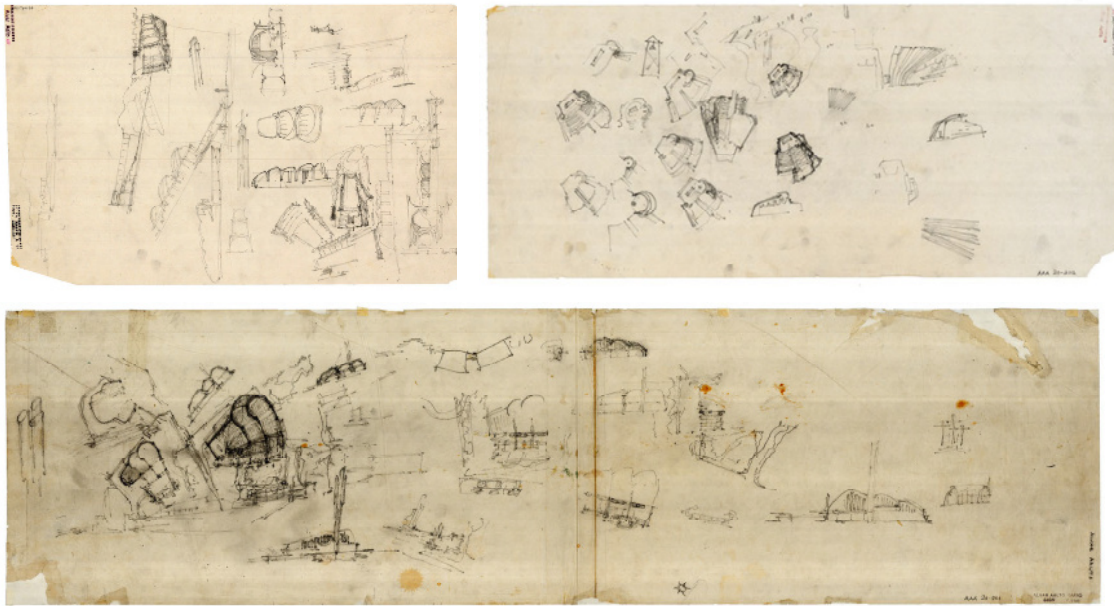


Figure 2.15. Comparing early design sketches from Seinäjoki, Wolfsburg and Vuoksenniska Church illustrates a reprise and continuity across the design processes for the three churches. The Alvar Aalto Museum, Finland.

Similar section sketches for the rear wall behind the altar in each church suggest another common element and interaction between furniture and architecture in Aalto's design process. Sketches for Vuoksenniska and Wolfsburg Church (Figs. 2.2 and 2.12) show explicitly how these curved wall surfaces were first sketched as a grained wood structure. Previous discussions also highlighted a connection between the design process for Vuoksenniska Church and one of Aalto's bentwood sculptures from the 1950s. For example, as already noted earlier on, Menin and Samuel viewed the bentwood sculpture as a conceptual model of wood, which could be extrapolated to the scale of the church's rear wall.¹¹ The sketches (Fig. 2.11) and interior detailing of Wolfsburg Church (Fig. 2.16) show how the extrapolation could be extended even further, from the scale of furniture and sculpture, to a wall or an entire church, or across different projects. Aalto could use design elements like trapezoid, fan-shaped, and bentwood forms not as fixed geometry, but malleable and highly adaptable elements for addressing different design situations.



Figure 2.16. (left) Early design sketches for the Wolfsburg Church involving bentwood forms, and (right) the finished interior of the church. (left) The Alvar Aalto Museum, Finland, and (right) photograph by author.

2.4 Discussion

The reprise and continuity seen in Aalto's design sketches seems relatively straightforward and simple. The idea of Aalto effectively repeating elements or borrowing and reworking previous ideas has also been a common point of criticism and discussion in previous literature. For example, previous studies¹² noted that the competition entry for Seinäjoki Church was closely based upon a previous competition design for a church in Lahti, with a simple trapezoidal plan, suggesting an expanded scope for future studies. Radford and Oksala¹³ further studied the entire range of Aalto's design output, from glass items to tables, door handles, and buildings, throughout the architect's career. They argued, however, that Aalto's general tendency for the repetition of forms creates a recognizable style, but also achieves an expression of discontinuity or incompleteness, namely to represent ruin and fragmentation. This latter discussion was based on general observations and without reference to specific instances in the architect's sketches and drawings. The present thesis uses these primary materials to illustrate Aalto's approach to designing. Rather than following a determined design process fixed on a consistent end expression or goal, such as ruin-like aesthetic or conceptual fragmentation, Aalto's design process is open-ended and at the same time grounded in the use of basic design elements. For Aalto, basic design elements like the trapezoidal, bentwood, and fan-shaped form might be akin to cells in organically growing forms. They result in flexible combinations and variations that are never schematic.¹⁴ Aalto's basic design elements are simple forms in themselves, but can be combined, adapted, or synthesized in complex ways through sketching and drawing to solve a broad range of design problems across different scales.

2.5 Summary

With an original methodology and process of organizing, comparing, and sorting Aalto's sketches and drawings, this chapter provides a general overview of the design processes for three churches from the 1950s. The design process for each church is represented with a time line made up of Aalto's most important sketches and drawings for a given project. As a somewhat overlooked but important primary source material, Aalto's sketches are complementary to existing Aalto research based on more conventional materials such as archived letters, texts, and interviews. Aalto's sketches and drawings, however, illustrate more clearly how and not just what the architect designed. In the three examples of Seinäjoki, Vuoksenniska, and Wolfsburg Church, a comparison of early design sketches from each project shows significant similarities, despite the final buildings being noticeably distinct. Aalto's sketches show a key process of reprise, with the subsequent modification of basic design elements for different projects and architectural situations. For the three churches examined here, Aalto's design process is characterized by a continuity and reprise of basic design elements, with their interaction and the careful adaptation, adjustment, and synthesis in realizing a unique and final design. As the design process for Vuoksenniska Church shows a much higher degree of complexity when compared to the case of Seinäjoki and Wolfsburg Church, an closer examination of the Vuoksenniska sketches and drawings is presented in the next chapter.

Notes for Chapter 2

¹ David Walker, "White Space in Northern Light: Two Churches Analysed," *Architectural Research Quarterly* 8, no. 1 (1999): 61–81, doi:10.1017/S1359135504000089.

² Sarah Menin and Flora Samuel, *Nature and Space: Aalto and Le Corbusier*, (London; New York: Routledge, 2003).

³ *ibid.*

⁴ Hyon-Sob Kim and Peter Blundell Jones, "Villa Mairea, the Lost Memories," *Ptah* no. 1, no. 1 (2004): 17–28.

⁵ Esko Suhonen and Jonas Cedercreutz, eds., "Seinäjoen Kirkkokilpailu," *ARK Arkitehti Arkitekten* 11 (1952): 175–85.

⁶ Harry Charrington and Vezio Nava, eds., *Alvar Aalto: the Mark of the Hand*, (Helsinki: Rakennustieto, 2011).

⁷ Markus Aaltonen, *Näkyhän Se Varmasti - Alvar Aalto Ja Seinäjoki*, trans. Elina Anttila, (Jyväskylä: Veterator Oy, 2005).

⁸ Alvar Aalto, "Vuoksenniskan Kirkko," *ARK Arkitehti Arkitekten* 12 (1959): 193–207.

⁹ Müller, *Aalto Und Wolfsburg*.

¹⁰ Susanne Müller, *Aalto Und Wolfsburg*, (Weimar: VDG, 2008).

¹¹ Menin and Samuel, *Nature and Space: Aalto and Le Corbusier*.

¹² Harry Charrington, "The Makings of a Surrounding World: the Public Spaces of the Aalto Atelier" (The London School of Economics and Political Science, 2008).

¹³ Antony Radford and Tarkko Oksala, "Alvar Aalto and the Expression of Discontinuity," *The Journal of Architecture* 12, no. 3 (June 2007): 257–80, doi:10.1080/13602360701469986.

¹⁴ Alvar Aalto, *Alvar Aalto in His Own Words*, ed. Göran Schildt, (New York: Rizzoli, 1998).

Chapter 3. Retracing the design process of Vuoksenniska Church (1955-58)

3.1 Introduction

An overview of the design process for Vuoksenniska Church was established in the previous chapter, illustrating a degree of complexity and development not seen in the other two churches. The present chapter therefore examines Vuoksenniska Church in greater detail to better understand the subtleties and detailed issues of Aalto's particular design process for the church. The key ideas and preoccupations in the church's design process, as briefly introduced in Chapter 2, will be used as themes to organize the following discussion. With regard to previous literature, although a number of Aalto's sketches and drawings have already appeared in previous studies on the church,¹ they have received little consideration relative to the extensive body of written literature relevant to the project. When Aalto's sketches and drawings have been considered, they are often used to limited effect: to illustrate an isolated aspect of the church's design, such as an acoustic² or lighting phenomenon;³ to discuss Aalto's technique and way of sketching or drawing,⁴ or simply to convey an impression of creativity. Yet a more careful analysis and interpretation of a broader selection of the church's working drawings and sketches can help to clarify Aalto's design process, architectural intentions and thinking.

3.2 Literature and background of Vuoksenniska Church

Locating Vuoksenniska Church in broader architectural culture, Juhani Pallasmaa has cited it as an exemplar of the spatial complexity that can be achieved with handmade drawings rather than computer-aided design.⁵ As briefly noted earlier, Eeva-Liisa Pelkonen⁶ and Richard Weston⁷ have summarized the church's form in terms of ambiguity and plasticity, respectively. The building has formal and spatial qualities, which therefore seem well placed for further examination of the thinking and drawing behind its development. By examining the sketches and drawings for the design of the church in more detail, and not just the building alone, we will see how Aalto's sketches and design drawings provide new and more detailed insights. For convenience, the previous visual representation of the church's design process (Fig. 2.11) is reproduced herein as Figure 3.1, acting as an overview and starting point for the more detailed analysis that follows.

During the main design period from 1955–56, Aalto was occupied with the design for the church, bell tower, and nearby vicarage (Fig. 3.2). The earliest known dated drawing for the church is from 13 May 1955 and the construction drawings date from July and August of 1956.⁸ These dates are taken as the start and end of the design process for the church itself, although the building was actually opened later in September 1958. Note that some drawings for the church's furniture and organ are also dated November 1958, after the church's official opening.

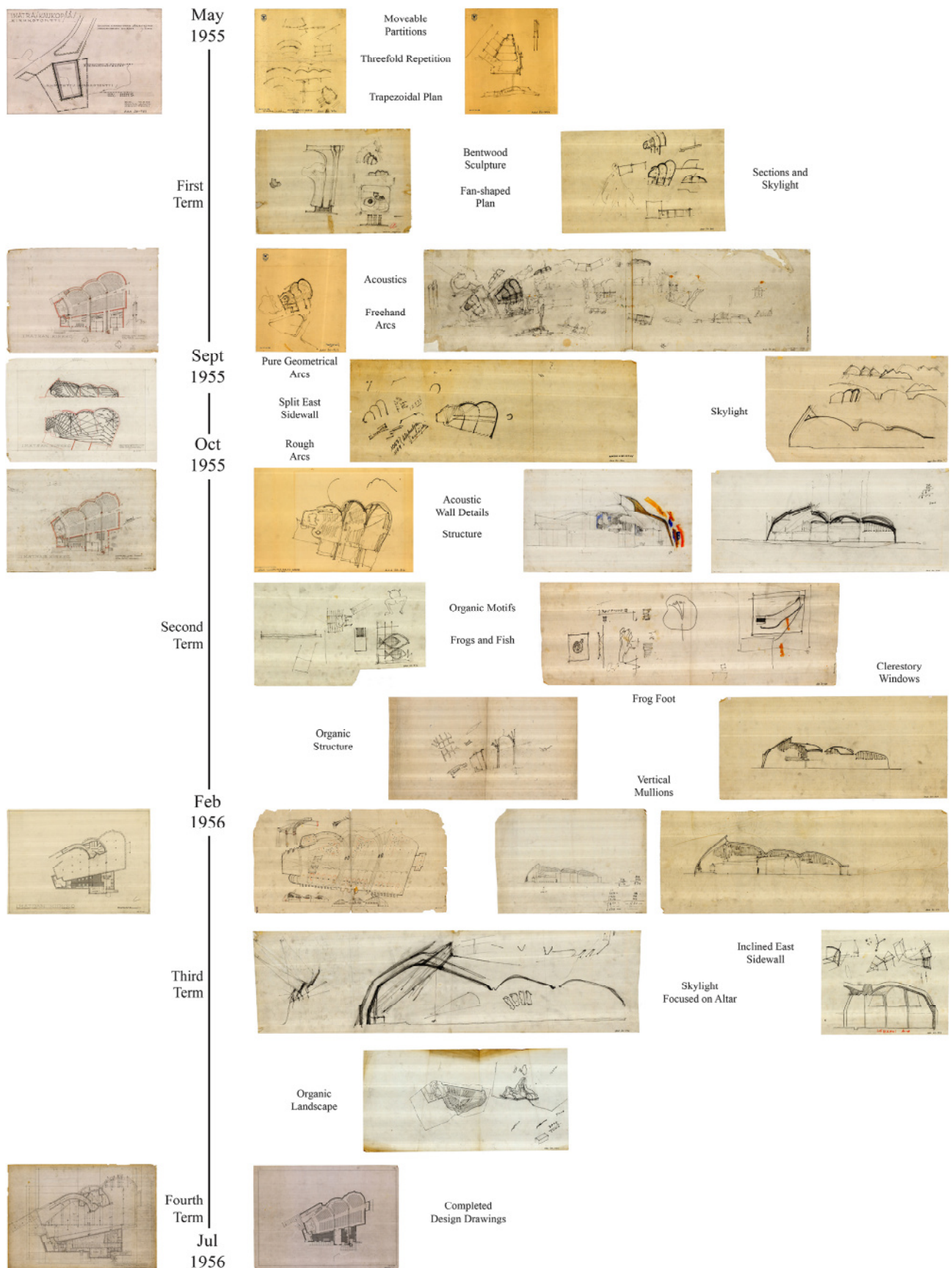


Figure 3.1. Approximate timeline of the design process for Vuoksenniska Church with Alvar Aalto's most significant sketches and drawings. Original sketches and drawings courtesy of the Alvar Aalto Museum, Finland.



Figure 3.2. Vuoksenniska Church in Imatra, Finland by Alvar Aalto, completed 1958. Photograph by author.

3.3 Site, Plans, and Acoustics

3.3.1 The site, repetitive lines, and trapezoidal plan

A basic site plan, showing a trapezoidal area in which to locate the proposed church, is the first dated drawing for Vuoksenniska Church (Fig. 3.3a). Many of Aalto's other initial design sketches are undated but we can assume that they were most likely drawn around the same time as this rough site plan in May 1955. The site plan itself shows the main axis of the building directed slightly westward from a north-south axis, and this general orientation remained constant throughout the entire design process. In Aalto's starting sketches for the project, the common theme is the threefold repetition of simple lines, and the repetition of a basic tapering trapezoidal form. Even at this first initial stage, Aalto appears to work in plan and section simultaneously, tying the two together with repetitive elements and basic ideas for foldable or sliding partitions in the church (Fig. 3.3b). These starting sketches of partitions confirm the priority Aalto gave to the architectural mediation of social and religious activities in the church, and providing separable meeting spaces (Fig. 3.3c). The threefold repetition may have been intended to symbolize the three crosses of the crucifixion, or perhaps even the Trinity (depending on one's interpretation of the hierarchy in the Trinity and the hierarchy evident in this early plan for the church). As observed in the previous chapter, the basic tapering trapezoidal form was most likely borrowed from Aalto's earlier Seinäjoki Church competition design from 1950–51. The trapezoidal plan was also able compatible with, and could accommodate the traditional layout and elements expected in a Lutheran church, including altar, pulpit, organ, aisle, and seating. In a similar manner to the church's orientation, the importance of this threefold repetition of elements in both plan and section cannot be understated. This repetition reappears throughout the design process for the church, its bell tower, and interior light fixtures.

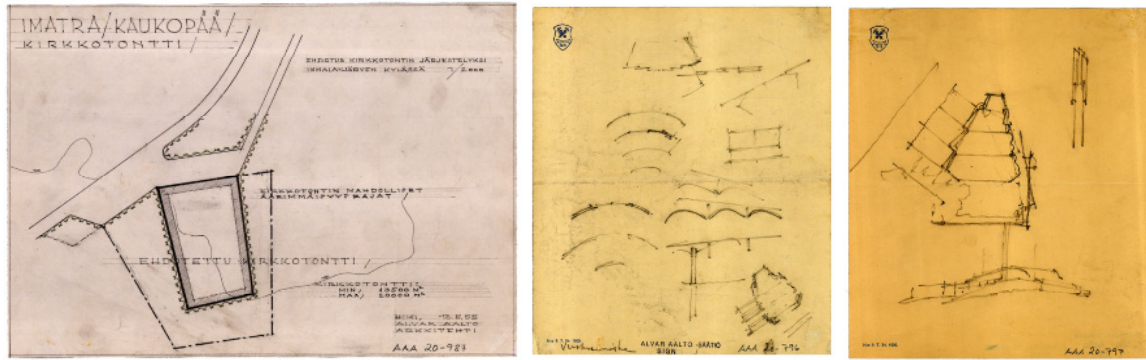


Figure 3.3. (a, left) early site plan dated 13 May 1955 and initial sketches of Vuoksenniska Church showing (b, middle) movable partitions and (c, right) a trapezoidal plan repeated three times. The Alvar Aalto Museum, Finland.

3.3.2 The Fan-shaped plan and bentwood sculpture

In undated sketches, Aalto continued to develop the church's design from the early trapezoidal plan by trying an alternative fan-shaped plan (Fig. 3.4). Here the repetitive three parts remain, but with a fan-shaped form instead of a basic trapezoid. The section sketch shows the church's characteristic division into three spaces with what appears to be a fourth separate lower space attached to the main church. On first glance, the fan-shaped plan reminds us of the basic arcs from Aalto's other initial sketches already discussed. Upon closer examination of these sketches, however, in this instance the fan-shaped plan is copied from a drawing of the lower cross-section of one of Aalto's bentwood sculptures (Fig. 3.4). As previously noted, Sarah Menin and Flora Samuel⁹ have also discussed this specific sketch in reference to the church's curved wall in the section behind the altar. They explained that the curvature of the wall was an extrapolation of the curvature of the bentwood. The similarity, however, between the sculpture's cross-sectional fan-shaped form and scale and the fan-shaped plan of the church is much more explicit. Here Aalto displays a distinctive facility to synthesize a basic architectural plan across scales with a small sculpture related to his experiments for furniture design. We cannot know for certain whether these drawings of the bentwood sculpture and its cross-section were a spontaneous incident, with Aalto recognizing a potential new plan for the church while in the process of drawing the sculpture's cross-section. Nonetheless, the drawing unmistakably shows the bentwood sculpture, its lower cross-section, and the transposition of the bentwood form into the building's plan. Researchers such as Pallasmaa¹⁰ and Schildt¹¹ have also commented before on the general relationship between Aalto's furniture and buildings, observing that he often drew different ideas for furniture and buildings side by side. Yet this example from the Vuoksenniska Church project highlights a much more interactive, direct, and intimate connection between his furniture and architecture design processes. This connection merits a closer examination and will be considered in the next chapter.

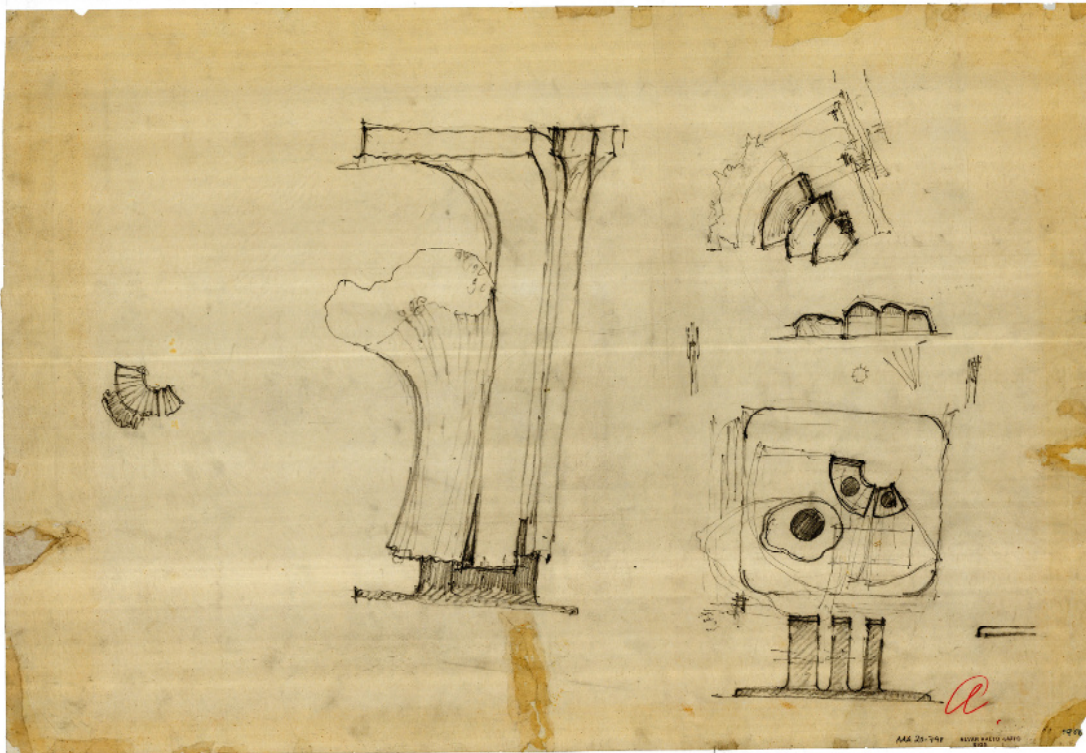


Figure 3.4. Aalto's sketch of a bentwood sculpture, its lower cross-section, and a fan-shaped plan repeated three times. The Alvar Aalto Museum, Finland.

3.3.3 The Freehand Arcs and Pure Geometrical Arcs

The transition from the first to second term of the design process for Vuoksenniska Church involves Aalto settling on a rough plan, combining parts of both the trapezoidal and fan-shaped forms. Rather than directing the arcs towards the church's altar as in the previous fan-shaped plan, the arcs are now shifted and focused instead on the main space and seating area of the church (Fig. 3.5a). In section, the three divisions of space remain, but in plan, this combination of arcs and trapezoid pushes parts of the east sidewall outwards. This shift in plan leads to more defined and focused areas within the main church space, further articulating the church's social purpose and potential. These sketches show an apparent restlessness, with several variations of arcs drawn quickly in freehand, and with many also showing two arcs instead of three. The hard lines along the arcs in the sketch suggest that Aalto had also considered several options for the church's sliding or moving partitions. For example, many of the initial freehand arc sketches show the partitions curling southward along a pair of arcs, rather than northwards like in the church today. As the design continued through the second term, Aalto returned to a plan with three arcs that still balanced religious and social priorities (Fig. 3.5b). The three arcs also maintain coherence with the existing section, and more importantly introduce the concept of splitting the church's east sidewall to provide a storage space for the movable partitions. As we continue now to look at the design process in the second term, three pure geometrical arcs will define the church's plan in formal drawings dated September 1955 (Fig. 3.5c), five months after the first initial dated site drawing.



Figure 3.5. (a, top) Aalto's sketches of the church plan with freehand arcs, (b, bottom left) pure geometrical arcs, and (c, bottom right) a staff drawing dated 22 September 1955. The Alvar Aalto Museum, Finland.

3.3.4 Acoustics and the East Sidewall

So far we have examined the first term of the design process for Vuoksenniska Church in a somewhat sequential manner. While resolving the church's general plan and section, a key parallel concern that appeared throughout the design process was the acoustics of the church's interior. The repetitive lines in Aalto's very first sketches may have even been originally thought of as abstract waves of sound. His sketches in the first and second terms provide a clearer picture, however, with each design iteration (Figs. 3.3c, 3.5b, 3.6a, 3.6b) showing a persistent concern with acoustics and the reflections of sound from the pulpit. Unlike the threefold repetition of elements and tension between the building's social and religious roles, these sketched sound rays do not appear to play a major formative role in the church's overall plan or section. Instead, the sketched rays might have served as a rough metric always present in the background of the design process, allowing Aalto to test and think about the church's atmosphere and acoustical behavior at intermediate design stages. Because acoustical behavior also depends on the general volume and proportions of a space, its surfaces, and finish materials, acoustics remain a relevant consideration at several architectural scales. As a basic environmental design metric, acoustics and primary sound reflections are simple enough to estimate, and were continually applied in all three terms of the church's design development.

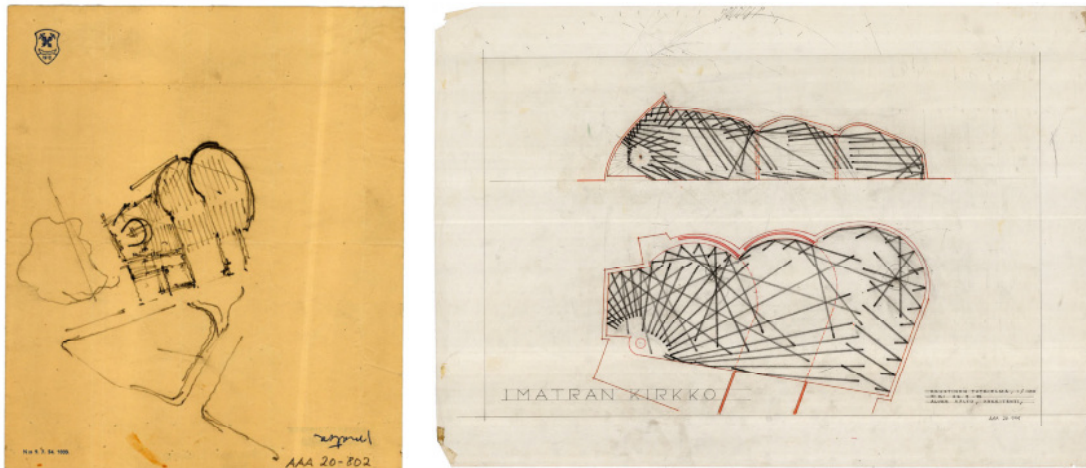


Figure 3.6. (a, left) Sketch in plan of estimated sound reflections from the pulpit and (b, right) drawings of sound reflections in plan and section. The Alvar Aalto Museum, Finland.

Subsequent changes in the east sidewall illustrate an example of how Aalto adjusted the church's design based on acoustical considerations (Fig. 3.7a). With the overall form of the church already established, as we move down in scale to the church's wall details, the smooth geometrical arcs become rough, segmented and faceted arcs based on acoustics and sound reflections. Aalto's sketches show a clear intention to facet and reshape the arcs in an attempt to better reflect sound radiating from the pulpit (Fig. 3.7a). Note that the majority of these sketches were done in plan, but some acoustical sketches were also drawn in section (Fig. 3.6b). Some Aalto office staff members recall how the church's acoustical development was based on physical models with reflecting light rays.¹² Compared to the convenience of drawing, these models were probably built for checking or comparing different designs already drawn on paper. In either case of drawing or physical modeling, these acoustically driven changes are layered or mapped on to a plan and section of the church, both of which were already established from the threefold repetition and division of the main church space for social purposes (Fig. 3.7b). In more general literature, Giedion¹³ understood Aalto's use of such curved and organic forms in opposition to overly rational and geometrical design tendencies in early modern architecture. Aalto's sketches for the church's east sidewall show otherwise. The design of these walls were not opposed to, but were actually rooted in and built upon the earlier pure geometrical arcs and then later refined based on acoustics. The previously established split wall for storing the movable partitions also provides the necessary freedom for molding the church's inner wall surfaces based on acoustical considerations.

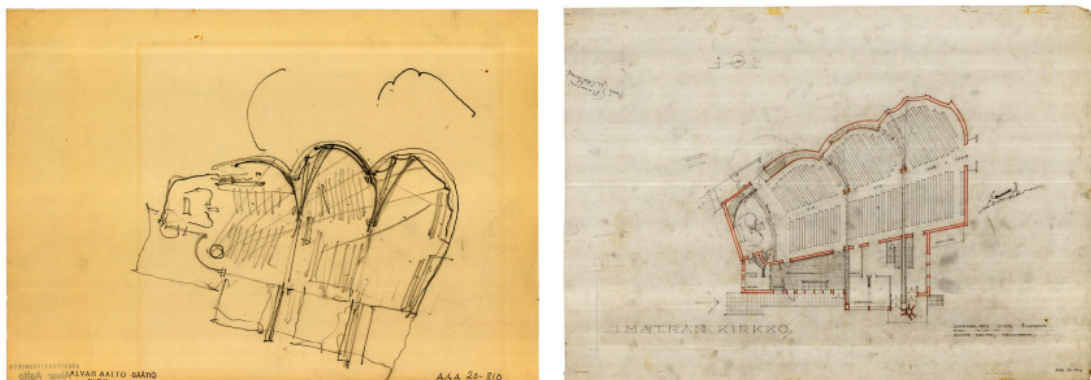


Figure 3.7. (a, left) Change of the church's east sidewall from smooth to rough arcs based on acoustical considerations, and (b, right) a staff drawing dated 12 October 1955. The Alvar Aalto Museum, Finland.

3.4 Sections, Light, and Interior

3.4.1 Sections and Light

If acoustics appear to have been the predominant environmental design consideration in the church's plan, the church's section drawings show an equally intense preoccupation with light. I showed earlier how section drawings from the first term of the design process defined partitions in the main church that could divide the space into three. In addition to acoustical considerations, second term section drawings show Aalto's considerations for the quality of natural light in these spaces, especially the lighting conditions of the church's altar. For example, an early section sketch shows a curving wall rising behind the altar, continuing up and cantilevering over the adjacent roof area of the church (Fig. 3.8a). This section and cantilevered detail creates a south-facing skylight over the altar and is similar to the section of Wolfsburg Church. Compared to the Wolfsburg Church, however, the Vuoksenniska Church section was further developed (Fig. 3.8b, 3.8c). After numerous sketches and design iterations, the Vuoksenniska section shows a separate directed skylight, offset from the curved wall and pointed directly at the altar area, as seen in the church today (Fig. 3.8d). Aalto most likely thought that this directed skylight would provide more natural light focused on the altar and symbolic three crosses of the church. The developed skylight could therefore focus light on the three crosses in the church, just as Walker¹⁴ observed during his lighting studies in the church, whereas the earlier scheme would yield even more natural light washing down the wall behind the altar and crosses. Just like Aalto's design for the church's lighting fixtures¹⁵ (Fig. 3.9), the developed skylight is finally divided into three, further extending the continuity of the church's threefold repetitions throughout its design, from architecture to furniture.

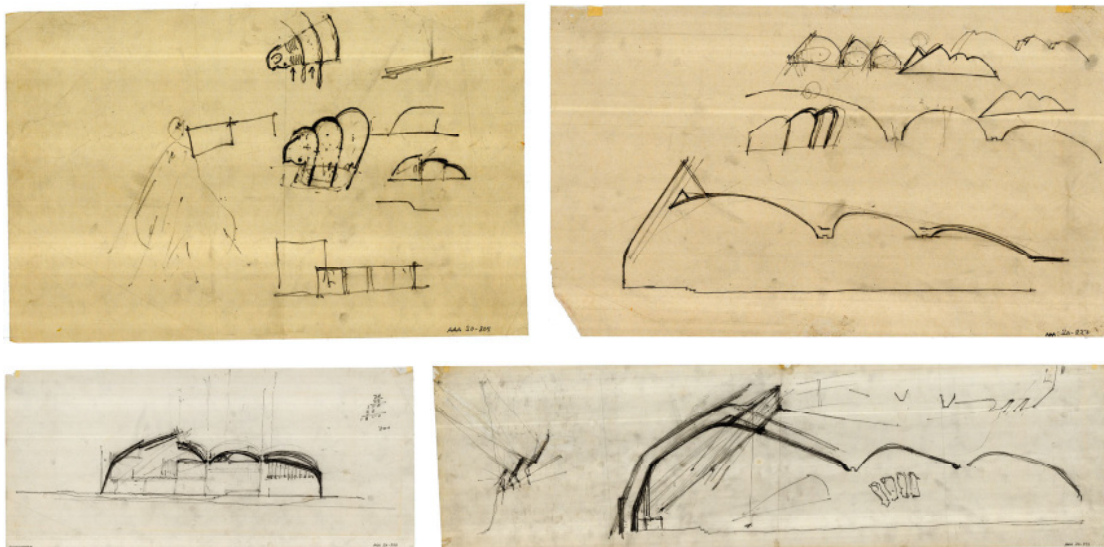


Figure 3.8. (a, top left; and b, top right) Initial section sketches showing a curved wall and integrated skylight, and (c, bottom left, and d, bottom right) the transition to a separate skylight directed at the altar area. The Alvar Aalto Museum, Finland.

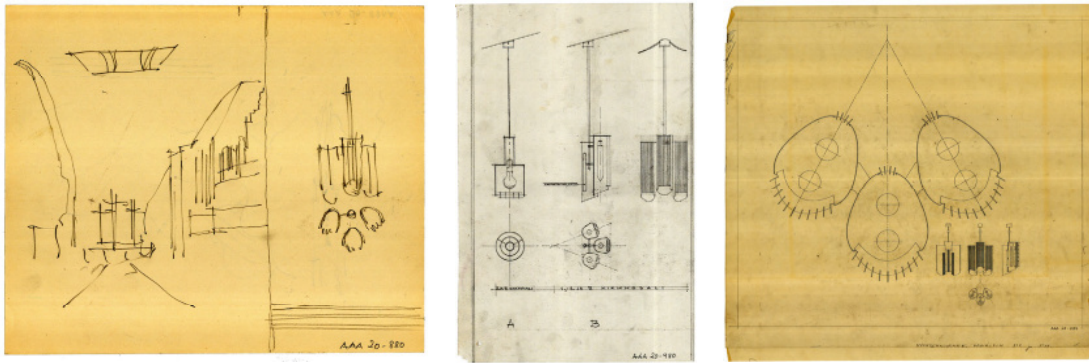


Figure 3.9. (a, left) An initial design sketch of the church's skylight, altar area, and light fixture; (b, middle) preliminary, detail drawings of the church's light fixtures; and (c, right) detail drawing of the church's light fixtures with the characteristic three-fold repetition. The Alvar Aalto Museum, Finland.

Alongside the natural lighting of the altar and three crosses of the church, a number of section drawings show Aalto's persistence to resolve the design of the church's unique clerestory windows. The church's side windows were sketched many times over, with several variations sketched by Aalto and redrawn by studio staff.¹⁶ A collection of figures (Fig. 3.10) shows a limited sample of the multiple attempts to finalize the church's window details. For instance, the initial second and even later third term window sketches show vertical mullions in the church's east sidewalls (Fig. 3.10c). With curved walls in plan, the vertical mullions seen in these section sketches and drawings indicate that the walls themselves were also initially vertical instead of inclining. Note that with the latter case of curved, inclined walls, the window mullions must be drawn as diagonal lines in section. Only after several attempts do we see Aalto sketching a more detailed section of the east sidewall with inward leaning walls and windows, thereby tying the curved elements of the plan and section together more forcefully (Fig. 3.10d). Unlike the development of other parts of the church, the side windows appear to have been decided upon much more suddenly, made only after several unsatisfactory attempts. We might even speculate that studio staff members, or the lead project architect Karlo Leppänen,¹⁷ and not Aalto, might have suggested the inclined sidewalls of the church, as the studio staff appeared to have redrawn the windows many times over themselves.

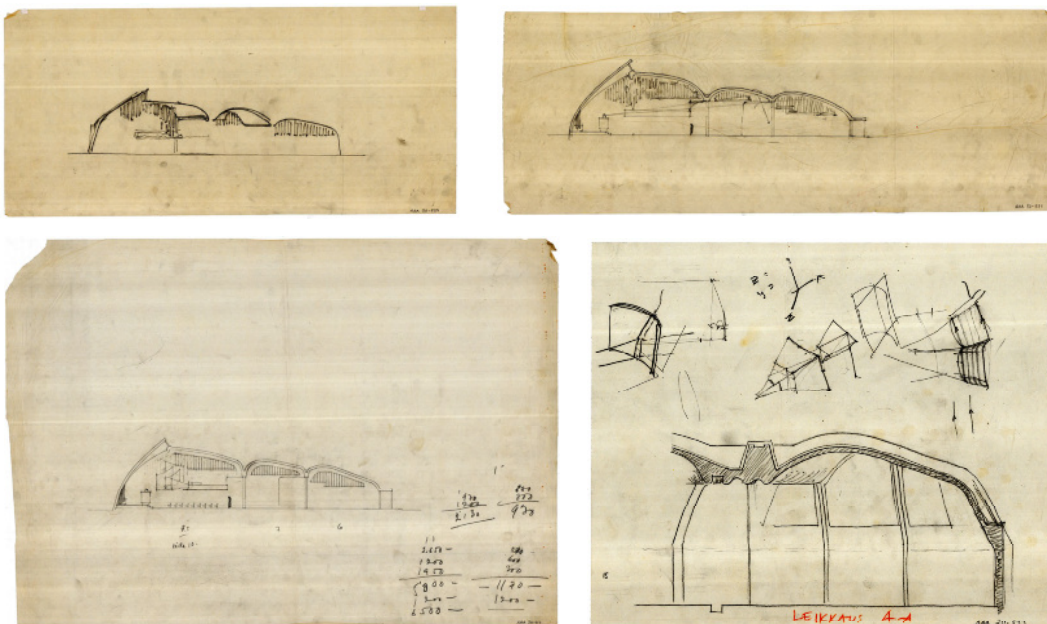


Figure 3.10. (a, top left; b, top right; and c, bottom left) Variations of church's clerestory windows and (d, bottom right) a detailed sketch of the church's inward leaning east sidewall. The Alvar Aalto Museum, Finland.

3.4.2 Organic Motifs for Structure, Landscape, and Altar

This examination of Aalto's design sketches for Vuoksenniska Church has so far prompted discussions focused on form, acoustics, and light with little attention paid to structure or material. We only see Aalto's sketches engaging with structure relatively late in the second and third terms of the design process. Interviews with Aalto studio staff members even note how they first considered building the church in steel, but only later switched to in-situ reinforced concrete due to stability issues with the church's complex form.¹⁸ In general, Aalto's sketches of Vuoksenniska Church show little concern or preference for either material. Rather, they disclose a way of engaging with the structure of the church through forms and motifs that can be much more easily labeled as 'irrational' and organic. For example, several sketches show inspiration for elements in the church roughly based on frogs and fish (Fig. 3.11a). The church's main beams were first roughly sketched as webbed frog feet (Fig. 3.11b) and then in more detail as hand-like forms reaching over the space (Fig. 3.11c, 3.11d). The church's basement was also designed as a distinct hand-shaped plan, while Aalto even produced a sketch of the surrounding landscape as organ and rib-like elements (Fig. 3.12). In plan, the unique form of the church's altar rail also bears an uncanny similarity to one of Aalto's childlike sketches of a smiling frog's face (Fig. 3.13). In light of these organic elements and motifs seen in Aalto's sketches, along with their direct influence on the church's structure, we might find renewed meaning in Banham's reading of the church as alligator eyes burrowing in a white substructure.¹⁹ These words speak to the church's organic influences and some of the later underlying themes in the design process. The sketches therefore provide some evidence for both Giedion's broader narrative and Banham's somewhat idiosyncratic reading. More importantly, however, they illustrate Schildt's general explanation of how simple sketches from nature and daily experience could play a role in Aalto's design process.²⁰

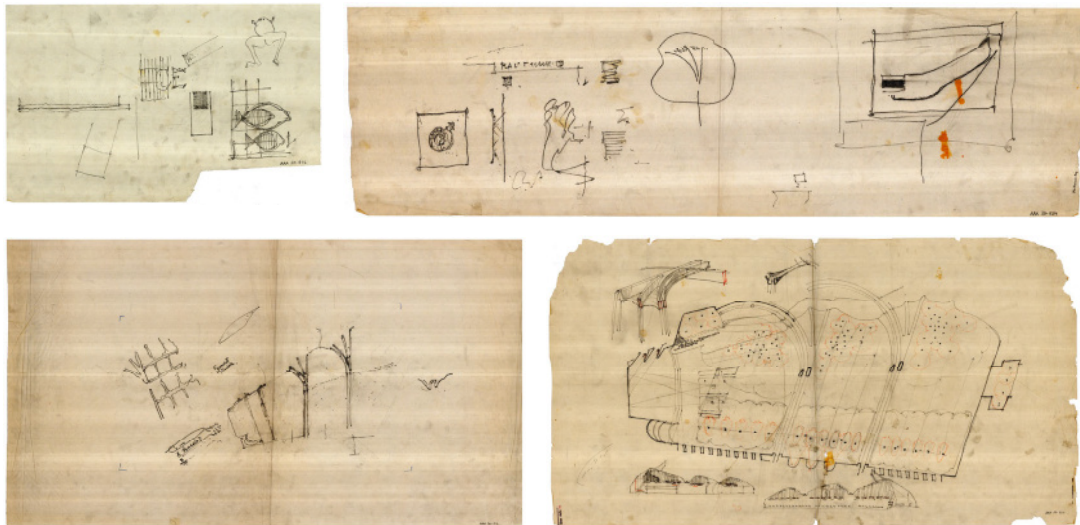


Figure 3.11. Organic themes for the structure of the church based on (a, top left) fish and frogs, (b, top right; and c, bottom left) webbed frog feet, and (d, bottom right) their alignment with the faceted east sidewall. The Alvar Aalto Museum, Finland.

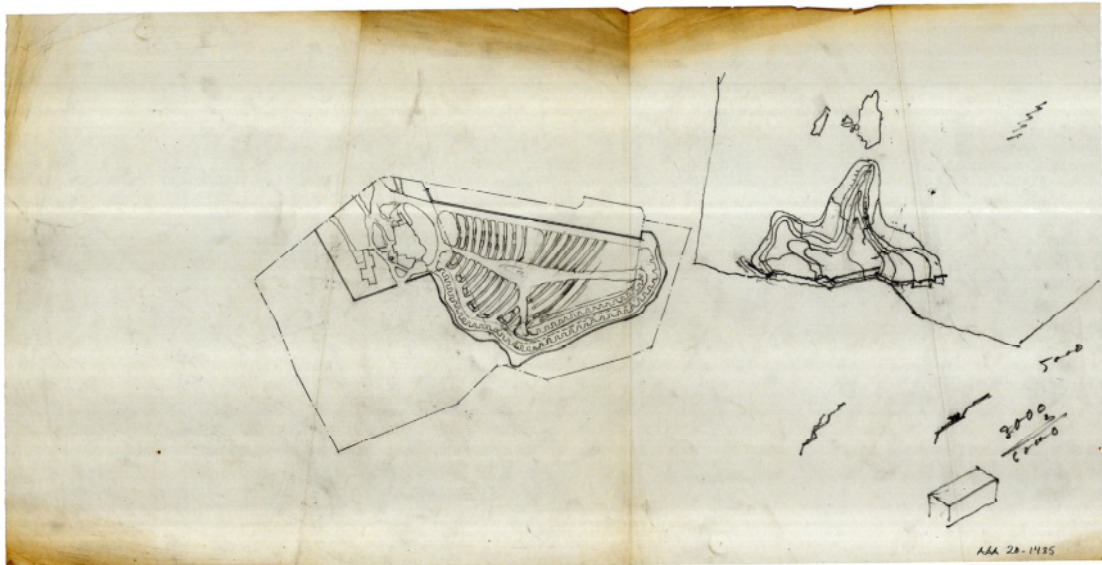


Figure 3.12. Sketch of the church's surrounding site as a landscape of organic elements. The Alvar Aalto Museum, Finland.

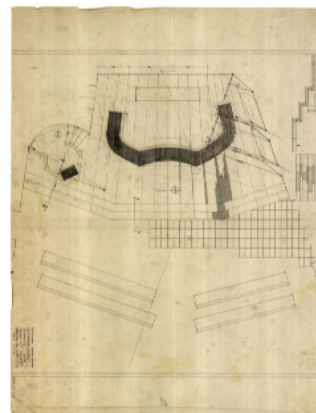
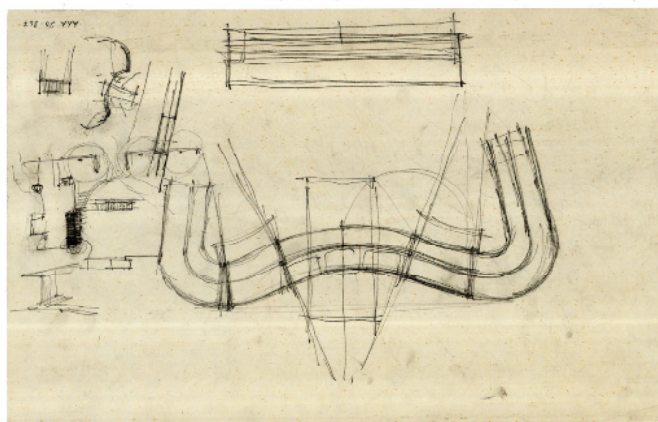
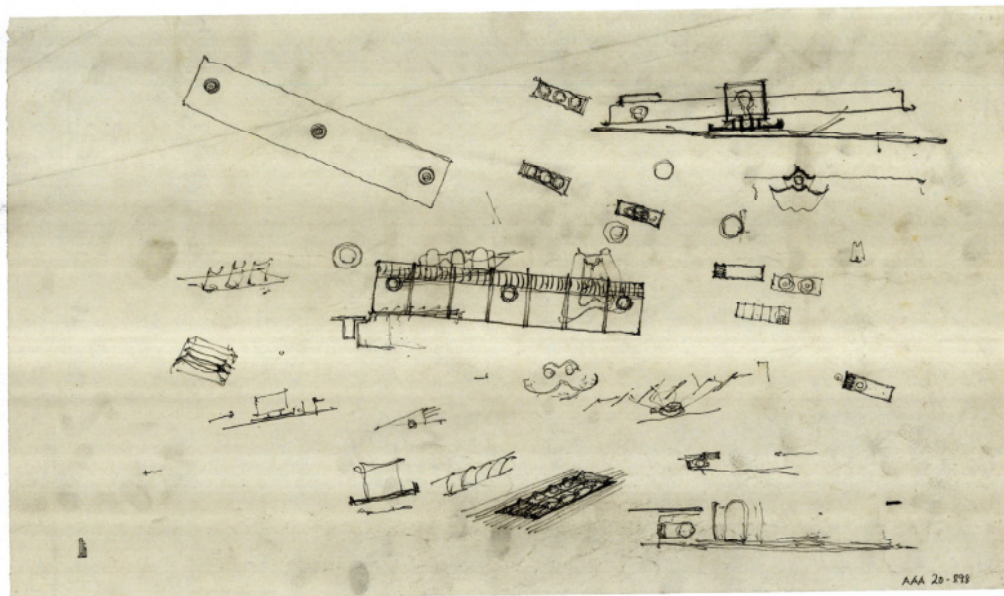


Figure 3.13. (above) Aalto's playful sketch of a frog's smile, (below, left) design sketch for the church's altar in plan, and (below, right) drawing of the altar. The Alvar Aalto Museum, Finland.

The organic forms and motifs for elements in Vuoksenniska Church in the first instance can provide examples for thinking of Aalto's design process as 'irrational'. Although these organic influences in the church may seem arbitrary, they were certainly not applied or integrated in an arbitrary way with other elements in the design process. For example, the church's main structural beams, originally based on the webbed feet of a frog, were aligned with the segments of the rough arc in the east sidewall, already established from acoustical considerations (Fig. 3.7a). And the columns supporting these beams in the church's plan were located at the joints of the movable partitions. While we see that the church's structure was derived using organic themes relatively late in the design process, these themes were still flexible enough to be successfully combined with other elements of the church. Despite being considered late in the design process, the organically-inspired structure of the church does not distract or undermine other architectural elements. The church's structure does the opposite, supporting and connecting the principal architectural ideas behind the project: affording divisible spaces for social and religious gatherings, the threefold repetition of elements, and functional considerations of both sound and light.

3.5 Discussion

Aalto's own writing on Vuoksenniska Church, published shortly after its official opening, explains briefly that the building's design was influenced by the importance of social gathering spaces in an industrialized area, threefold repetitions, and acoustics.²¹ After considering the working sketches and drawings for the church, we can confirm this explanation as a seemingly accurate account. But this examination of his sketches also shows how the explanation is oversimplified. Aalto's working sketches provide a far more detailed story of the church's development. They confirm the architect's priorities for creating social spaces, the threefold repetition of elements, and the importance of acoustics.²² The sketches and drawings also show how these themes and elements were interrelated, prioritized and layered onto one another in the design process. In contrast, Weston's criticism²³ of the movable partitions as 'alien' in the overall design seems to reflect a misperception, appreciating that the church was actually designed around these partitions and their social implications from the very first sketch. Similarly, others tend to emphasize one element of the church over another, but the church cannot be fully understood or explained by focusing on only one of its aspects or elements, just as its design process also cannot be explained with any one isolated drawing. The relative relationships between sketches and drawings in the progression of the design process are more important than any single sketch. As a work of architecture, the church's harmony of architectural ideas is far more compelling than any one particular feature or notable detail. Such harmony occurs when several elements are present, and not only accessible and well balanced, but also complementary to one another.

After examining Aalto's sketches for Vuoksenniska Church in detail, we can now also see the shortcomings of interpreting the church in general terms of ambiguity, plasticity, or sensual forms, or even the common comparison with Le Corbusier's chapel at Ronchamp.²⁴ Such readings are fundamentally those of an aesthetic spectator from inside the church. Furthermore, any significant work of architecture can also offer different interpretations regarding its design, thereby having a claim to ambiguity. Pelkonen, however, specifically cites the church's rough, faceted east sidewalls and smooth beams as representing formal ambiguity. Such ambiguity is then linked to broader geopolitical narratives in Europe, and Finland's ambiguous political situation between East and West in the Cold War era.²⁵ In contrast to an ambiguous relationship, we have seen how these elements interacted and were intentionally combined with one another in the design process of the church. After examining Aalto's sketches and drawings of Seinäjoki Center, Charrington²⁶ similarly notes their purposive intention, with the Aalto Studio staff translating these rough sketches into formal drawings and buildings. The sketches and drawings of Vuoksenniska Church yield further evidence to support this explanation of Aalto's design process and interaction with staff. Rather than ambiguity or plasticity, upon returning to Vuoksenniska Church, we can now understand more readily how its interior (Fig. 3.14) reflects an overall coherence of developed and interrelated architectural ideas.



Figure 3.14. Interior view of Vuoksenniska Church with open partitions. Photograph by author.

3.6 Summary

Aalto's design sketches and drawings of Vuoksenniska Church illustrate a more detailed understanding of the building's design process, and offer an alternative view of the church itself, emphasizing several important architectural and interior features: the key commitment to divide the church into separate social spaces, and the interactive role played by Aalto's bentwood sculpture and the consideration of acoustics when establishing the basic plan and section; and the lighting, environmental, and functional concerns layered onto ideas concerning movable partitions established earlier in the design process. The church's threefold repetition of spaces and elements was the common and unifying theme between plan and section, and architecture and furniture. The structure was surprisingly developed from organic metaphors and motifs from daily experience. While many people admire one aspect of the church or another, Aalto's sketches prompt to a more holistic understanding of the church, highlighting its definitive qualities of architectural harmony and coherence.

Notes for Chapter 3

¹ Peter Reed, ed., *Alvar Aalto*, (New York: Museum of Modern Art, 1998); Alvar Aalto, *Synopsis: Painting, Architecture, Sculpture*, vol. 12, (Basel: Birkhäuser Verlag, 1970).

² Nicholas Ray, *Alvar Aalto*, (New Haven: Yale University Press, 2005).

³ David Walker, "White Space in Northern Light: Two Churches Analysed," *Architectural Research Quarterly* 8, no. 1 (1999): 61–81, doi:10.1017/S1359135504000089.

⁴ Mark A Hewitt, "The Imaginary Mountain," *Perspecta* 25 (1989): 162–77.

⁵ Juhani Pallasmaa, *The Thinking Hand*, (Chichester: Wiley, 2009).

⁶ Eeva-Liisa Pelkonen, *Alvar Aalto: Architecture, Modernity, and Geopolitics*, (New Haven: Yale University Press, 2009).

⁷ Richard Weston, *Alvar Aalto*, (London: Phaidon, 1995).

⁸ Jonas Malmberg (Architect) in discussion with the author in Helsinki, December 2013.

⁹ Sarah Menin and Flora Samuel, *Nature and Space: Aalto and Le Corbusier*, (London; New York: Routledge, 2003).

¹⁰ Juhani Pallasmaa, "Towards a New Humanism," *Space and Design* 149 (1977): 10–20.

¹¹ Göran Schildt, *Alvar Aalto Interiors 1923-1970*, (Jyväskylä: Satakunnan Museo, 1986).

¹² Harry Charrington and Vezio Nava, eds., *Alvar Aalto: the Mark of the Hand*, (Helsinki: Rakennustieto, 2011).

¹³ Sigfried Giedion, *Space, Time and Architecture*, 3rd ed., (Cambridge: Harvard University Press, 1954).

¹⁴ Walker, "White Space in Northern Light: Two Churches Analysed."

¹⁵ Jaakko Kontio (Manager of the Aalto Studio, 1955-60) in discussion with the author in Helsinki, May 2014.

¹⁶ Jaakko Kontio (Manager of the Aalto Studio, 1955-60) in discussion with the author in Helsinki, May 2014.

¹⁷ Harry Charrington, "Not a Locked Box: the Everyday Art of the Aalto Atelier," *Architectural Research Quarterly* 14, no. 3 (November 10, 2010): 255–66, doi:10.1017/S1359135510001016.

¹⁸ Charrington and Nava, *Alvar Aalto: the Mark of the Hand*; Louna Lahti, *Alvar Aalto - Ex Intimo: Alvar Aalto Through the Eyes of Family, Friends & Colleagues*, trans. Roger Connah and Tomi Snellman, (Helsinki: Building Information, 2001).

¹⁹ Reyner Banham, *Age of the Masters*, Revised, (London: The Architectural Press Ltd, 1975).

²⁰ Göran Schildt, ed., *Alvar Aalto Luonmoska*, (Helsinki: Kustannusosakeyhtiö Otava, 1972).

²¹ Aalto, "Vuoksenniskan Kirkko."

²² Alvar Aalto, "Vuoksenniskan Kirkko," *ARK Arkitehti Arkitekten* 12 (1959): 193–207.

²³ Weston, *Alvar Aalto*.

²⁴ Menin and Samuel, *Nature and Space: Aalto and Le Corbusier*.

²⁵ Pelkonen, *Alvar Aalto: Architecture, Modernity, and Geopolitics*.

²⁶ Harry Charrington, "An Agency of Endless Play: Alvar Aalto & Frederick Kiesler," (Alvar Aalto Researcher's Network, Seinäjoki and Jyväskylä, 2012), 1–14.

Chapter 4. Alvar Aalto's wood reliefs for furniture and architectural design

4.1 Introduction

In the previous analyses and chapters, Alvar Aalto's sketches of fibrous wood sections and bentwood sculptures played an explicit and important role in the design processes for both Vuoksenniska and Wolfsburg Church. Given the similarities between Vuoksenniska, Wolfsburg, and Seinäjoki Church, Aalto's experiences from earlier bentwood experiments may have also played an implicit role in designing Seinäjoki Church. Despite the previous observations of bentwood sculptures in Aalto's architectural design sketches, the architect's bentwood sculptures and wood reliefs are still commonly associated with the design and development of the architect's wood furniture. Many of the reliefs were designed and made at the same time as some of Aalto's most well-known furniture in the late 1920s and early 1930s, such as the Paimio chair and three-legged stool (Stool 60). Yet Aalto still continued to design additional small-scale wood reliefs and sculptures as late as the mid-1950s, suggesting that the reliefs were important elements in designing both architecture and furniture. Starting with the original insights noted in the previous chapters, the following sections will therefore examine Aalto's wood reliefs in greater detail to highlight their dual influence and interactive relationship between Aalto's architecture and furniture design.

To highlight their critical role in the development of Aalto furniture, the wood reliefs are first discussed in the following sections as straightforward technical models and material experiments for different ways of working with wood for mass-produced furniture. The techniques for realizing the wood reliefs and furniture are also closely related to Aalto's patents dating from the mid-1930s through to the mid-1950s, including the key patent for Aalto's bentwood technique and the so-called 'L-Leg' used extensively in Aalto furniture.¹ Yet as more abstract, formal models, the wood reliefs have invited comparisons to other theories and works of modern art, such as the painted wood reliefs of Jean Arp and the material theories of László Moholy-Nagy.² They still bear striking similarities with many architectural projects, both formally and conceptually. The second part of the following discussion will therefore examine the influence and general similarities of Aalto's wood reliefs and sculptures and architectural projects, including Aalto's 1950s churches. Note that the two general perspectives taken here are not mutually exclusive, as several of Aalto's wood reliefs engaged both technical and formal issues simultaneously, as discussed later on. In considering these perspectives together, however, a better and broader understanding of Aalto's wood reliefs can be achieved than has been previously presented in literature and recent exhibitions,³ thereby emphasizing the importance of the wood reliefs, and their shared relevance and interaction between the design of Aalto's furniture and architecture.

4.2 Background and approach

4.2.1 Furniture and Artek

One of the main reasons why we tend to associate Aalto's wood reliefs and sculptures first and foremost with the architect's furniture is their consistent appearance together in exhibitions. Schildt noted how wood reliefs have been quietly present in the background (Fig. 4.1) of nearly every significant Aalto exhibition.⁴ In addition to sharing exhibition spaces, Aalto's wood reliefs and furniture were further connected through two important companies. First, through their shared place of origin and production at the manufacturer Huonekalu-ja Rakennustyötehdas Oy in Turku, Finland; and second, with the founding of the Artek design company in 1935 to sell Aalto furniture and promote modern living, one of the wood reliefs

was also used as the symbol and logo of the company on its original letterhead and promotional materials.⁵ That symbolic status continues today, as Artek reproduced a limited edition series of eighty numbered pieces of one of Aalto's most recognizable wood reliefs to mark the company's eightieth anniversary.⁶ Aalto's wood reliefs have gradually come to represent the architect's design process for furniture, as tangible examples of his playful way to design, based on the theories of Finnish philosopher Yrjö Hirn.⁷ With an experimental approach influenced by Bauhaus designers Marcel Breuer and especially Moholy-Nagy, the reliefs are rooted in both technique and art. They are synonymous with Aalto furniture design, so much so that they are commonly presented in exhibitions and literature as Aalto's wood 'constructions', 'experiments', or 'material studies' for furniture.⁸



Figure 4.1. Photographs of three Aalto exhibitions with wood reliefs from the 1930s: (a: top, left) 'Wood Only' in London, 1933; (b: top, right) 'Alvar and Aino Aalto Architects' in Helsinki, 1934; and (c, bottom), the Sixth *Milano Triennale* in Milan, 1936. The Alvar Aalto Museum, Finland.

4.2.2 Architecture

Several references from Aalto literature point to the wood reliefs' importance extending beyond furniture and into architectural design. For example, in the seminal essay from 1947, 'Architettura e arte concrete', better known in English as 'The Trout and the Stream', only the the Viipuri Library project (1933–35) and the wood reliefs were cited by Aalto to explain his approach to designing:

At our London exhibition in 1933 (on the work of architect Aino Aalto and myself, arranged by The Architectural Review), we displayed some wood constructions. Some of these directly represented the structures we had used in our furniture; others were experiments with the form and handling of wood without any practical value or even any rational bearing to practice. An art critic wrote in The Times about these as expressions of abstract art... But I would like to add as my personal, emotional view that architecture and its details are in some way all part of biology. Perhaps they are, for instance, like some big salmon or trout. They are not born fully grown; they are not even born in the sea or water where they normally live... Just as it takes time for a speck of fish spawn to mature into a fully-grown fish, so we need time for everything that develops and crystallizes in our world of ideas. Architecture demands even more of this time than other creative work.⁹

In more recent literature, Pelkonen has emphasized the importance of the wood sculptures and reliefs as the decisive starting point of the curved or organic line in the architect's work.¹⁰ Schildt has also explained how the reliefs were used to understand the properties of wood as an architectural material.¹¹ Schildt has further described the wood reliefs as 'symbols of the whole of Aalto's work, the epitome of his love of classical balance, organic forms and the spontaneous harmony of nature'.¹² This last description suggests a broader understanding of Aalto's wood reliefs in relation to both furniture and architectural design that has not yet been fully elaborated or thoroughly investigated in literature about Aalto or in recent exhibitions.

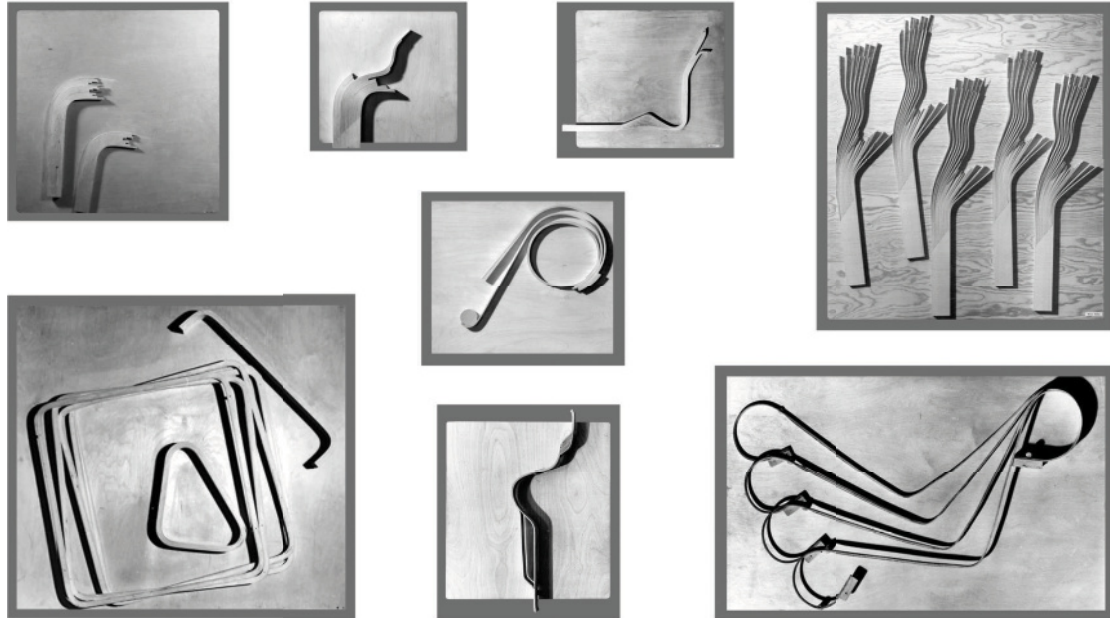
4.2.3 Research materials and methodology

This research offers the first comprehensive overview of Aalto's wood reliefs as a body of design work positioned between furniture and architecture. While previous studies and exhibitions have tended to include only a limited number of the reliefs, usually one or two, and rarely more than a group of four or five as illustrative examples, Aalto's wood reliefs are presented here as a broader collection of sixteen works, spanning over a period of two decades.¹³ The sixteen reliefs presented here represent a majority of Aalto's original collection of twenty small-scale wood reliefs, not including much later and larger reliefs that were often designed with a non-wood backing, named, and made for a specific exhibition or architectural project.¹⁴ Only sixteen of the twenty wood reliefs are presented (Fig. 4.2), however, as detailed historical photographs of the four remaining reliefs cannot be found in the Alvar Aalto Museum archives. They can still be seen, however, in the background of historical exhibition photographs in the archives (Figs. 4.1a, c).¹⁵ Compared to the sixteen reliefs present and examined here in detail, the remaining four reliefs not included were relatively straightforward and simple examples. The discussion that follows is therefore also equally relevant to the four reliefs not included with the sixteen shown in the main collection in Figure 4.2.

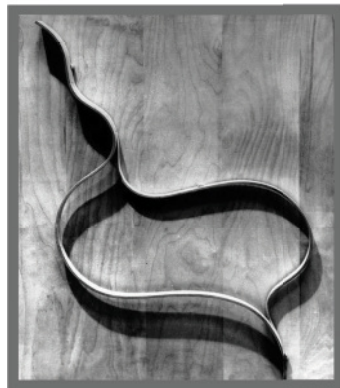
Historical photographs and recent exhibitions further reveal how some of the original reliefs were also subtly changed and varied, with one or two additional examples made either at the time of their production or slightly later as reproductions. For example, one variant of the 1934 relief (Fig. 4.2i), mounted on plywood and also dated to 1934, has been included in several exhibitions in recent years.¹⁶ Yet another variant of the same 1934 relief, but having a

slightly different curvature, can also be seen in exhibition photographs from 1935 (Fig. 4.1b) and 1936 (Fig. 4.1c). Five of the original reliefs (Figs. 4.2e,i,j,m,n) were further reproduced in 1979 as a limited series of ten replicas, and they are sometimes confused with originals as they have been published and exhibited with the date of the original work.¹⁷ This discussion, however, focuses in detail on the original small-scale reliefs rather than reproductions and replicas.

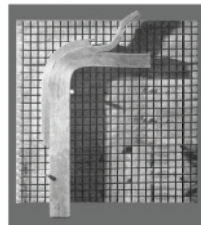
1929-1933



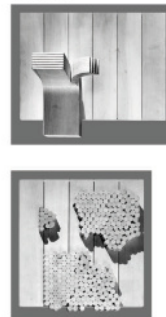
1934



1935



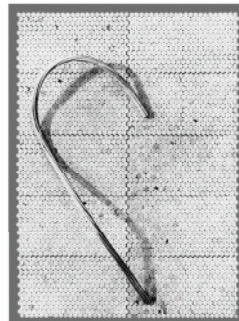
1936



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1946



1947



1955

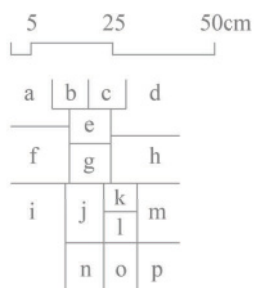
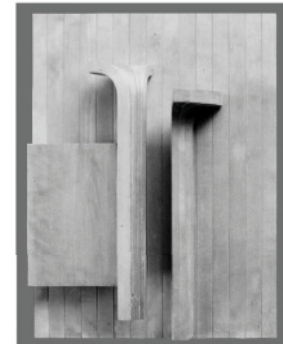


Figure 4.2. Collection of archival photographs of Alvar Aalto's wood reliefs, shown by approximate date and scale. Original photographs courtesy of the Alvar Aalto Museum, Finland.

Original materials related to the design and making of the wood reliefs, such as design sketches or memos, have unfortunately been lost. Despite the apparent shortage of sketches related to the wood reliefs, many of the original reliefs themselves have been saved, and important archival photographs and materials, literature, and relevant people are still available in Finland today. For example, interviews with now-retired Artek staff have already provided insight into their experience in working directly with the Aaltos.¹⁸ In the early stages of preparing research materials for this chapter, I also interviewed former Artek Design Director Ville Kokkonen, and Otto Korhonen's grandson, Jukka Korhonen, to discuss and better understand the collaboration between the Aalto studio, the Artek design company, and Korhonen's factory.¹⁹ Since the time of these interviews, the connection between the Aalto Studio and Artek was also explored in depth through the 2016 exhibition 'Artek and the Aaltos', and its accompanying catalogue.²⁰ With the interviews conducted for this research, the former with Kokkonen took place in Helsinki at the Artek company headquarters, whereas the latter with Korhonen was conducted in Turku, before seeing the original Korhonen factory and the Aalto furniture production process firsthand.²¹

To build upon these preliminary interviews, as already noted, I have used archival exhibition photographs and detailed historical photographs of the wood reliefs from the Alvar Aalto Museum to bring together the sixteen works presented herein.²² Establishing an overview of the wood reliefs can be seen as analogous to the visual overview and timelines of Aalto's design processes, seen in the previous chapters. Rather than comparing undated sketches with dated drawings, exhibition photographs from the Alvar Aalto Museum archives date many of the earliest wood reliefs to 1933, with the 'Wood Only' exhibition in London at the Fortnum and Mason Department Store. Although the earliest reliefs could have been designed and made slightly earlier, the majority of literature on Alvar Aalto indicates that the reliefs were first made from either 1929 or in the earlier 1930s. Figure 4.2 illustrates these dates accordingly.

4.3 The wood reliefs as technical models for furniture

4.3.1 Forming and moulding

The wood reliefs and Aalto furniture are commonly described by general terms such as laminated wood, moulded or bent plywood, and bentwood. These terms and their corresponding techniques can be seen both individually and in different combinations in the wood reliefs, so it is worthwhile to define and briefly discuss them for clarity. The most general of the terms is laminated wood, which describes the straightforward process of bringing laminates or layers of wood together to make larger or longer elements, either in parallel or cross-grained configurations.²³ Two of the earlier wood reliefs from 1929–1933 and one of the most recognizable reliefs from 1934 show a wide range of possibilities with basic laminated wood: straight lengths, closed curves, and sharp bends defined by small radii (Fig. 4.3a), or gradual curves with varying (Fig. 4.3b) or constant thickness (Fig. 4.3c) can all be realized. These curves in laminated wood are simply made by applying glue and either forming or moulding laminates such as veneers into shape (Fig. 4.3a, b). The formed or moulded laminates are then held in place until the glue sets, either with simple clamps against a former (Fig. 4.4a) or in a mould (Fig. 4.4b), respectively.

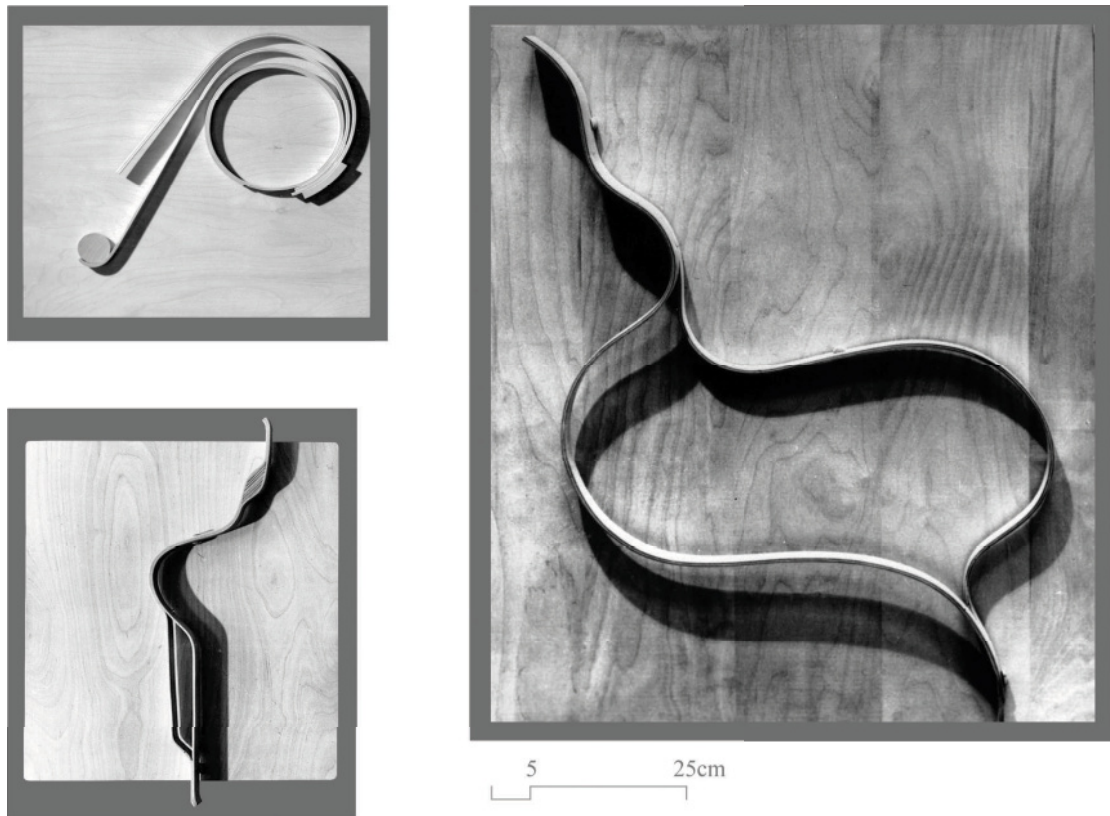


Figure 4.3. Laminated wood reliefs, shown approximately to scale (a, top, left; b, bottom, left; and c, right). The Alvar Aalto Museum, Finland.

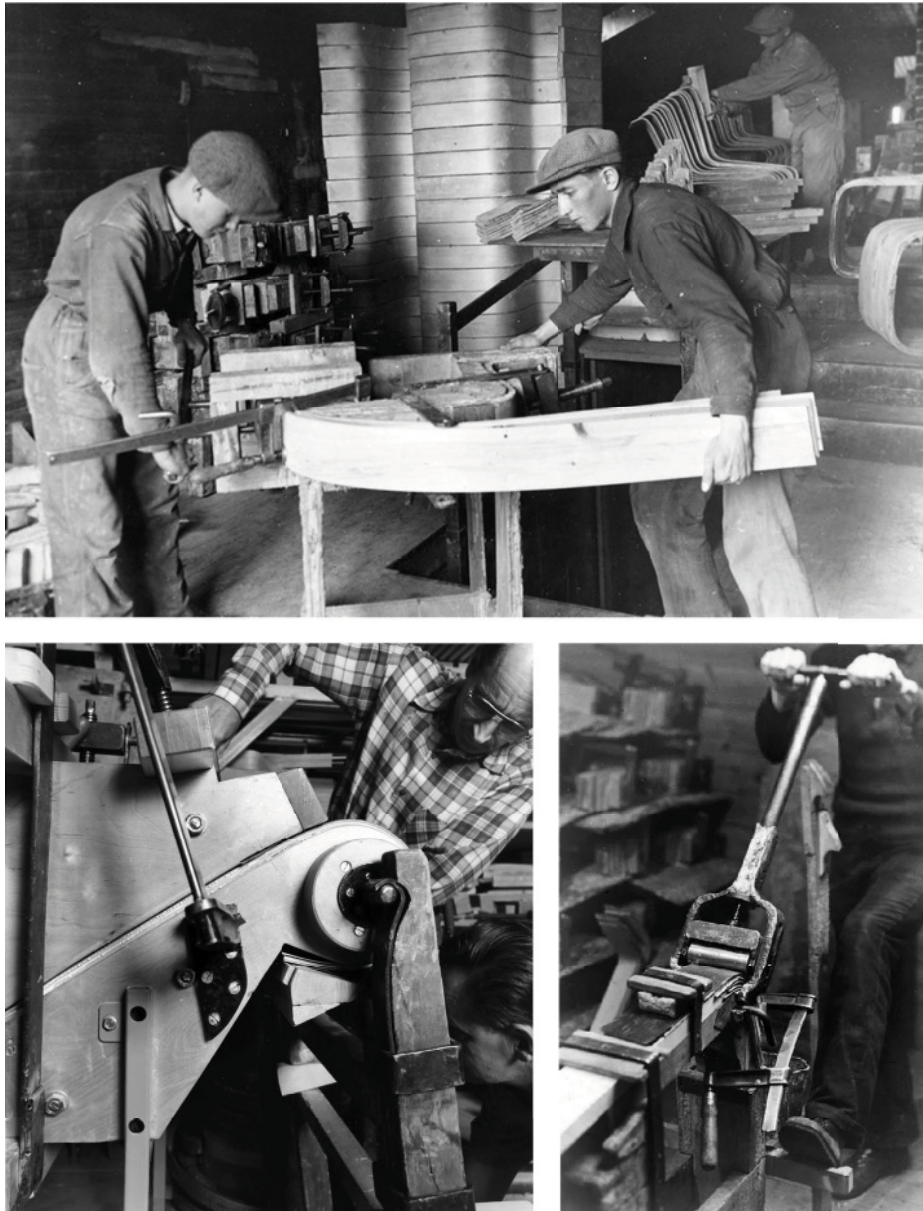


Figure 4.4. Photographs illustrating the techniques for making the wood reliefs and Aalto furniture: (a, top) forming a laminated wood chair frame, (b, bottom, left) molding and bending plywood for a Paimio chair seat and back, (c, bottom, right) bending an L-Leg according to Aalto's patented bentwood technique. The Alvar Aalto Museum, Finland.

Various types of laminated wood products were already well known in the early 1930s, including plywood, and glue- and nail-laminated timber. For designers like the Aaltos, general lamination techniques could offer new possibilities for designing modern furniture with wood as an alternative to modern furniture designed with tubular steel.²⁴ At the same time, Korhonen was familiar with lamination techniques and their compatibility with industrial production. Thus, he was able to create relatively simple but multipurpose forms and moulds, where one mould could be used for producing different variants.²⁵ In the case of Aalto's Paimio chair (Fig. 4.5), the side frames are examples of laminated wood, formed with the grain of each laminate parallel with one another. The Paimio chair's continuous seat and back is an example of moulded and bent plywood.²⁶ The Paimio chair was also one of two examples given in Alvar Aalto's 1935 patent for a new method for making furniture.²⁷ Even though laminated wood and moulded plywood were relatively common in Finland and

Germany at that time, the patent was challenged but later granted for the novel idea of combining the two general techniques to create flexible wooden furniture.



Figure 4.5. Overlaid photographs with Aino Aalto illustrating the flexibility and ‘softness’ of the Paimio Chair. The Alvar Aalto Museum, Finland.

4.3.2 Bending

Aalto's bentwood technique is a much more distinct alternative to forming or moulding laminated wood or plywood. Many of the earliest reliefs from around 1929–1933 are related to and produced using Aalto's bentwood technique. While lamination and gluing is still partially involved in Aalto's bentwood, regular and less expensive solid wood is used as a starting material instead of a stack of wood veneers as in plywood. With solid sections of wood that are relatively stiff and difficult to bend to the relatively sharp radii required, such as in Aalto's typical L-Leg, Aalto's bentwood technique offered a practical alternative compared to conventional bending involving thoroughly steamed and plasticized wood.²⁸ Aalto's bentwood technique involved first sawing slots along the grain in one end of the wood (Fig. 4.6). The intermediate result was what carpenters would generally call a ‘featherboard’, with thin individual ‘feathers’ or fingers that could then be easily curved or formed, as shown in one of the wood reliefs (Fig. 4.7d). The second major step is inserting veneers with glue between these fingers; thereby replacing the wood material that had been taken away from the previous sawing process (Fig. 4.6). After attaching a metal bending strap and bending the piece into shape (Fig. 4.4c), and then allowing the glue to set, the bend is held more or less in place due to the glue's resistance against shear or sliding between the layers.

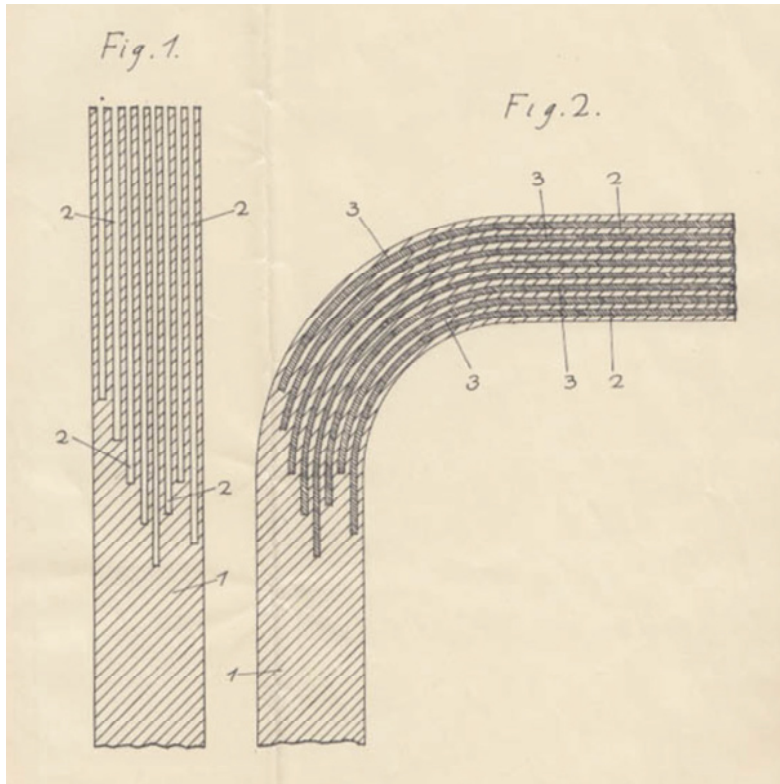


Figure 4.6. Illustration accompanying Finnish Patent No. 18666, 'A bending method for wood, and the articles produced by this method' by Alvar Aalto, 1934. The Alvar Aalto Museum, Finland.



Figure 4.7. Aalto's bentwood reliefs from approximately 1929-1933 (a, left; b, top, centre; c, bottom, centre; and d, right). The Alvar Aalto Museum, Finland.

Aalto's bentwood technique was initially developed and demonstrated through the reliefs already discussed (Fig. 4.7), but more reliefs were also made later on to vary and develop the technique further for new furniture models. The wood relief made around 1936 (Fig. 4.8), most likely for the sixth Milano Triennale where it was displayed (Fig. 4.1c) and gathered considerable attention, illustrates how Aalto's bentwood technique could be extended for bending in two directions.²⁹ Here a relatively large section of wood was first sawn and then bent in one direction, following Aalto's typical bentwood technique and process already described. After the glue for this first initial bend had set, the piece was then most likely sawn again, and a second bend was made in a perpendicular direction. Although not shown in any wood reliefs, Aalto also later developed a subtle technical variant of the L-Leg, where veneers

were completely omitted after sawing, and only glue was used between the individual fingers after the initial sawing process (Fig. 4.6). The wood relief from 1936 and the technical variant of the L-Leg together formed the basis for Aalto's so-called 'Y-Leg', which in turn then led to a new line of Artek and Aalto furniture products in the late 1940s (Fig. 4.9). Although the 1936 wood relief demonstrated the technical possibility to effectively bend one piece of solid wood in two different directions, a much simpler configuration was adopted later in the 1940s for Aalto furniture based on the Y-Leg. Two L-Legs, bent with or without veneers, could be simply sawn longitudinally at forty-five degrees and then glued to each other to make a corner Y-Leg (Fig. 4.10) for a chair, table, or stool. The resultant Y-Leg effectively showed how a design approach based on adapting and modifying the earlier L-Leg could be simpler and more effective than the more advanced technique demonstrated in the original wood relief from 1936.



Figure 4.8. Bentwood relief from 1936 for bending in two directions, as seen from the front and above, respectively. The Alvar Aalto Museum, Finland.

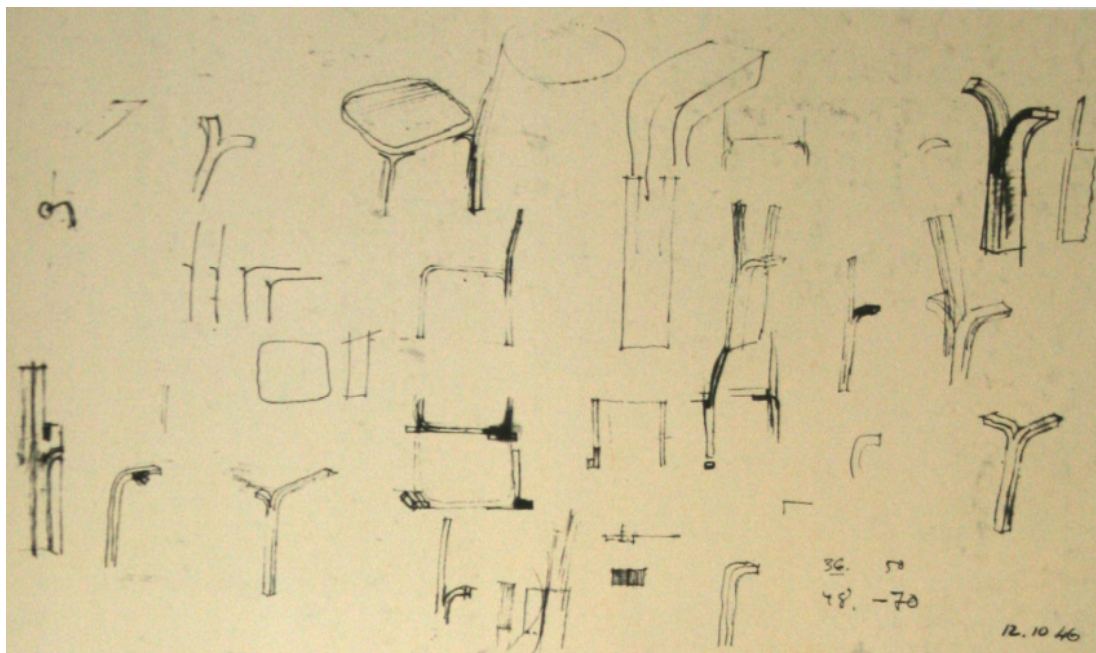


Figure 4.9. Initial design sketches from 1946 for Y-Leg furniture based on earlier technique and form of the 1936 wood relief. The Alvar Aalto Museum, Finland.



Figure 4.10. Exhibition models in the Alvar Aalto Studio showing the Y-Leg (left), X-Leg (centre), and four intermediate manufacturing stages of the basic L-Leg (right). Photograph by author.

Just as the 1936 wood relief related to the Y-Leg focused on extending Aalto's bentwood technique from one to two directions, the thinking behind much later reliefs was preoccupied with even more complex three-dimensional forms. Returning to basic wood lamination principles, but starting with relatively long and small-diameter wood dowels in a complex mould could result in much more sculptural and organic forms (Fig. 4.11). To achieve such difficult forms, according to Schildt and Giedion, these reliefs were made using a special mould subjected to vacuum pressure.³⁰ Pallasmaa described these works as 'macaroni bends', while Schildt used the term 'spaghetti' in referring to their long, thin dowels.³¹ We can see the formal potential of this technique in one of Aalto's more well known reliefs, with a relatively complex laminated form juxtaposed with a small twisted piece of natural wood (Fig. 4.11c). In the mid 1950s Aalto would attempt to design furniture based on these complex three-dimensional forms, but with limited success compared to earlier models. If Aalto's basic bentwood technique and L-Leg inherently combined aspects of art and industry in simple harmony, this later three-dimensional moulding technique showed promising results but was lacking in its compatibility with mass-production and manufacturing.

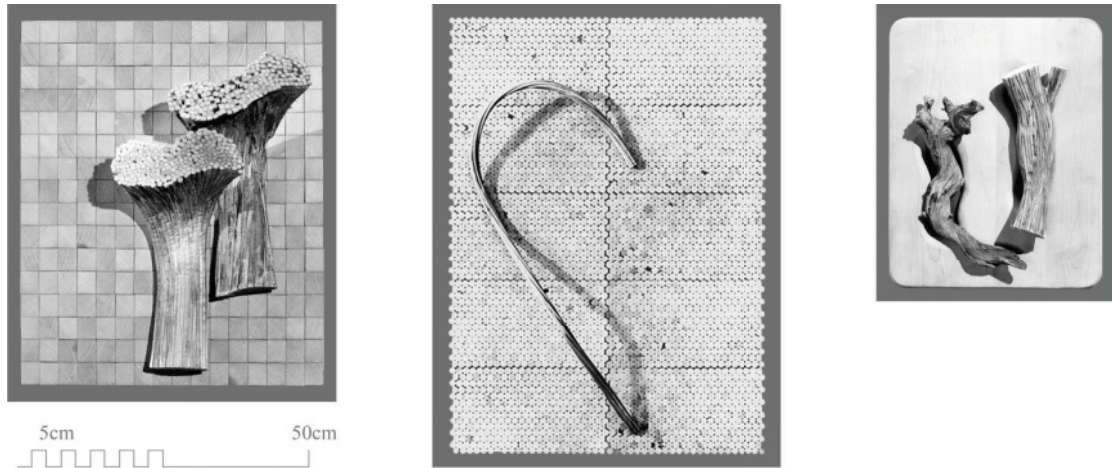


Figure 4.11. Three-dimensional wood reliefs, shown approximately to scale (a, left; b, centre; and c, right). The Alvar Aalto Museum, Finland.

Following a simpler design approach and again starting with a regular L-Leg yielded a viable compromise between formal complexity and ease of production for later Artek furniture in the 1950s. Sawing regular L-Legs longitudinally into wedge-shaped sections and then gluing them together in a radial or fan-shaped pattern resulted in Aalto's so-called 'X-Leg' in 1954. One of the last wood reliefs from 1955 was a simple composition of two X-Legs, showing the legs' geometry from different angles (Fig. 4.2p). At the same time as exhibiting this X-Leg wood relief in the mid 1950s, Aalto also designed a similar freestanding wood sculpture set upon a brass base (Fig. 4.12). The design sketches of this sculpture appeared in previous chapters. The sculpture was also made with two X-Legs, alongside a small three-dimensional lamination just like one from the 1937 wood relief (Fig. 4.11a). This small freestanding wood sculpture from 1955, as a composition with a more complex, organic laminated model and the practical forms of the X-Legs, marked the end of Aalto's work with small-scale bent and laminated wood. Although variants of the sculpture exist, an original was kept in the living room of the Aalto House, where it still stands today, highlighting its importance as the conclusion of the Aalto's bentwood experiments and small-scale wood reliefs.

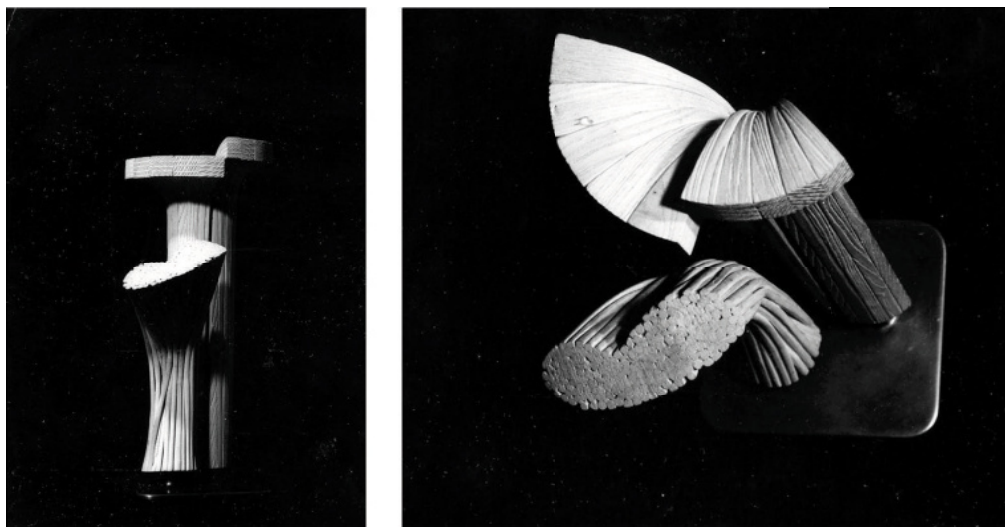


Figure 4.12. Freestanding wood sculpture with a three-dimensional lamination and two X-Legs, as seen from the front and above, respectively. The Alvar Aalto Museum, Finland.

4.4 Beyond scale, and material: the wood reliefs' extended influence on architecture

In parallel to the technical issues already explored, an engagement with formal issues was also present in many if not most of the wood reliefs. But as Aalto's later wood reliefs gradually increased in their complexity, as already noted, they could not be directly applied to furniture design. They still served as formal experiments that could be of service to Aalto's architecture. Previous literature by Schildt, Miller, and Pelkonen have emphasized a connection between the curving or organic lines in Aalto's architecture and the original wood reliefs.³² In terms of earlier built work from the 1930s, we can see two straightforward examples of how the Aaltos' earlier experience with the wood reliefs and furniture could be formally applied to architecture and interior design. Firstly, in the Viipuri Library project from 1935, with its wooden lecture hall ceiling (Fig. 4.13); and secondly, in the undulating interior wood panels of the Finnish Pavilion at the 1939 New York World's Fair (Fig. 4.14).³³ These examples help to illustrate Aalto's earlier explanation of a developed architectural idea as a big salmon or trout, but not being born in the sea or water where it normally lives. The wood reliefs were originally made in relation to furniture in Korhonen's factory, but their experimental forms were also influential on some of the Aaltos' most well-known interior details and architectural designs in wood.



Figure 4.13. Interior view of the undulating wooden ceiling in the lecture hall of the Viipuri Library. The Alvar Aalto Museum, Finland.

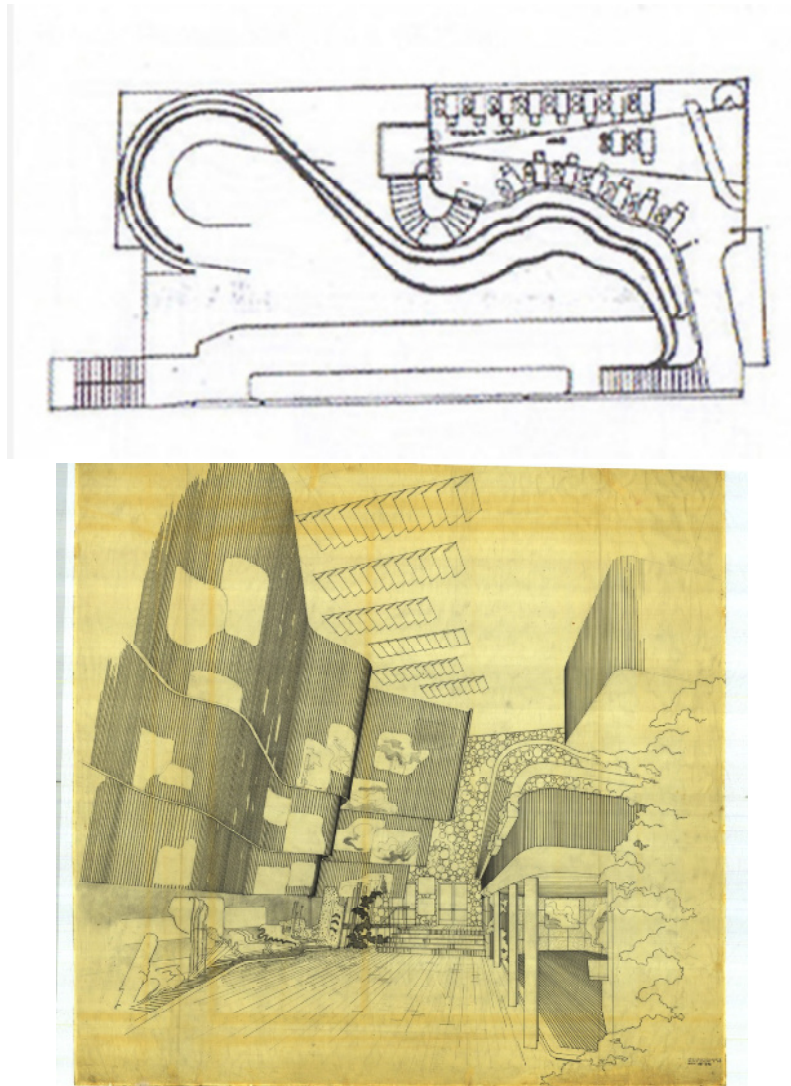


Figure 4.14. Design sketch of the plan for the New York World's Fair Finland Pavilion (1939) and interior perspective drawing. The Alvar Aalto Museum, Finland.

As the majority of the wood reliefs were made throughout the 1930s, they also coincided with Aalto's theoretical agendas concerning the broadening of rationalism and 'elastic' or flexible standardization in architecture. The wood reliefs exemplified Aalto's repeated references to the cellular structure of wood and wood cells in his lectures at that time. For example, in the often quoted lecture entitled 'Rationalism and Man' from 1935, Aalto concluded with the following sentences:

Nature, biology, has rich and luxurious forms; with the same construction, the same tissues, and the same principles of cellular organization, it can create billions of combinations, each of which represents a definitive, highly-developed form. Man's life belongs to the same category. The things that surround him are hardly fetishes or allegories with mystical eternal value; more than anything else, they are cells and tissues, living beings like himself, building components that make up human life.³⁴

Aalto's 1938 lecture entitled 'The Influence of Structure and Material on Modern Architecture' further reflected the striving for greater formal flexibility seen in the wood reliefs, especially those from 1937 onwards (Fig. 4.2m-p) involving small (standardized) dowels to yield complex, three-dimensional forms:

I have said before that nature herself is the best standardization committee in the world, but in nature, standardization is almost exclusively applied to the smallest possible unit, the cell. This results in millions of flexible combinations that never become schematic. It also results in unlimited riches and perpetual variation in organically growing forms. We must follow the same path in architectural standardization, too.³⁵

The previous quotes frequently appear in literature on Aalto, as the concept of flexible standardization was applied in much of Aalto furniture; standard components like the L-Leg were used repeatedly in Artek's 'standard' Aalto stools, chairs, tables, and case pieces (Fig. 4.15). The same concept also established the main principle for Aalto's prefabricated A and AA type housing systems from the 1930s and 1940s.³⁶ The A and AA housing systems were similarly based on standardized wall and building elements in wood that could be prefabricated and mass-produced, but combined in different ways to maximize variation and also grow over time.³⁷ The concern to increase variation through design and the concept of flexible standardization was therefore present in Aalto's wood reliefs, lectures, furniture, and architectural work.

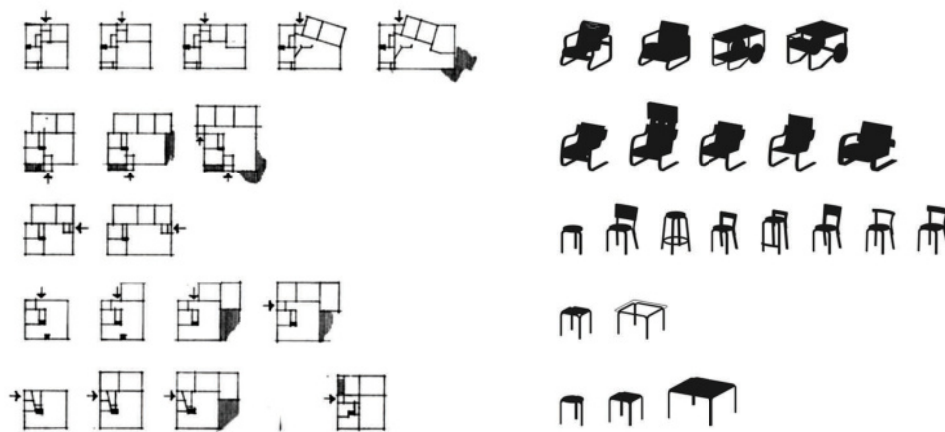


Figure 4.15. Diagrams illustrating the concept of flexible standardization in (left) Aalto's AA housing system and (right) Artek standard furniture. The Alvar Aalto Museum, Finland, and Artek, respectively.

Beyond architecture and interior details in wood, the reliefs had an extended impact on the Aaltos' later architecture and design work in other materials. Moravánszky has discussed the connection between Aalto's theoretical arguments concerning flexible standardization and his built work, citing important projects executed with brick such as the House of Culture (1952–58) in Helsinki and the Baker House (1946–49) at the Massachusetts Institute of Technology (MIT).³⁸ Following Moravánszky, a single brick is likened to a cell, which can be combined in a variety of ways to yield varying forms.³⁹ Such examples suggest how Aalto's concept of flexible standardization could be developed and formally tested in the wood reliefs, and then later applied in other materials. What is more crucial to realize though is how these different areas of activities, namely theoretical lectures, experimental small-scale wood reliefs, furniture and architectural design formed a mutual interaction in service of Aalto's broad design activities and thinking. The wood reliefs were intimately related to and synergistic in supporting new design endeavors in furniture and architecture, in both formal and conceptual terms.

4.5 Discussion

Connections between Aalto's wood reliefs and those of Arp and the material theories of Moholy-Nagy were noted earlier in the opening section of this chapter, but without further elaboration. Pelkonen has already summarized key ideas in Moholy-Nagy's book *Von Material zu Architektur* and its impact on the wood reliefs and the Aaltos' work.⁴⁰ The discussion here will focus instead on the similarities and differences between Aalto and Arp's reliefs. It is important to address the connection with Arp in more detail, as Pelkonen and Eisenbrand have also further emphasized Arp's wood reliefs as an important influence for Aalto and highlighted their similarities, respectively.⁴¹ Recent exhibitions on Aalto at the Vitra Design Museum in Germany and the Ateneum Art Museum in Finland have intended to develop this narrative further.⁴²

While the curving and organic forms of Arp's wood reliefs certainly bear a resemblance with those of Aalto's and may have been an important inspiration, there are also several critical differences that have been either overlooked or ignored in the previous literature already noted. For instance, Arp's use of paint and especially color to create contrast between different shapes and forms differs significantly from the consistent presentation of natural, plain wood surfaces in Aalto's reliefs (Fig. 4.2). Although also executed in wood and plywood, Arp's reliefs are relatively flat in their actual depth, and could be easily made in a variety of different materials to achieve the same formal and artistic results. The same cannot be said when considering many of Aalto's wood reliefs as experimental models in the context of furniture and architectural design, as the resultant forms must be made in wood and entail a functional dimension. Furthermore, as abstract works of art, without an indication of materiality, Arp's reliefs do not convey a specific sense of scale. Aalto's reliefs and their curved forms, however, are firstly and firmly rooted in technique, demonstrating an informed designer's respect and understanding for the natural grain and materiality of wood. This key difference in materiality is perhaps best emphasized by Aalto himself, in an interview with Karl Fleig entitled 'The Relationship Between Architecture, Painting, and Sculpture':

For me, wood is not a neutral substance, it is more: it is a living material, produced by growing fibers, something like the human muscular system. It is therefore impossible for me to carve figures out of wood as though it were cheese. In my wood forms, I therefore always follow – or at least try to follow – the structure of the wood as it has grown.⁴³

So while Aalto was familiar with the biomorphic forms of Arp's wood reliefs, most likely through experiences with Giedion in Zurich, Aalto's intentions as a designer towards material and making modern furniture for everyday life set his wood reliefs firmly apart.⁴⁴ Arp's reliefs were formal and aesthetic works belonging to art, but Aalto's reliefs were technical, formal, and exhibition models that were relevant to architecture and design, in addition to art and sculpture.

4.6 Summary

This chapter has presented the first visual overview (Fig. 4.2) of Aalto's small-scale wood reliefs as a significant body of design work spanning over two decades. An examination of Aalto's wood reliefs as technical and formal models emphasizes their relatively complex, multifaceted nature and relationship to architecture, furniture design, and Artek. Aalto once described the connection between architecture and furniture design as the former simply providing a context for designing the latter, with suitable and well-designed furniture

contributing to an architectural wholeness.⁴⁵ The present research adds to this general understanding by showing how the reliefs could engage with aspects related to technique, form, and promotion, but also exert an extended influence in the fields of architecture, furniture and interior design. The experimental nature of many wood reliefs in the 1930s further complemented some of Aalto's most important lectures, thereby supporting the development and mutual interaction of new ideas, concepts, and forms in furniture and architectural design. Far more than simple material studies or experiments, the wood reliefs were therefore important in establishing an early connection and common design element between Aalto's furniture and architecture.

Notes for Chapter 4

¹ Marianna Heikinheimo, 'Alvar Aalto's Patents' *Ptah* 2 (2004): 9–16.

² Eeva-Liisa Pelkonen, *Alvar Aalto: Architecture, Modernity, and Geopolitics* (New Haven: Yale University Press, 2009), 148–53.

³ For example, see the three recent exhibitions from Note 4: Weil am Rhein (Vitra Design Museum), 2014; New York (Bard Graduate Center), 2016; and Helsinki (Ateneum), 2017.

⁴ Writing in 1980, Schildt provided the following list of Aalto exhibitions that featured wood reliefs, in addition to the 1933 'Wood Only' exhibition in London: 'New York, 1938; Zurich, 1948 and 1964, Paris, 1950 and 1966, Florence, 1965, and Stockholm, 1969'. The list could be easily expanded to include exhibitions in recent years, for example, Weil am Rhein (Vitra Design Museum), 2014; New York (Bard Graduate Center), 2016; and Helsinki (Ateneum), 2017. See Göran Schildt, 'Alvar Aalto's Wood Reliefs', *Mobilia* 296/297 (1980): 30.

⁵ Nina Stritzler-Levine and Timo Riekko, eds., *Artek and the Aaltos*, (New York: The Bard Graduate Center, 2016), 78.

⁶ Artek Celebrates Its 80th Anniversary at Salone Internazionale Del Mobile, 2015, www.artek.fi/news/pressreleases/561 accessed 18 March 2016.

⁷ Aalto later credited Hirn as a key influence on his design process and the importance of play without practical purposes. See Göran Schildt, *Modern Finnish Sculpture* (London: George Weidenfeld and Nicolson Ltd, 1970), 15.

⁸ Among many examples, see Malcolm Quantrill, *Alvar Aalto: a Critical Study* (London: Secker & Warburg, 1983), 252; Juhani Pallasmaa, ed., *The Language of Wood*, 2nd ed. (Helsinki: Museum of Finnish Architecture, 1994), 208; Pelkonen, *Alvar Aalto: Architecture, Modernity, and Geopolitics*, 144–51; Kazuki Takizawa and Masayuki Irie, 'Alvar Aalto's View of Nature—From His Experimental Bending of Wood Sculpture', *Summaries of Technical Papers of Annual Meeting 2012* (Architectural Institute of Japan, 2012), 399–400.

⁹ Alvar Aalto, *Alvar Aalto in His Own Words*, ed. Göran Schildt, (New York: Rizzoli, 1998), 108.

¹⁰ Pelkonen, *Alvar Aalto: Architecture, Modernity, and Geopolitics*, 143.

¹¹ Göran Schildt, *Alvar Aalto - the Decisive Years*, (New York: Rizzoli, 1986), 78–80, 257.

¹² Schildt, 'Alvar Aalto's Wood Reliefs': 30.

¹³ One exception was the 2007 exhibition 'Puun Ulottuvuuksia: Some Dimensions on Wood' at the Alvar Aalto Museum in Jyväskylä, Finland, which included at least eight of the wood reliefs presented in Figure 2, and several large-scale reliefs designed by Aalto in the 1960s and 1970s. For an example of the latter, see the 1965 wood relief entitled 'Blue Bord' on the cover of Aila Kolehmainen, ed., *Alvar Aalto Puu Taipuu Det Formbara Träet*. Helsinki: Alvar Aalto Säätiö, 2010.

¹⁴ While it is possible that more than twenty small-scale wood reliefs were made, the author could find no evidence or photographs in the Alvar Aalto Museum archives of additional reliefs to support such a claim when visiting the archive in February, 2015. Regarding Aalto's later reliefs, for example, the large wood relief entitled 'Tekniikan symboli' (Symbol of Technology) was designed in 1966 specifically for the main lecture hall of the Helsinki University of Technology in Otaniemi (now Aalto University). See Jaakko Penttilä, 'Building Alma Mater', in *Alvar Aalto Architect: University of Technology, Otaniemi 1949–74*, ed. Mia Hipeli, vol. 13 (Helsinki: Alvar Aalto Academy, 2008), 32–33.

¹⁵ In Figure 1a, one can see a simple relief composed of four repeated sections of the curved seat of Aalto's stackable 'Hybrid Chair'. Additional historical photographs of the 1933 'Wood Only' London exhibition further show another two reliefs not included in Figure 2: one demonstrating the intermediate stages for making an 'L-Leg', and another made with a single thin meandering strip of wood. In Figure 1c, the relief on the far right is composed as a group of 13 'L-Legs'.

¹⁶ For example, the three exhibitions from Note 4: Weil am Rhein (Vitra Design Museum), 2014; New York (Bard Graduate Center), 2016; and Helsinki (Ateneum), 2017.

¹⁷ According to Schildt, the same person from Korhonen's factory who made the original reliefs also made these limited edition replicas in 1979. This person was most likely Jaakko Koskinen. Each replica was numbered and signed by Alvar Aalto's second wife, Elissa Aalto, and they were made for an international 'memorial exhibition' following Alvar Aalto's death in 1976. They were then later sold to raise funds to allow the Alvar Aalto Foundation to purchase the Aalto Studio building. See Schildt, 'Alvar Aalto's Wood Reliefs', 30–36.

¹⁸ Harry Charrington and Vezia Nava, eds., *Alvar Aalto: the Mark of the Hand*. Helsinki: Rakennustieto, 2011.

¹⁹ Ville Kokkonen (Artek Design Director) in discussion with the author in Helsinki, May 2013, and Jukka Korhonen (Director of HKT Korhonen) in discussion the author in Turku, October 2012.

²⁰ Stritzler-Levine and Riekko, *Artek and the Aaltos*.

²¹ Although photographs of the production processes were not allowed while visiting the Korhonen factory, seeing the production of Aalto furniture was relevant for gaining a better understanding of technical issues related to both the wood reliefs and furniture.

²² Digital images of the wood reliefs in the Alvar Aalto Museum archives are grouped together in a digital folder and can be found using a straightforward digital search of the archive catalogues.

²³ Laminated wood is a common term in the fields of design, architecture, engineering, and construction. A relatively broad definition is used here for consistency across these various areas. See J. M. Dinwoodie, *Timber: Its Nature and Behaviour*, 2nd ed., (London: Spon, 2000), 234–35; USDA Forest Service Forest Products Laboratory, 'Wood Handbook, Wood as an Engineering Material', ed. Robert J. Ross, (Madison: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory, 2010), 11–12; and for an overview of cross-lamination or cross-grained wood lamination such as in plywood, see Christopher Wilk, ed., *Plywood*, (London: Thames & Hudson, 2017), 7–15, and 148–49.

²⁴ Aalto's critique of tubular steel furniture as practical but also cold and uncomfortable was outlined in his 1935 lecture 'Rationalism and Man'. See *Aalto, Alvar Aalto in His Own Words*, 90.

²⁵ Pelkonen, *Alvar Aalto: Architecture, Modernity, and Geopolitics*, 113.

²⁶ In practice, the main angle between the seat and back of the Paimio chair is made through a simple moulding process. Due to their relatively complex geometry, the end loops of the seat and back, however, are bent using metal bending sheets and a separate lever that can be attached to the mould. See Figure 4.4b for a historical photograph taken during the subsequent bending process of an end loop for a Paimio chair seat and back. The use of a metal bending sheet or bending strap is taken here as the key difference between bending on the one hand, and forming or moulding on the other.

²⁷ Heikinheimo, 'Alvar Aalto's Patents': 11.

²⁸ Edward C. Peck, 'Bending Solid Wood to Form', (Madison: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory, 1957), 8–11.

²⁹ Following the Milan exhibition in 1936, Aino wrote a letter to Alvar explaining how she received many enquiries on the price of the reliefs. See Ulla Kinnunen, ed., *Aino Aalto*, trans. Jüri Kokkonen, (Jyväskylä: Alvar Aalto Säätiö, 2004), 11.

³⁰ See Schildt, *Modern Finnish Sculpture*, 16, and Sigfried Giedion, *Space, Time and Architecture*, 3rd ed., (Cambridge: Harvard University Press, 1954), 602–603.

³¹ See Juhani Pallasmaa, ed., *Alvar Aalto Furniture*, 2nd ed., (Helsinki: Museum of Finnish Architecture, 1984), 129, and Schildt, *Modern Finnish Sculpture*, 16.

³² See Schildt, 'Alvar Aalto's Wood Reliefs', 30; William C. Miller, 'Furniture, Painting, and Applied Designs: Alvar Aalto's Search for Architectural Form', *The Journal of Decorative and Propaganda Arts* 6 (1987): 24; and Pelkonen, *Alvar Aalto: Architecture, Modernity, and Geopolitics*, 143.

³³ Additional examples can also be found in Isohautta's study of Aalto's various uses of wood in architecture. See Teija Isohautta, 'The Diversity of Timber in Alvar Aalto's Architecture: Forests, Shelter and Safety', *Architectural Research Quarterly* 17, no. 3 (December 2013): 269–80, doi:10.1017/S1359135514000086.

³⁴ Aalto, *Alvar Aalto in His Own Words*, 93.

³⁵ Ibid., 100.

³⁶ Juhani Pallasmaa, 'Aalto Standards', in *Artek and the Aaltos*, ed. N. Stritzler-Levine and T. Riekko, (New York: The Bard Graduate Center, 2016), 191.

³⁷ Pekka Korvenmaa, 'A Bridge of Wood: Aalto, American House Production, and Finland', in *Aalto and America*, ed. Stanford Anderson, Gail Fenske, and David Fixler, (New Haven: Yale University Press, 2012), 107.

³⁸ Ákos Moravánszky, 'Baker House and Brick: Aalto's Construction of a Building Material', in *Aalto and America*, 213–14.

³⁹ Ibid., 213–14.

⁴⁰ Pelkonen, *Alvar Aalto: Architecture, Modernity, and Geopolitics*, 144–50.

⁴¹ See Pelkonen, *Alvar Aalto: Architecture, Modernity, and Geopolitics*, 150–52; and Eeva-Liisa Pelkonen, 'Symbolic Imageries: Alvar Aalto's Encounters with Modern Art', in *Alvar Aalto: Second Nature*, ed. Mateo Kries and Jochen Eisenbrand, (Vitra Design Museum GmbH, 2014), 124–27, and 487.

⁴² See M. Kries and J. Eisenbrand, eds., *Alvar Aalto: Second Nature*, 487–91, and Sointu Fritze, ed., *Alvar Aalto—Art and the Modern Form* (Helsinki: Ateneum Finnish National Gallery, 2017), 71–74.

⁴³ Aalto, *Alvar Aalto in His Own Words*, 268.

⁴⁴ For a brief discussion on Aalto and Arp and their mutual acquaintances, see Fritze, *Alvar Aalto—Art and the Modern Form*, 74.

⁴⁵ Pallasmaa, *Alvar Aalto Furniture*, 9.

Chapter 5. Conclusions and recommendations

5.1 Conclusions

Reflecting on the broad body of existing international research on Alvar Aalto's architecture and furniture, this thesis has offered several notable contributions. The following conclusions summarize and highlight these contributions, starting with a reminder of the context and motivation for this work and its goals. Recalling how existing literature¹ has noted the difficulty in working directly with Aalto's many undated sketches and drawings, this thesis has taken on this challenge directly to produce new insights regarding Aalto's design process. With an aim to clarify Aalto's design process and deeper connections between Aalto's furniture and architecture, archival photographs and recently catalogued 1950s sketches and drawings from the Alvar Aalto Museum archive have been used here to their full potential as a primary source material for research. This work has complemented existing studies based primarily on interviews,² analyses of archival letters and documents,³ and on-site surveys and photography.⁴ By combining a broader research perspective from Japan with more direct and personal research experiences in Finland, this work represents the first major academic dissertation on Alvar Aalto from a Japanese researcher.

5.1.1 Scope of methodology

The original methodology developed throughout the course of the thesis has been applied and tested to illustrate a novel way of working with Aalto's sketches, drawings, and archival photographs. In the three examined cases of Aalto's 1950s churches in Seinäjoki, Vuoksenniska, and Wolfsburg, the methods outlined in the thesis of carefully sorting and organizing undated design sketches with respect to one another and in reference to dated drawings has given the opportunity to retrace, reconstruct, and visually represent Aalto's design processes. Rather than focusing on a single sketch or drawing, this thesis has brought to light the flow and progression of Aalto's design process, primarily by discussing how different sketches and drawings are related to one another. This methodology and process is not only suitable for churches, but generally applicable to different projects, and perhaps even different architects. Establishing a simple but useful overview and visual representation of Aalto's design process for a given project enables more in-depth study and investigations: comparisons can be made between two or more projects, as seen with the three church examples considered in this thesis; or the complexities of a single project can be interrogated in detail if so merited, such as in the case of Vuoksenniska Church. In contrast to abstract spatial diagrams⁵ attempting to represent Aalto's architecture and process of designing, the simple timelines of Aalto's design process and accompanying illustrations offered in this thesis are intuitive and easy to grasp for a wide range of architects and architectural researchers. They offer a direct and visual understanding of Aalto's thinking and design process. Adapting this process for use with archival photographs of experimental wood reliefs instead of design sketches yielded an analogous and equally useful result; the first comprehensive and chronological overview of Aalto's small-scale experimental wood reliefs and sculptures as a body of design work related to both furniture and architecture.

5.1.2 Aalto's design process for three churches

The resultant visual timelines of Aalto's design processes for the three 1950s churches in Seinäjoki, Vuoksenniska, and Wolfsburg illustrated Aalto's way to design architecture. Aalto's design process in the 1950s was characterized by simple sketches made early on, often with basic elements such as trapezoids, fan-shaped, and bentwood forms associated with furniture designs. These elements were reprised from one project to another, and established continuity between the three church projects. Aalto could then gradually develop an individual project by combining, repeating, or varying these elements in scale, working in plan and section simultaneously. Examples include the repetition of vaulting in the section of Seinäjoki Church, or the repetition of spaces and fan-shaped forms for Vuoksenniska Church, or the smaller scale, almost furniture-like fan-shape form and interior of Wolfsburg Church. Despite the noticeably similar conception sketches for all three of these churches, the distinct

architectural designs for each church are a reminder of the open-ended nature of Aalto's design process.

In parallel with identifying the continuity and similarities in the design processes for all three churches, a comparison of the projects further showed how Aalto's design process and architecture could significantly vary in their depth and degree of complexity. For example, compared to the more well-known case of Vuoksenniska Church, which is considered one of Aalto's masterpieces by many sources, the churches in Seinäjoki and Wolfsburg and their design processes were relatively simple and did not undergo significant developments in their design after the first initial concept term of the design process. Throughout the design process for Vuoksenniska Church, however, Aalto often checked plan and section sketches with acoustical sound wave drawing and sketches. In the case of Seinäjoki and Wolfsburg Church, as the clients accepted an initial design relatively early on, there was no incentive to further improve the design of the churches. Compared to the churches in Seinäjoki and Wolfsburg, a more detailed analysis of Vuoksenniska Church was merited and presented later in the thesis accordingly.

5.1.3 Drawing insights: Vuoksenniska Church

A closer examination of the design process for Vuoksenniska Church highlighted Aalto's commitment to the social and cultural aspects of architecture. By starting to design the church from a basic trapezoidal plan with the three-fold repetition of separable spaces, Aalto intended from the onset to achieve a balance between the religious and social purposes of a modern church. Combining this early plan with fan-shape forms based on a sketch of a bentwood sculpture in turn yielded a plan defined by rational and geometrical lines in the intermediate stages of the design process. With numerous acoustical sketches in plan and natural lighting sketches in section, the church's basic geometry was gradually infused with a rich complexity, while the three-fold repetition of elements were carried throughout the church plan, section, bell tower, lighting, and details. Using organic metaphors to finally integrate structural elements into the architectural design resulted in a complete and holistic proposal. While Aalto's sketches and drawings offered a unique and novel analysis of the church, this discussion further demonstrated how they also encourage a broader, more complete understanding of the church as a coherent and highly-developed work of architecture.

5.1.4 Aalto's wood sculptures and reliefs

Aalto's wood sculptures were previously identified as an influential source in the design processes for the three churches considered in this thesis. To investigate and clarify their extended role and dual influence between Aalto's architecture and furniture, the complete collection of Aalto's small-scale and experimental wood reliefs was considered in the final chapter of this thesis. Aalto's wood reliefs and sculptures were examined as prototypes and design models for architecture and furniture, representing a body of work dating from the late 1920 to the mid 1950s. While these wood sculptures and reliefs have been usually associated with Aalto's furniture, mainly as examples of Aalto's playfully testing of design ideas in wood, their technical and formal characteristics were equally relevant for furniture and architecture and established an interaction between the two areas. While the complicated techniques associated with these wood sculptures and reliefs proved difficult to adapt for mass-produced furniture, their forms and structure influenced not only the three churches already noted, but also some of Aalto's most well known architectural projects from the 1930s. As prototypes and formal models for furniture and architecture, these wood sculptures also complemented Aalto's lectures and ideas regarding rationalism and 'elastic' standardization, forming a mutual interaction between Aalto's broad design activities and theoretical agenda. The wood reliefs represent a common element and close connection between furniture and architecture in Aalto's design process.

5.2 Future research

In examining Aalto's sketches and drawings for specific projects, the scope of the present thesis included examining the design process for three of Aalto's 1950s churches. Future work could naturally extend this range to Aalto's other realized church projects, such as the Church of the Cross (1969-79) in Lahti, Finland and the later Detmerode Church (1963-68) in Wolfsburg, Germany. Furthermore, rather than focusing on just the church buildings themselves, future studies could also consider the design process for each church's bell tower and accompanying parish and town hall buildings. In any case, the results presented here regarding the initial design sketches for Seinäjoki, Vuoksenniska, and Wolfsburg Church still offered valid observations regarding basic design elements, and specifically how they initiated the design process through the act of drawing. Future research could also consider the broader meaning behind such forms and elements. For example, such research could answer questions as to why Aalto drew what appears to be a girl when beginning the design process for Seinäjoki Church. Is the girl's form simply a spontaneous and creative idea, or does it carry a deeper meaning for Aalto? Similar work in the future could also address what appears to be a common tendency for Aalto to draw a distinct hand-shaped form for parts of project's plan, like in the case of the basement plan for Vuoksenniska Church. What is the meaning of the hand and why is Aalto fascinated with this form while designing? These and other questions remain as open issues for future researchers.

Recent research efforts have often focused on the role of Aino Marsio-Aalto and her role in much of the work usually solely credited to Alvar Aalto. This is an important progression although it can be argued that many significant Aalto projects and designs were still completed during the time following Aino Marsio-Aalto's life. This observation is not used in an attempt to reinforce Alvar Aalto's as an independent and lone designer, but as a reminder that several other important collaborators also worked with Alvar Aalto after 1949, following Aino Marsio-Aalto's death. For example, Elissa Aalto, as Aalto's second wife and design partner, was the project architect for Säynätsalo Town Hall, and lead the Aalto Studio during the later years of Aalto's life and afterwards until her own death in 1994. Maija Heikinheimo, who became the Artek's Art Director after Aino Marsio Aalto, would often sign her own drawings with Alvar Aalto name, and was also responsible for many furniture and interior designs which were credited to Alvar Aalto and the Aalto Studio.⁶ In the same manner as current revisionist studies regarding Aino Marsio-Aalto's contributions, Elissa Aalto and Maija Heikinheimo are still unaddressed subjects waiting to receive such attention from researchers. Research on their collaboration with Alvar Aalto is therefore recommended for future work.

As the first major academic thesis on Aalto from Japan, many aspects of this work could lead to future studies with additional recommended research. Based on my own experiences during this thesis, I would highly recommend for future researchers interested in focusing on Aalto to visit and if possible, stay in Finland. It is simply crucial to spend time in the Alvar Aalto Museum archives in Jyväskylä. In addition to gaining access to a much broader body of existing literature on Aalto, new archival material such as photographs, letters and documents, and design sketches and drawings, are continually being digitalized and made available for future research studies. For example, Alvar Aalto Museum staff members are currently scanning and cataloguing the sketches and drawings from Aalto's projects from the 1960s and 1970s. As already noted, the structure of this thesis could be extended to include projects from additional decades in future research, but such extension need not be limited to just churches. For example, an extended research project could aim to clarify Aalto's so-called 'red-brick' and 'white' periods of design and construction, with a more careful reading and understanding of a selection of projects and the transition or overlap between these periods. In such research, examining Aalto's design sketches and drawings, and not just the completed buildings along, would also be naturally recommended. The current work has shown the value of examining Aalto's sketches and drawings to clarify design intentions, and how Aalto could effectively design architecture and furniture with a keen sense for the human experience of everyday life.

Notes for Chapter 5

¹ Susanne Müller, *Aalto und Wolfsburg*, (Weimar: VDG, 2008).

² Harry Charrington and Vezio Nava, eds., *Alvar Aalto: the Mark of the Hand*, (Helsinki: Rakennustieto, 2011).

³ Müller, *Aalto und Wolfsburg*.

⁴ David Walker, "White Space in Northern Light: Two Churches Analysed," *Architectural Research Quarterly* 8, no. 1 (1999): 61–81, doi:10.1017/S1359135504000089.

⁵ Tadanao Maeda, "On Aalto's Methodological Concept and His Work," *Journal of Architecture and Planning (Transactions of AIJ)* 66, no. 550 (2001): 295–302.

⁶ Nina Stritzler-Levine, "Artek and the Aaltos," in *Artek and the Aaltos*, ed. Nina Stritzler-Levine and Timo Riekko, (New York: The Bard Graduate Center, 2016), 41–99.

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Appendix A: Photographs of Seinäjoki Church







Appendix B: Photographs of Vuoksenniska Church







Appendix C: Photographs of Wolfsburg Church





Publications

Chapter 2

Mihoko Ando, "Reprise and Continuity in Alvar Aalto's Design Process for Three Churches," *Journal of Asian Architecture and Building Engineering* 17, no. 2 (2018): 237-244, doi:10.3130/jaabe.17.237.

Chapter 3

Mihoko Ando, "Retracing Alvar Aalto's Design Process Through the Sketches and Drawings of Vuoksenniska Church (1955–8)," *Architectural Research Quarterly* 20, no. 4 (2016), 333-344, doi:10.1017/S1359135516000567.

Chapter 4

Mihoko Ando and Patrick H. Fleming, "A Study of Alvar Aalto's Wood Reliefs for Furniture and Architectural Design," *Journal of Design History* 32, no. 2 (2019) 146–169, doi:10.1093/jdh/epy042.

