UTZON'S MIDDLE EAST: THE REINTERPRETATION OF THE TRADITIONAL MIDDLE EASTERN ARCHITECTURE IN THE WORK OF JØRN UTZON

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By

Cem Yılgın

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We certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Science.

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ABSTRACT

Utzon's Middle East:
The Reinterpretation of the Traditional Middle Eastern Architecture in the Work of Jørn Utzon.

Cem Yılgın

M.S. in Architecture

Advisor: Chen-Yu Chiu

August 2022

Middle Eastern ideas had a remarkable influence on Utzon's artistry besides other non-European cultures, as seen in his manifestations and architectural works. However, the effects of Middle Eastern building culture on Utzon's career have not been carefully investigated. In this manner, this thesis aims to explore the reinterpretation of Middle Eastern ideas in Utzon's work to reveal his cross-cultural position and trans-cultural intention. It argues that the Middle East provided ideas to Utzon over his lifetime career, and gave inspiration for the manipulation of his ideas and ideals. Regarding this context, the research firstly examines Utzon's Middle East through his social and cultural background by surveying his readings and study trips and reviewing his manifestoes, project descriptions, and edited materials. Secondly, Utzon's early perception of the Middle East was illuminated with built-form analogies, such as the Sydney Opera House and Masjid-i Jamii of Isfahan, the Melli Bank and Masjid-i Shaikh Lotfollah, the Silkeborg Museum and Bazaar of Kashan. Thirdly, the transformation of Utzon's ideas and ideals between his two manifestos, the 1962 "Plateaus and Platforms" and 1970 "Additive Architecture", is investigated by highlighting the limitations and strengths of a series of buildings and projects. Fourthly and finally, Utzon's seminal project proposal for the Farum Town Center is examined as a case study to reveal the role of the Middle East in his "additive" theme. Utzon's receiving of the Middle East, specifically through the Grand Bazaar of Isfahan, could reflect Utzon's manipulation of a group of ideas to resolve the limitations of his earlier projects, seen in the Farum Town Center proposal.

Keywords: Jørn Utzon, Islamic Architecture, the Sydney Opera House, the Masjid-I Jamii of Isfahan, Bazaar Architecture

ÖZET

Utzon'un Orta Doğu'su:
Jørn Utzon'un Eserlerinde Geleneksel Ortadoğu Mimarisinin Yeniden Yorumlanması.

Cem Yılgın

Mimarlık, Yüksek Lisans

Tez Danışmanı: Chen-Yu Chiu

Ağustos 2022

Utzon'un manifestolarında ve mimari eserlerinde görüldüğü üzere Orta Doğu fikirleri, diğer Avrupa dışı kültürlerin yanı sıra onun sanatı üzerinde dikkate değer bir etkiye sahiptir. Ancak, Orta Doğu bina kültürünün Utzon'un kariyeri üzerindeki etkileri dikkatli bir şekilde araştırılmamıştır. Bu tez, Utzon'un kültürler arası konumunu ve kültürler ötesi amacını ortaya çıkarmak için onun çalışmalarındaki Orta Doğu fikirlerinin yeniden yorumunu araştırmayı amaçlamaktadır. Bu kapsamda, Orta Doğu'nun hayat boyu kariyeri boyunca Utzon'a fikirler sağladığı, fikirlerinin ve ideallerinin manipüle oluşunda ilham kaynağı olduğu savunulmaktadır. Bu tez öncelikle Utzon'un okumaları ve çalışma gezilerini, manifestolarını, proje açıklamalarını ve editörlüğünü yaptığı materyallerini gözden geçirerek onun Ortadoğu'sunu sosyal ve kültürel arka planı üzerinden incelemektedir. İkinci olarak, Sidney Opera Binası ve İsfahan Cuma Camii, Melli Bankası ve Şeyh Lütfullah Camii, Silkeborg Müzesi ve Kaşan Çarşısı gibi yapı formu analojileriyle Utzon'un erken Orta Doğu algısını aydınlatmaya çalışmaktadır. Üçüncü olarak, bir dizi bina ve projelerin motivasyonlarını ve sınırlamalarını inceleyerek Utzon'un fikir ve ideallerinin 1962 "Plato ve Platformlar" ve 1970 "Eklemeli Mimari" adlı iki manifestosu arasındaki dönüşümünü araştırmaktadır. Dördüncü ve son olarak, Utzon'un Farum Şehir Merkezi için ufuk açan proje önerisi "eklemeli" temasında Orta Doğu'nun rolünü ortaya çıkarmak için bir vaka çalışması olarak incelenmiştir. Farum Şehir Merkezi önerisinde görüldüğü şekliyle, Utzon'un özellikle İsfahan Kapalı Çarşısı üzerinden yaptığı Ortadoğu gözlemi önceki projelerinin limitasyonlarını çözmek için bir grup fikri manipüle ettiğini yansıtabilir.

Anahtar Kelimeler: Jørn Utzon, İslam Mimarisi, Sidney Opera Binası, İsfahan Cuma Câmii, Kapalı Çarşı Mimarisi

To my family,

for their endless support and encouragement

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CHAPTER 1

INTRODUCTION

1.1 Between the East and West, between Utzon and his Middle East

Danish architect Jørn Utzon (1918-2008) is one of the most significant architects in the modern architectural theory, most widely known for his masterpiece the Sydney Opera House (1956-1966). Besides the fact that his early works as well as his works and projects after his resignation from the Sydney Opera House were not as well-known to society, his lifetime interest in the traditional architecture of the Middle East was vague. The cross-cultural studies about Utzon and Middle East as well as about his interest in other cultures such as China and Japan were not to be occurred until 1990s, which were in an arguably mystifying fashion to rather reveal his interest with materials and stories instead of an in-depth cross-cultural study.

This thesis aims to explore the relationship between Utzon, his work and his ideas which could be described under the umbrella of the term 'traditional art and architecture of the Middle East'. In this study it is not intended to reveal or construct a link between the East and the West, nor to create a myth between Utzon and his Middle East. The substantial contribution of this thesis to the scholarship on Utzon should not only be the identification of Utzon's receiving and interpretation of the Middle East, but also to reflect on his Middle East as part of his own desire, to show his ideas and ideals through his own growth and maturity. Eventually, this study aims to reconstruct the understanding of both Utzon and his Middle East.

1.2 Problem Statement – The Continuity and Discontinuity of Utzon's Middle East

In Utzon's lifetime career, relative references to his Middle East were inherent in several of his written manifestoes and rhetorical statements, regarding his architectural design ideas for his buildings and projects. However, it is possible to trace a continuity and discontinuity of these appearances throughout his career, which raises a question about the complexity of the interaction between Utzon and his Middle East. The continuity and discontinuity could reflect different perceptions, meanings, and varied applications of his Middle East with specified focuses, and under varied circumstances regarding his design problems at different times. These being considered, Utzon's forming and manipulating of his Middle-East inspired ideas regarding the continuity and discontinuity of his Middle East could represent his growth and transformation. In previous scholarship, the continuity and discontinuity of Utzon's cross cultural references were discussed only for Utzon's China and Japan[1], however, the precise role of Middle East was not studied.

The precise role of the Middle East as well as other cultures on Utzon's career was not carefully explored and analyzed by previous scholars. Due to the contemporary trend of world architectural history being dominantly Eurocentric, Utzon's relationship with the East Utzon and the Middle Eastern culture should not be seen and portrayed as two 'exotic' objects, instead, should be investigated from Utzon's cross-cultural perspective and should be disussed be able to interpret the meaning of his transcultural act.

[1] See; Chen-Yu Chiu, "China Receives Utzon: The Role of Jørn Utzon's 1958 Study Trip to China in His Architectural Maturity," *Architectural Histories*, 4(1), 12 (2016): 1–25.

1.3 Research Question, Aim and Objectives

The main discussion of this thesis is subject to the primary research question, “What is Utzon’s Middle East?”. This question involves the reinterpretation of Utzon’s ideas and ideals associated with his Middle East, with the aim of demonstrating how he manipulated those ideas within his cross-cultural position and transcultural intentions. For this discussion, three research questions are put forward.

Firstly, what was Utzon’s perception of the Middle Eastern building culture, and through what channels? The aim of this question is to address Utzon’s life-time perception of the Middle East including his readings, study trips and experiences. This provides an understanding of Utzon’s receiving of the Middle Eastern ideas as well as a social and intellectual background to be able to assess a series of ideas manipulated by him which associates with the Middle Eastern building culture.

Secondly, why and how did Utzon reinterpret the perceived ideas and ideals of the Middle East? This question aims to discuss firstly why did Utzon reinterpret Middle Eastern ideas, considering his transculturation as part of his critical reflection on the weaknesses of modern architecture. Followingly, how he reinterpreted Middle East is to be able to analyze his personal circumstances in which the Middle Eastern inspired ideas were involved. For these, the different roles of the Middle East in Utzon’s diverse design solutions at different points in time are to be addressed, to reveal the strengths and weaknesses of his Middle East inspired ideas.

Thirdly, what was the precise role of Middle Eastern architecture in Utzon’s career, seen in the transformation of his architectural beliefs and idioms? This question aims to address the contribution of Utzon’s reinterpretation of Middle East ideas, to his individuality, personal desire and growth, and his self-promoting within the world-culture, and the struggle and anxiety on which caused the continuity and discontinuity of his Middle East during his lifetime career.

1.4 Methodology

Besides the inspiration from the modern discussions between the East and West including mainly Orientalism, Occidentalism and Nihilism, as well as Hermeneutics; the theory of methodology of interpretation, there are no specific theories applied in this thesis. To be able to address Utzon's Middle East and the relationship between Utzon and his Middle East, the discussion over the two questions about "What is Middle East" and "What is Utzon" will be clarified.

1.4.1 What is Middle East?

The term "Middle East" in this thesis does not refer to a single previously constructed idea/ideal related to the Middle Eastern culture, neither historical nor contemporary. Thus, the reference to "Middle East" does not belong to a certain nation, race or territory; it could however refer to a series of dynamic ideas associated with the "traditional art and architecture of the Middle East", which is essentially a transformed knowledge between the receivers and interpreters of the Middle East. Therefore, as the "Middle East" constitutes a wide-range term and cannot be precisely definable, this study is about Utzon's receiving a group of ideas about the "Middle East" from earlier interpreters and how he reinterpreted them through his own work. Hence, this thesis is about interpreting Utzon's reinterpretation of the so called "traditional architecture of the Middle East", to search for the motivation, mechanism and outcomes of his reinterpretation.

1.4.2 What is Utzon?

In this thesis, "Utzon" refers to the architect's creativity by essentially interpreting his perception and application of his associated ideas. For this interpretation, besides historical surveys and studies for the background of Utzon's life, a series of analogies and comparisons are put forward to demonstrate the relationship between his receiving and application of his ideas associated with Middle East. Unfortunately, it is not possible to precisely and objectively define "Utzon" and his approach to his Middle East, merely because of the unknown link between an individual and his outward gesture and expression. In this thesis, it is assumed that the expression of the architect through his architectural creations represents his own individuality.

1.5 Method – Approaching Utzon and His Middle East

Unfortunately, Utzon and his spouse Liz Utzon passed away in 2008 and 2010 respectively, which made impossible to directly interview with them to illuminate Utzon's own perspective on Middle East. Therefore, this thesis is conducted as a historical study, to approach to the research questions via indirect resources. Due to the global pandemic condition of the time period this study was conducted, travelling to Denmark was not possible for the author. However, fortunately, more than half of Utzon's archives were already digitalized and served from the Utzon Archives in Aalborg. Therefore; drawings, photographs, films and travel documents of Utzon were gathered from the Utzon Archives and carefully investigated. Thus, Utzon's own unpublished 9mm films, unscanned drawings and an extensive list of Utzon's own collection of readings were gathered from Chen-Yu Chiu. The personal reading collection of Utzon was systematically reviewed and specifically classified for the Middle East, to be physically collected and examined.

For arguing Utzon's perception and reinterpretation of the Middle Eastern building culture, the found materials are served as a base to conduct a series of comparative analyses between Utzon's seminal work and specific monuments from Persian architecture, namely, today's Iran. These monuments are: the Masjid-i Jamii of Isfahan (مسجد جامع اصفهان) , the Masjid-i Shaikh Lutfullah (مسجد شیخ لطف الله) , the Grand Bazaar of Isfahan (بازار بزرگ) , Masjid-I Shah (مسجد شاه), and the Naqshe Jahan Square (میدان نقش جهان).

1.6 Limitation and Contribution – Between Interpretation and Misinterpretation

Firstly, similar to other historical studies, this thesis only partially reconstructs Utzon's Middle East from the available direct and indirect resources and materials that survived. This being the primary limitation, it can never truly conceptualize Utzon's own perspective, similar to any historical study.

Secondly, this thesis does not refer to all possible interpretations and reinterpretations of the Middle East. Only part of the interpreted knowledge has been explored about the Middle East, in which Utzon's Middle East is associated with or inspired by. Therefore, "Utzon" could be the main figure and the focus of the point of view of this study to carefully elaborate the Middle East of prior interpreters.

Thirdly, this thesis does not focus on the distinctive characteristics of diverse interpretations of Middle East prior to Utzon. However, various analogies could be made between Utzon's and others' Middle East. As the similarities and differences between Middle East and Utzon's receiving and application of his Middle East are highlighted, the transformation of knowledge about Middle East could be conveyed, and the existing Middle East could be re-defined. Furthermore, Utzon's Middle East will provide a deeper understanding of what had been defined as "Utzon".

Fourthly, in spite of the fact that this thesis is not the first study to reveal Utzon's cross-culturation, it is the first to explore his interpretation of the Middle East. Therefore, this study alone cannot completely reveal what is Utzon's Middle East, nor its full complexity within the artistic creations of his lifetime career. As further research is needed, this study should provide a foundation for future scholarship about Utzon and the Middle East.

1.7 Literature Overview

In 1965, Sigfried Giedion's seminal article "Jørn Utzon and the Third Generation"[2] was published, which indicated Utzon's interest and receiving of architectural traditions of different cultures including the Middle East. In 1995, Kenneth Frampton published Studies in Tectonic Culture[3]. The book included a chapter – "Jørn Utzon: Transcultural Form and the Tectonic Metaphor"[4] theorizing Utzon's work, with an articulated elaboration of its cross-cultural sources of inspiration[5], including the Middle East. In 1999, *The Masterpiece, Jørn Utzon: A secret Life*[6], Philip Drew mentioned several design features of Utzon's 1959-62 Melli Bank[7] and 1972-82 Kuwait National Assembly[8] buildings for highlighting his receiving and application of Middle East. In 2001, Richard Weston published *Utzon: Inspiration, Vision, Architecture*[9], adding to a similar theoretical framework, especially seen in the role of Middle Eastern building culture in the varied design proposals for the Sydney Opera House. In 2004, Weston's book chapter "Platforms and Plateaus in Utzon's Architecture" was published in *Jørn Utzon: The Architect's Universe*[10], examining the role of the ancient Islamic city and its inspired design principles in Utzon's early work.[11] The same book also included architect Hans Munk Hansen's (1929-) chapter *Utzon and the Orient*[12], which indicated several important inspirational sources of Utzon's seminal projects, especially received from the architect's 1959 study trip to Iran. The *Logbook Series*[13] was published by Torsten Bløndal between 2004-2009, in which a series of monographs of Utzon's architectural and artistic creations were served. In *Logbook Vol. V: Additive Architecture*[14] was it was made possible to observe the ideas and ideals specifically received from the Middle East in Utzon's late work, particularly within his "additive" theme. In 2021, Adrian Carter and Marja Sarvimäki's *Jørn Utzon and Transcultural Essentialism*[15] was published, which accumulated a series of stories and peripheral analysis of Utzon's work to reveal his cross-culturation including Middle East. Nonetheless, none

[2] Sigfried Giedion, "Jorn Utzon and the Third Generation," *Zodiac* no. 14 (1965).
[3] Frampton, K. *Studies in Tectonic Culture: The Poetics of Construction in Nineteenth and Twentieth Century Architecture* (Chicago, Illinois: the MIT Press, 1996).
[4] In Frampton's *Studies in Tectonic Culture: The Poetics of Construction in Nineteenth and Twentieth Century Architecture*, 247-298.
[5] Frampton mentioned the influences of world cultures such as from China, Japan, Morocco, America, Mexico and India besides the Middle East.
[6] Philip Drew, *The Masterpiece, Jørn Utzon: A secret Life* (South Yarra, Victoria, Hardie Grant Books: 1999).
[7] Ibid., 175-176.
[8] Ibid., 449-460.
[9] Richard Weston, *Utzon: Inspiration, Vision, Architecture* (Hellerup: Edition Bløndal, 2002).
[10] Kjeldsen Holm, Mette Marcus & Poul Erik Tøjner (ed.), *Jorn Utzon, The Architect's Universe* (Louisiana, Humlebaek: Louisiana Museum of Modern Art, 2004).
[11] Richard Weston, "Platforms and Plateaux in Utzon's Architecture," in *Jorn Utzon, The Architect's Universe*, ed. Kjeldsen Holm, Mette Marcus & Poul Erik Tøjner (Louisiana, Humlebaek: Louisiana Museum of Modern Art, 2004), 28-35.
[12] Hans Munk Hansen, "Utzon and the Orient," in *Jorn Utzon, The Architect's Universe*, ed. Kjeldsen Holm, Mette Marcus & Poul Erik Tøjner (Louisiana, Humlebaek: Louisiana Museum of Modern Art, 2004), 66-71.
[13] Vol. I: The Courtyard Houses (2004), Vol.II: Bagsværd Church (2005), Vo.l.llI: Two Houses on Majorca (2004), Vol.IV: Kuwait National Assembly (2008) and Vol.V: Additive Architecture (2009).
[14] Jørn Utzon, *Logbook vol. V: Additive Architecture*. (Copenhagen: Edition Bløndal. 2009).
[15] Adrian Carter and Marja Sarvimäki, *Jørn Utzon and Transcultural Essentialism* (London and New York: Routledge, 2021), 103-112.

of these publications delivered a detailed study on Utzon's perception of Middle East, and its role in the development and transformation of the architect's architectural beliefs and idioms.

Existing scholarship already indicated Utzon's interest in several building cultures around the world, such as China and Japan.[16] Frampton emphasized the fundamental role of traditional Chinese architecture in general and historical monuments particularly in Utzon's early work.[17] Later, some scholars[18] indicated that Utzon had a lifetime perception of Chinese building culture, especially regarding architectonic aspects of imperial temples and palaces. Therefore, these perceived artifacts played a crucial role in the long-term development of his architectural creations. Comparing with the scholarship focusing on the relationship between Utzon and East Asia, the influences of Middle Eastern building culture on Utzon's architectural creation have not been carefully investigated. Hence, there is a need to explore Utzon's interpretation of ideas and ideals of the Middle East. Moreover, the previous scholars seem to totally ignore the complex encapsulated in the interaction between different cultural sources in Utzon's architectural design.

[16] Chen-Yu Chiu, Philip Goad, Peter Myers, and Yıldız Kılınçer, "My Country and My People and Sydney Opera House: The missing link," *Frontiers of Architectural Research* no. 8 (2018): 136-153.
[17] In Frampton's *Studies in Tectonic Culture: The Poetics of Construction in Nineteenth and Twentieth Century Architecture*, 247-298.
[18] Chen-Yu Chiu, Philip Goad, Peter Myers, Yıldız Kılınçer, Tobias Faber.

1.8 Scope – The Proposed Themes of Utzon's Middle East

Despite the ideas and ideals of Middle East being inherent in Utzon's lifetime work, this thesis only focuses on the most significant 10-year period of Utzon's career, i.e., from the 1956 Sydney Opera House to the 1966 Farum Town Center. This period not only housed the design process of the Sydney Opera house, but also Utzon's two trips to Iran in 1959 and 1960, as well as works and projects of his two manifestos, "Plateaus and Platforms" (1962)[19] and "Additive Architecture" (1970)[20].

For this time period, Utzon's Middle East is studied according to four different approaches, organized in separate themes:

Firstly, Utzon's relationship with Middle East is conceptualized through two main channels:

Utzon in the Middle East – exploring his receiving of Middle East through written form, published materials and study trips;

Middle East in Utzon – exploring Utzon's reinterpretation and application of Middle East through surveying his rhetoric, manifestos and explanations of his architectural creations.

Secondly, Utzon's early perception and application of Middle East was investigated for the time period between 1956 Sydney Opera House and 1965 the Wolfsburg Theatre, through a series of analogical studies with the historical monuments he perceived in Iran. These buildings and projects of Utzon includes: Sydney Opera House, Housing Complex in Fredensborg, Melli Bank, Market in Elineborg, Silkeborg Museum of Art, Elviria Housing, Bayview House, Zurich Theatre and Wolfsburg Theatre. To conduct a series of analogical studies, several themes of Middle East are proposed:

Persian Religious Architecture,

Unity in Persian Architecture,

Islamic Housing,

Islamic Roof/Earthwork Juxtaposition,

Islamic Roof Composition,

Centralized Space,

[19] Jørn Utzon, "Platforms and Plateaus: Ideas of a Danish architect," *Zodiac*, 10 (1962).
[20] Jørn Utzon, "Additive Architecture," *Arkitektur*, 14 (1970).

Courtyard Space.

Thirdly, to clarify the relationship between Utzon's 1962 "Plateaus and Platforms" and the 1970 "Additive Architecture" manifestoes and to signify the transformation of his ideas and ideals, a series of comparative studies were conducted between his seminal projects from 1953 Skanska Housing Competition Scheme to 1969 Silkeborg Museum of Art II. these comparative studies are approached through four different themes:

Courtyard Scheme in Housing Projects,
Courtyard Scheme in Institutional Projects,
Courtyard Scheme in Urban Projects,
Axial Scheme in "Additive" Projects.

Fourthly, Utzon's seminal project the Farum Town Center is studied as a case study to explore the transformation of Utzon's motivation to develop the 'additive' system after his iconic dualism. To be able to clarify why and how he dissolved his iconic roof/earthwork juxtaposition and served "additive" as a solution to the earlier weaknesses of his projects, four different themes are proposed:

Dissolving of the Roof- Earthwork Juxtaposition,
Search for Monumentality,
Configuration of Urban Complex,
Geometry and Space,
Processional Movement.

The content of this Masters study is organized into six chapters according to the four groups of themes mentioned. In Chapter Two, Utzon's early perception and application of Middle East is investigated. In Chapter Three, a transformation of Utzon's ideas and ideals was explored through his works and projects between his two manifestoes, 1962 "Platforms and Plateaus: Ideas of a Danish Architect" and 1970 "Additive Architecture". In Chapter Four, the motivations and applications of this transformation are investigated through the case study of 1966 Farum Town Center. These themes were carefully selected and encapsulated within the important time period 1956 Sydney Opera House and 1966 Farum Town Center, in order not to compromise the Masters study timeline.

CHAPTER 2

THE INTERACTIONS BETWEEN UTZON AND THE MIDDLE EAST

2.1 Utzon in Middle East: The Exploration of Utzon's Receiving of the Middle East from the View of His Social and Cultural Background

Part of exploring Utzon's Middle East should be through investigating the direct materials Utzon had received. This chapter investigates and surveys the wide context of Middle East that Utzon was exposed to and ultimately received through written form and architectural form. This investigation should provide a social-cultural background to Utzon's Middle East by providing an insight into his personal experience, to be able to explore his intuitions and motivations. In the first section, Utzon's personal collection of readings will be surveyed, secondly, Utzon's study trips and the historical monuments he studied onsite will be investigated.

2.1.1 Utzon's Reading of Middle East

Utzon collected a wide range of written materials including books, journals and magazines, which were not only about a country/region's art, architecture and culture, but also about people and his/her work. In his collection, materials related to Middle East consist of only a part of a broad range of cultures[21], some of which are from Afghanistan, Bahrain, Kuwait, Lebanon, Pakistan, Persia, Saudi Arabia and Turkey. The author selected 15 materials from Utzon's collection of readings that relate to the culture, art and architecture of Middle East.

One of Utzon's earliest published readings about Middle Eastern culture was *The Practical Book of Oriental Rugs*[22], firstly published in 1920, an illustrated descriptive piece intended for the 'modern-day' buyers and aficionados of antique rugs from the Middle and Far East. The first part of the book included advices for the buyers such as dealers, care, material and dyes, weaving methods, design and symbolism of the rugs, as well as their identification. The second part included more encyclopedic insight to rugs of different cultures and regions, providing a broad classification of rugs as Persian, Turkish, Caucasian, Turkoman, Beluchistan, Chinese, as well as the types of rugs according to their usage, and more information about rugs as museum collection pieces.

The *Persische Miniaturen: Meisterwerke Orientalischer Buchmalerei (Persian miniatures: masterpieces of Oriental book painting)* [23] was a handbook sized collection of selected examples of historical Persian miniature paintings of the 15th and 16th century from Utzon's reading. The piece was organized as a showcase of sixteen color-printed illustrations besides an eight pages long commentary in German language at the end, about Persian miniature art and its contrasts and similarities to Turkish and Indian miniatures. The illustrations were received from visualizations of manuscripts from epic poems depicting scenes, mostly from Firdewsi's *Shahname* and life story of Timur[24].

Utzon did not have any study trips to Turkey, however, he acquired the substantial book *Trésors de la Turque (Treasures of Turkey)*[25], documenting historical monuments and cultural aspects of Turkey with photography and text in French, published in 1959. The publication includes 303 photographs by photographer Jean Dieuzaide

[21] Some of these cultures include the following countries and regions: Africa, Amazon, America, Australia, Brazil, China, Denmark, Egypt, Europe, France, Germany, Greece, India, Italy, Japan, Mexico, Norway, Peru, Rome, Scandinavia, Slovenia, South Asia, Sweden, Switzerland, United Kingdom.
[22] Griffin Lewis, *The Practical Book of Oriental Rugs* (Philadelphia: J.B. Lippincott Company, 1920).
[23] Emil Preetorius, *Persische Miniaturen* (Bern: Iris Druck Verlag, 1947).
[24] Shahname and History of Timur were both 10th century renowned epic poems, they were widely illustrated in miniature art in Safavid Persia.
[25] Michel De Saint-Pierre, *Trésors de la Turque* (Paris: B. Arthaud, 1959)

(1921-2003), text by writer Michel de Saint-Pierre (1916-1987) and commentary text by historian, turcologist Robert Mantran (1917-1999). The foreword essay and commentary sections of the book delivers an insight to the Turkish culture and history through the travel stories of Saint-Pierre and Mantran. The content of the book is organized within twelve themes; Istanbul and Boshphorus, Memories of Byzantium, Streets of Istanbul, Peasant of Anatolia, Ankara, Hittite Empire, Cappadoccia, Turkish Art, Turkish Woman, From Steppe to Mediterranean, Greek-Roman Antiquities, Traditions. Utzon's selected photographs[26] were documenting the following historical monuments: Mouzaffer Baroudjirdi Madrasah (Sivas), Twin-Minaret Madrasah (Sivas), Gök Madrasah (Sivas), Ince Minaret Madrasah (Konya), Selimiye Mosque (Konya), Ulu Camii Mosque (Bursa), Green Mosque (Bursa), Green Turbe – The Tomb of Sultan Mehmed I (Bursa), Stone Bridge of Sille Village (Sille, Konya).

Sablier's *Persien*[27] (Persia) from Utzon's collection was a publication that provides an insight to Iran's natural and cultural aspects, published in 1960. The book is divided into 3 sections; the travelogue, the picture report, and close examination. The first section conveys culture and history of Persia with novelistic style, providing historical stories, travel memories, folk art and myths. The second section consists of 48-pages photography of Iran; streets, lands, modern-day buildings, historical monuments, activities with a focus on people, space and contrast of traditional/historical versus modern. This section included photographs of traditional courtyard houses with wind towers, interiors of Gulistan Palace (Teheran), Naqshe Jahan Square (Isfahan), Shah Mosque (Isfahan), Ali Kapu Palace (Isfahan) and the domes of the Grand Bazaar (Isfahan). The third section includes encyclopedic knowledge about nature and culture of Iran; the country, people, weather, languages, religion, administration, food, art and various cultural information, combined with illustrative drawings of historical places, monuments and people.

Utzon's collection housed a single piece about Lebanon, which was the *Tourist and hotel guide for Lebanon*[28], published in 1963. The publication gives a brief story and history of Lebanon beside advices to travelers, suggestions of activities and places to visit. Some of the important monochrome photographs included in the publication are the following: The Palace of Beit-Eddin - external view of *iwan* facade, the divan interior decorations and external wall mosaics; pre-historical pieces of the National Museum; modern-day Beirut city – aerial views, streets, people, modern buildings; Baalbek Roman temple – ground plan of the site and exterior views; columns, column capitals, ceiling decorations, stairs and podium of Temple of Jupiter.

[26] Utzon selected several pages for publications of *his Logbook vol. IV prefab: Kuwait National Assembly* and *Logbook vol. V: Additive Architecture*.
[27] Edouard Sablier, *Persien* (Zürich: Manesse Verlag Conzet & Huber, 1960).
[28] National Advertising System, *Tourist and hotel guide for Lebanon* (Beirut: Catholic Press, 1963)

Mecca the Blessed, Madinah the Radiant[29] is a book from Utzon's collection that illustrates the two holy cities of Mecca and Madinah in Saudi Arabia, with text from Emel Esin, an expert on Islamic art, and 113 colored and monochrome illustrations with photography by Haluk Doganbey, published in 1963. Esin states that, since these two cities are closed to non-Moslems, she and Doganbey took permission to travel and document historical sites and monuments for the West with this publication. The text of the book delivers comprehensive information about historical and cultural aspects of Mecca and Madinah beginning from the prehistorical era to the modern era, with an informative focus on religious history and information. The most significant illustrations of art and architecture include the following: Miniature painting, photographs, reconstruction drawing and axonometric drawing of Ka'bah; ruins of Nabatu (Petra, rock-hewn city); oratories at Aqabah and Madinah; miniature paintings and photographs of Mecca and Madinah; Persian ceramic *mihrab*; masjid at Quba; 'Green Dome' of Muhammad's mausoleum; porticoes of Madinah Mosque; façade, exterior and interior view of Apostle's Mosque; courtyard and exterior views of the mosque at al-Khaif.

Another publication about the culture of Saudi Arabia in Utzon's collection is *Saudi Arabia in Pictures and Figures*[30], published in 1967. The book demonstrates brief information about the Kingdom of Saudi Arabia, and monochrome photography of street views of cities, historical and modern buildings, with a specific focus on people using modern-day facilities built under the leadership of King Faisal. Some of the important illustrations include views of the Sacred Mosque in Mecca, the Prophet's Mosque in Medina, Al-Safat Square and the city of Riyadh.

Ardalan and Bakhtiar's *The Sense of Unity*[31] should be one of the most important books in Utzon's collection, which is a careful study of Persian art architectu re regarding both its formalistic and spiritual dimensions, tracing the culture of *Sufi* tradition ingrained in traditional built forms. It was published in 1973 as the ninth publication of the Center for Middle Eastern Studies by the University of Chicago Press, with the patronage of the Ministry of Science and Higher Education of Iran. The content of book is divided into three main sections: The Morphology of Concepts, The Concept of Traditional Forms and Levels of Realization, in which the unity principle of *Sufism* is pronounced through all the chapters, giving insight to the expression and receiving of religious concepts. The book includes a wide range of architectural plans, diagrams, sketches and photographs of historical monuments,

[29] Emel Esin, *Mecca the Blessed, Madinah the Radiant* (London: Elek Books, 1963)
[30] Ministry of Information, *Saudi Arabia in Pictures and Figures* (Kingdom of Saudi Arabia: Ministry of Information, 1967)
[31] Nader Ardalan and Laleh Bakhtiar, *The Sense of Unity* (Chicago and London: The University of Chicago Press, 1973)

most of which were visited by Utzon onsite. Some of these important monuments include: Masjid-i Jamii (Isfahan), Masjid-I Shaikh Lotfollah (Isfahan), Bazaars of Isfahan and Kashan, Madrasah-yi-Sultani (Kashan), Masjid-I Shah (Isfahan), Khwaju bridge (Isfahan), Hajji Karim Khan caravanserai (Isfahan), Ali Qapu Palace (Isfahan).

Iran: yesterday, today, tomorrow[32] is another publication about art and architecture of Iran from Utzon's collection, published in 1973 and edited by E. Nader Khalili and Moira Moser-Khalili, members of American Institute of Architects. This special 'International Edition' issue was divided into three sections: Iran yesterday, Iran today, Iran tomorrow. The first section was composed of images of historical monuments with brief commentaries, such as; Persepolis ruins, the roofscape and view of Bazaar of Kashan, wind towers of Borujerdiha Mansion and traditional houses of Kashan, *iwan* and *muqarnas* of Masjid-i Jamii of Isfahan, domes and decorations of Masjid-I Shah and Masjid- Shaikh Lotfollah. The second section displays the industrialization of Iran showing several modernist buildings and their similarities and contrasts to the historical context, as well as contemporary art and architecture of Iran. The third section is a brief commentary for the future of Iran, commenting on issues such as urban development, rural development, transportation and facilities.

Kühnel's *Die Moschee*[33] is a handbook-size piece from Utzon's collection, which was published and acquired[34] by him in 1975. The book conveys the importance, establishment and historical aspects of mosques, with 18 in-text illustrations including architectural drawings and plans, and 38 photographs of various mosques and Islamic art. The contents of the book include a general introduction to the origin, purpose and administration of the mosques, furnishing of the mosques, the early Islamic Mosque of Umayyad and Abbasid periods, The Medieval Mosque of the Fatimid, Moorish, Seljuk, Mongol and Mamluk periods, the modern-day mosque of Persia, India and Turkey, and information about the spatial concept of the mosque. The illustrations of the book include the following from Iran; Shaikh Bayazid's tomb mosque in Bostam, ruins of the Friday Mosque in Veramin, main *iwan*, *mihrab* and courtyard of the Masjid-i Jamii of Isfahan.

Bernard Gerard's *Bahrain*[35] from Utzon's collection is a color-illustrated book that gives extensive information about Bahrain's history, culture and industry, published in 1974. The book is divided into 14 sections and covers

[32] Nader Khalili and Moira Moser-Khalili, "Iran, Yesterday, Today, Tomorrow", *Art and Architecture*, International Edition Issue Number 18-19 June-Nov (Tehran: Abdolhamid Eshragh, 1973).
[33] Ernst Kühnel, *Die Moschee* (Graz-Austria: Verlag für Sammler, 1974).
[34] The first page of Utzon's copy of the book shows that it was acquired in 09.04.1975 in Zurich.
[35] Bernard Gerard and James Belgrave, *Bahrain* (Boulogne: Delroisse, 1974).

a wide range of cultural aspects: Introduction, History, Development, People, Manama City, Boat Building, Muharraq City, Isa City, Bapco Oil Company, Alba Aluminium Company, Agriculture, Pottery, Arts, Sports and Games. Some of the significant historical architecture of Bahrain illustrated are; the Suq Al-Kahmis Mosque, Qalat al-Bahrain (Fort of Bahrain), Friday Mosque of Manama, and the Siyadi Mosque of Muharraq.

Kochwasser's *Kuwait. Geschichte, Wesen und Funktion eines modernen arabischen Staates*[36] *(Kuwait. History, nature and function of a modern Arab state)* is a comprehensive, 420 pages long book about the history and human culture of Kuwait with several monochrome and colored illustrations. The book is divided into three sections: 'Kuwait – a small principality on the nortwest corner of the Arabian Gulf', 'A young state with a rich history', 'Kuwait today'. These sections describe history, life and culture in Kuwait, as well as industry, economy, politics, infrastructure, education, government and institutions of the country. Beside city plans, some of the illustrations display significant monuments and buildings of Kuwait such as the traditional Kuwait houses, Othman Mosque, Al-Shamlan Mosque and the Seif Palace.

Traditional Architecture of Afghanistan[37] is the only book from Utzon's collection to give an insight to the art, architecture and culture of Afghanistan, published in 1980. The book is divided into 9 main sections: Ghezhdi: The Nomadic Black Tent, Kherga: The Yurt of Turkestan, Qawwal: From Tent to Hut, Nuristan: The Hillside Villages, Salang: The Mountain Villages, Qala: The Fortress House, Herat, Kandahar, and Kabul. Each section is dedicated to a separate group of people/region's architectural unit such as the Yurt tent, mud-straw house, village house or Qala – Fortress house. These units are investigated through their architectural, architectonic and constructional aspects with photographs, plans, elevations and axonometric drawings provided as an in-depth survey and analysis. As the author states in the conclusion section, the book provides a perspective to appreciate the traditional architecture by understanding how it was synthesized to resolve certain problems and challenges of climate and terrain.

Der Orient im Spiegel, Bilder und Abbilder[38] *(The Orient in a Mirror, Pictures and Images)* is a book from Utzon's collection that is constituted of 94 colored illustrations of works of art, bringing together and juxtaposing 14th to 19th century central Asian miniature paintings and daily-life photography of people - the miniatures representing

[36] Friedrich H. Kochwasser, *Kuwait. Geschichte, Wesen und Funktion eines modernen arabischen Staates* (Tübingen, Basel: Horst Erdmann Verlag, 1975)
[37] Stanley Ira Hallet and Rafi Samizay, *Traditional Architecture of Afghanistan* (New York, London: Garland STMP Press, 1980)
[38] Roland and Sabrina Michaud, *Der Orient im Spiegel, Bilder und Abbilder* (Cologne: DuMont Buchverlag, 1981)

the past while the photography representing the present. The artworks of the book are organized within 7 themes: Mountains and Steppes, Caravans, Bazaars, Submission to God, Troubadours, Turkistans, Remembrance to God.

Lehmarchitektur: Die Zukunft Einer Vergessenen Bautradition[39] *(Clay Architecture: The Future of a Forgotten Building Tradition)* from Utzon's collection is a comprehensive book about earth architecture around the world, showcasing 303 illustrations and descriptions, published in 1982. Dethier's description of the book highlights the 'growing disillusion' with the International Style, conveying the importance of using available sustainable materials with examples of earth. The content of the book is divided into two sections, the first part includes historical and traditional examples of earth architecture, the second part includes modern implications. Some of the photography included monuments that were in Iran and Morocco, some of which Utzon studied onsite such as the domes of the bazaar of Kashan and the bazaar at Yazd.

These selected and surveyed publications are not the only pieces from Utzon's collection that are related to the architecture and culture of the Middle East. Some of the materials were not surveyed and need further research. These are: *Kuwait Tourist Guide, Education in Kuwait 1969-1970, Kuwait in Pictures, Visual Geography Series*[40], *Tunisien: Kairouan*[41], *Yemen, avec les montagnards de la Mer Rouge*[42], *The Ford Foundation and Pakistan*[43].

[39] Jean Dethier, *Lehmarchitektur: Die Zukunft Einer Vergessenen Bautradition* (München: Prestel-Verlag, 1982)
[40] Camille Mirepoix, *Kuwait in pictures, visual geography series* (New York: Sterling Pub. Co, 1971).
[41] Imprimerie Arabe de Tunisie, *Tunisien: Kairouan* (Tunisia: ONTT, 1989)
[42] Jargy Simon & Saint-Hilaire Alain, *Yemen, avec les montagnards de la Mer Rouge* (Paris: Réalités, 1978)
[43] Ford Foundation Photo Library, T*he Ford Foundation and Pakistan* (Crafton Graphic Co., Inc., 1959)

2.1.2 Utzon's Study Trips to Middle East

Utzon was not only interested in reading the monographs related to the Middle East, but he also studied it onsite several times. Utzon was to get acquainted with Iran firstly after being commissioned to design the Melli Bank in Teheran in 1958 with the Danish construction company Kampsax A/S.[44] For a study trip, Utzon and his wife Lis (1919 - 2010) flied to Teheran arriving on 28 March 1959, they also had been to Isfahan before their flight back from Teheran on the 4th of April, accompanied by his close friend Hans Munk Hansen.[45] This trip was followed by another journey to Teheran with Hansen in 1960 for a more detailed study onsite.

In Isfahan, Utzon visited several historical monuments and documented them with his 9mm camera. These monuments were the Masjid-i Jamii, Grand Bazaar, Masjid-I Shaikh Lotfollah, Masjid-I Shah, Ali Qapu palace, Chehel Sutun Palace, Naqshe-Jahan Square, residential quarters near Masjid-Jamii. He also photographed several courtyard villages as well as desert landscapes near Isfahan during his flight. It is very possible Utzon visited Kashan and studied monuments of Teheran, however, the specific content of his travel program needs further research.

In 1968, Utzon was invited to participate in the architectural competition for the new National Assembly Building in Kuwait, he completed his scheme in 1970 and won the competition in 1971. He had a flight to Kuwait afterwards, to discuss the project with the Emir[46] as well as to study the construction site and the city. During this visit, Utzon had the chance to perceive historical buildings of Kuwait City, such as the Seif Palace[47], which was the Royal Palace of the Emir. The other monuments Utzon could study onsite in Kuwait need further research.

[44] Drew, 175.
[45] Ibid.
[46] The Emir, head of the state, for the period between 1965-1977 was Sabah al-Salim al-Sabah (Sabah III) (1913–1977).
[47] Richard Weston. *Utzon: Inspiration, vision, architecture*. (Hellerup: Edition Bløndal, 2002), 300.

2.2 Middle East in Utzon: The Survey and Review of Utzon's Perception and Application of His Middle East

2.2.1 Middle East in Utzon's Architectural Manifestoes

Utzon's direct references to Middle East were most significantly inherent in his project descriptions and publications. However, it is possible to trace Middle East within several of his manifestoes. In 1947 Utzon visited Morocco and studied their vernacular architecture onsite, in which he grew an interest to Islamic architecture.[48] Upon his return, he published his article "Tendenser i nutidens arkitektur" *in Arkitektur y Byggmästaren*, 1947, and included an image of vernacular architecture titled "Arabisk klippeby (Arabic rock-city)" among 28 selected images. One year later in 1948 Utzon published his first individual manifesto, "The Innermost Being of Architecture". This manifesto did not include Middle East as a direct reference and could be referring to an idea of how Utzon appreciated monuments from the past: "The study of already existing architecture must consist in letting ourselves be spontaneously influenced by it and appreciating the ways in which solutions and details were dependent on the time at which they were created."[49] "The Innermost Being of Architecture" was also a reference to the initials of the "additive" theme found in nature, mentioning the growth principle and harmony of nature; therefore, it was included at the beginning of the *Logbook vol. V: Additive Architecture*. His 1970 Additive Architecture did not include Middle East as a direct reference; however, the Farum Town Center and Jeddah Stadium projects were described as 'bazaar' projects with Islamic references by Utzon himself. In his 1962 manifesto "Platforms and Plateaus: Ideas of a Danish Architect," Utzon provided a direct referring to Middle East as "In India and the East, not forgetting the Acropolis and the Middle East, many wonderful platforms of various kinds are the backbone of architectural compositions and all of them based on a great concept."[50]

[48] Jaime J. Ferrer Forés, *Jørn Utzon. Obras y Proyectos. Works and Projects* (Spain: GG, 2006), 14.
[49] Utzon, *Logbook vol. V: Additive Architecture*, 6.
[50] Forés, 143-147.

2.2.2 Middle East in Utzon's Project Descriptions

For several of Utzon's project descriptions, it is possible to observe his ideas and ideals directly or indirectly associated with Middle East, which is needed to be surveyed and investigated.

For the 1956-73 Sydney Opera House, Utzon stated the forms as "forms against a horizontal line like the sea or the clouds without a single vertical line, nothing constituting a weight, and with for that are different from all angles" For the roof, Utzon commented as "white ceramic tiles on a concrete shell"[51], which could refer to the Oriental platforms. Especially after his trip to Iran in 1959, for the first design of the ceramic roof with polychrome-colored tiles in 1962, he stated "When the sun is shining it is reflected in every conceivable way from the various rounded surfaces"[52]. When Utzon designed the stalactite vaulted acoustic ceilings of the Major Hall of the Sydney Opera House in 1960, Utzon stated:

> "Because I have treated the space with geometrically definable shapes, all this encirclement of the finally selected part of the space is fully defined, and the surface of the resultant space can be divided up into a number of similar elements. These similar elements can be mass-produced, and when their relationship to their neighboring elements is clarified, the elements can be put together like a giant jigsaw puzzle in the space."[53]

This statement could refer to the formation of *muqarnas* he studied in Isfahan onsite while composing the acoustic ceilings. In parallel to the 'additive' theme behind the ceramic tiles and acoustic ceilings of the Sydney Opera House, Utzon also made a statement about the importance of modification and addition of space: "As time passes and needs change, it is natural to modify the building to suit the needs and technique of the day. The changes, however, should be such that the original character of the building is maintained"[54]. This idea expressed was to be a fundamental part of his "Additive Architecture", published as a manifesto in 1970, in which his inspiration from Middle East should be inherent. For the quality of the tiles of the Sydney Opera House, Utzon referred to his inspiration from tiles of Isfahan mosques as the following:

[51] Forés, 166.
[52] Forés, 166.
[53] Ibid., 172.
[54] Ibid., 179.

> "The material would have to be sought in the building of the ancient world, which has stood up to many years' use without deterioration, but has aged and acquired harmonious patina, and the only material that would satisfy such demands was found to be the ceramic tile."[55]

For the 1958-62 Competition Scheme for the High School in Højstrup, Elsinore, Utzon designed spherical, experimental roof forms juxtaposed to the platform. He stated: "As shown in the sketches for the Sydney Opera House and for the High School in Elsinore, the curved forms of the roofs are suspended above or below the terrace".

For the 1959-60 Melli Bank project built in Teheran, Utzon made several statements to describe his design. When he stated "Entrance is through a shady pergola and a glass partition from where one gets a general view of the services one is going to visit."[56], the characteristics of the entrance could refer to the entrances of the mosques Utzon received in Isfahan.[57] For the illumination, Utzon stated: "The large hall of the bank is illuminated by indirect light"[58]. Utzon also mentioned the flexibility feature of the internal space of the bank, besides, he stated: "A world has been created within the bank, pertaining to both present-day and ancient Persian tradition."[59] The possible connotation within this idea will be discussed in the third chapter.

For the 1963-65 architect's house in Bayview, Utzon made preliminary sketches which were spherical and experimental in roof forms. He stated: "the roof can be hanging above, it can be spanning across or jumping over you in one big leap or in many small ones"[60]. This statement could also refer to the pluralist roof arrangements of the "Additive" projects in contrast to the single monolithic roof of the Plateaus of Platforms.

For the 1963 Silkeborg Museum of Art, Utzon described the design as a "buried museum" that has "a cave-like character", which had visible one-story skylights and shaped naturally without right angles.[61] While the underground space and bound roof-earthwork composition could refer to the Middle East, Utzon also stated the cladding will have tiles as such: "The external visible curved shapes will be clad with ceramics in strong colors so that parts of the building will appear like shining ceramic sculptures, and inside the museum will be kept white."[62].

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[55] Michael Asgaard Andersen, *Jorn Utzon Drawings and Buildings* (New York: Princeton Architectural Press, 2014), 222.
[56] Forés, 210.
[57] This idea of the mosque entrance was already commented on in Weston, *Utzon: Inspiration, Vision, Architecture*, 227, alongside the idea of the indirect illumination of mosque.
[58] Forés, 210.
[59] Ibid., 210.
[60] Ibid., 230.
[61] Ibid., 232.
[62] Ibid., 233.

Regarding the forms of the Silkeborg, as the simplicity and curvilinearity could refer to what constituted the "Additive" forms., Utzon stated:

> "A simple geometry will form the basis for a construction of mass-produced elements… Through my work with curved shapes in the opera house, I have been inspired to go further into free architectural forms, but at the same time to control the free forms by a geometry, which makes it possible to erect the building out of mass-produced components. The curved form world offers something, which one will never find in rectangular architecture."

For the design of the 1966 Farum Town Center, Utzon stated that the site was located at the edge of the town which has borders to school and roads, hence the access to the center can be confined to several points and as he states; "the town center has been designed as a closed bazaar with few, architecturally emphasized entrances, but otherwise turning its back to surroundings."[63] For the urban composition, Utzon also states: "The buildings face covered streets and piazzas, and segmentation is emphasized so that the individual shops and displays are subordinated as a whole."[64] Furthermore, the bazaar influence of the complex is directly expressed by Utzon as such: "The units can be combined to form a gently curved bazaar street from which the shops and other premises can be built in stages as required"[65].

For the 1969 Export College in Herning, Utzon designed the units with 'one roof per one room' formula, as they could come together to form a composition freely as opposed to the Plateaus and Platforms projects. This idea was mentioned by Utzon with the role of "Additive" as such: "An additive principle rose at the Herning colleges, in that it was desired to have, for each type of room, a completely free choice in respect of height, size and lighting and to base all these types of rooms on a common denominator so that they could come together, link up to become additive."[66] He also stated the expandability feature; "it is not so difficult to imagine a continuous expansion or modification of a house, a group of buildings or a town, if the house, the buildings or the town are based on the additive principle"[67].

[63] Ibid., 246.
[64] Ibid., 246.
[65] Ibid., 246.
[66] Ibid., 254.
[67] Ibid., 254.

Utzon designed the Stadium in Jeddah, Saudi Arabia in 1969 which was part of the "Additive" theme ideas. Utzon stated the importance of the climatic conditions of Jeddah as an input for the design process stating it was "governed by the local climatic conditions", as well as its ability to grow, "just as organically as a tree in the forest, avoiding at all times that unpleasant impression of a lack of readiness otherwise associated with the buildings erected in stages".[68] The forms of the stadium consisted of faceted screens which resembled acoustic ceilings of the Major Hall of the Sydney Opera House inspired from *muqarnas*, which Utzon states: "The structural design, using thin, angled slabs, provides an elegant, facetted screen which is further emphasized by the interplay of light and shade"[69].

For the 1972-84 National Assembly in Kuwait, Utzon described his adoration for Islamic bazaar system that he perceived in historic Isfahan, especially for its simple construction features with flexible usability[70], hence he transformed these features into an institutional building complex constructed by prefabricated elements. Utzon stated:

> "Traditional Arab architecture will have an enormous influence on the future architectural development of the world and it is, therefore, a natural thing that the concept of the Kuwait National Assembly complex has been based on some of the major elements of traditional Arab architecture, such as the covered street – the bazaar street – the interior courtyard, the succession of structural arches."[71]

For the Kuwait National Assembly Building, Utzon also emphasized the ability of the complex to grow sideways and connected to the central street, as the outer boundaries "are very much related to traditional Islamic bazaar architecture"[72]. Utzon also expresses that the pre-cast concrete construction reflects the "purity" of Islamic construction.[73] About prefabrication and Islamic influence, he stated:

[68] Ibid., 258.
[69] Ibid., 259.
[70] Utzon, *Logbook vol. IV Prefab: Kuwait National Assembly*, 10.
[71] Forés, 276.
[72] Ibid., 276.
[73] Ibid., 276

> "The bazaar in Isfahan is one long bazaar street with a network of side streets, and then there are some mosques along the way and bigger buildings in the same architecture, but made by hand and impossible to build today. So reinforced concrete is a blessing that can be fashioned as we like …"[74]

2.2.3 Middle East in Published Materials Edited and Reviewed by Utzon

Utzon declined several invitations for publications about his work in his lifetime career, however, in his late-life he decided to edit and publish *Sydney Opera House: Utzon Design Principles* (2002), *Utzon: Inspiration, Vision, Architecture* (2002) and *The Logbook Series* (2004-9), which included reviews and interpretations of his works and projects as well as providing monographic content. These publications were very important for revealing Utzon's Middle East, as well as the inspiration of world cultures to the public.

2.2.3.1 Middle East in *Sydney Opera House: Utzon Design Principles* (2002)

In *Sydney Opera House: Utzon Design Principles* (2002), Utzon mentioned the influence of and similarities to Middle East in several of his descriptions. For the structural expressivity and the tiles of the Sydney Opera House, Utzon stated:

> "By sub-dividing the tile surface into glossy tile lids, with matte tiles at the edges, I achieved my aim, to have the structure expressing the architecture and vice-versa. You find a similar situation in Gothic Cathedrals, where the structure is also the architecture. The same is seen in Chinese and Islamic architecture, although with different expressions. The architecture with the ribs is much more expressive than if the shells had been cast in-situ, with the resulting flat unstructured surfaces."

Furthermore, for the expression that could be achieved similar to a historical monument, Utzon stated: "You find a similar situation in Gothic Cathedrals, where the structure is also the architecture. The same is seen in Chinese and Islamic architecture, although with different expressions." It is significant that even after nearly 40 years of his departure from Sydney, Utzon still directly mentioned references to Islamic architecture.

[74] Utzon, *Logbook vol. V: Additive Architecture*, 228.

2.2.3.2 Middle East in *Inspiration, Vision, Architecture* (2002)

Richard Weston's *Inspiration, Vision, Architecture*, first published in 2002, was reviewed by Utzon upon compilation. Weston stated that the book was read, corrected and commented on the aspects of interpretation by Utzon, but was not interfered with the expression of his personal views.[75] For Utzon's studio practice, alongside a panoramic photograph of the Masjid-i Jamii of Isfahan, Weston stated that debates took place in which diverse traditional cultures, such as Islam, were discussed to enhance the future of modern architecture.[76] For the 1959 Frederiksborg, Copenhagen design competition scheme, Weston stated that framing done with the housing was constituted with cubic blocks resembling Islamic bazaars.[77] He also conveys the resemblance of wind towers in Yazd to the chimneys of the Fredensborg houses.[78]

For the acoustic ceilings of the Major Hall of the Sydney Opera House, Weston stated that the *muqarnas* decoration Utzon studied in Isfahan was of great influence:

> "The idea was derived from Islamic *muqarnas*, the celebrated so-called 'stalactite vaults', which themselves, thanks to their multiplying geometries, strikingly echo the crystalline forms of the honeycombs or minerals – which had features prominently in the 'New Trends' discussed in Chapter 1. A particularly splendid example, finished in gold-colored tiles, can be seen in the great south-west *iwan* or porch of the Friday Mosque in Isfahan, a building Utzon greatly admired and saw on several visits to the city en route to and from Sydney."[79]

For the roof-earthwork juxtaposition of the Sydney Opera House, Weston provided an image of the roofscape of Yazd (Iran) showing the unified view of the continuous domes of the roofscape and large glazed dome of Masjid-i Jamii of Yazd, stating that the juxtaposition of tile cladded shells and earth-like platform was inspired. For the influence of Middle East on the Sydney Opera House considering *iwan*, Weston wrote:

[75] Weston, *Utzon: Inspiration, Vision, Architecture*, 7.
[76] Weston, *Utzon: Inspiration, Vision, Architecture*, 31.
[77] Ibid., 82.
[78] Ibid., 91.
[79] Weston, *Utzon: Inspiration, Vision, Architecture*, 164.

> "But whilst Utzon's admiration for China, as we have seen in other projects, was enormous I do not think its influence was as pervasive or as decisive as that of Islam. Just as the Islamic city provided a generic model for the Kingo and Fredensborg housing clusters – and as we will see becomes explicit in the Additive Architecture projects – it surely also lies behind Sydney. What more apt analogue could there be for this earth-coloured platform surmounted by gleaming shells than a continuous mud-brick fabric jeweled with the tiled domes of mosques? A sketch in the Mitchell Library in Sydney shows a lone figure prospecting sky and sun from the sheltering refuge of one of he shells. It recalls the generous vaulted porch, or *iwan*, of a mosque, an impression which would have been reinforced by the golden, bronze-clad mullions Utzon intented – which, seen in this Islamic light, appear as echoes of the polygonal vaults that inspired the early scheme for the Major Hall."[80]

For the geometry of the Sydney Opera House and unity principle of Islam, Weston also commented on the similarities as such:

> "The geometric derivation of form also has striking resonances with Islamic architecture. If a Gothic cathedral can be interpreted as expressing a striving towards God, in Islam unity is seen as existing *a priori*, descending from heaven. To express this pre-existing, all pervasive units all the parts of a building are derived from geometric schema – typically sphere and cube – either by differentiation, to represent the immutable, or by fragmentation, to evoke the ephemeral."[81]

For the form shaping of the underground halls of the 1963 Silkeborg Museum of Art, Weston also wrote that the brick cisterns and above-ground cave-like Iranian houses were highly influential. What is more, for the materialistic unity of the "Plateaus and Platforms" theme, Weston stated that Utzon owned a book about pre-Muslim Persian city, and mentions that the contained examples were including platform-themed settlements in which the material of the buildings were the same as the earth itself.[82] For the design of the entrance and lighting of the 1959 Melli Bank building in Teheran, Weston stated that it could be referring

[80] Ibid., 186.
[81] Ibid., 186.
[82] Ibid., 221.

to entering a mosque, thus, the top lighting was inspired from the bazaars of Isfahan which was soft and diffused.[83]

For the urban composition of the Farum Town Center project, Weston stated:

> "The Islamic inspiration at Farum is almost too obvious to need comment. The structure of a traditional Islamic city has been likened to 'crystalline particles polarized by a magnet (which) is the linear movement system of the bazaar', and it is difficult to think o a more apt description of Utzon's plan. The section was also inspired by the Isfahan bazaar – Utzon uses the word in his own descriptions – suitably modified to admit rather than largely exclude light."[84]

For the influence of Islamic city on the Farum, Weston wrote:

> "The Islamic city, with its continuous, single-storey fabric peppered by courtyards and surmounted by endlessly repeated shallow-domed cells, wind catchers and occasional tiled domes is, as in Fredensborg and Sydney, the presiding image. Hans Munk Hansen, project architect for the Melli Bank in Teheran, recalls that Utzon was fascinated by the 'continuous cake' of Isfahan, and preoccupied with the idea of developing a 3-D module which, like the vaulted cell, could build anything – he recalls walking with Utzon on the roofs and experiencing the extraordinary continuity, broken only by the relatively small garden holes of shady courtyards. The inspiration is clear, but whereas at Farum the Islamic influence was overt, here it is assimilated and transformed into a convincing contemporary expression."[85]

For the cross-sectional design of the roof for the 1968-76 Bagsvaerd Church, Weston stated the influence of Islamic script or calligraphy, which was seen in the Melli Bank skylight.[86] Furthermore, he also mentioned the similar aesthetic for the Elviria housing in an illustration description, mentioning the

[83] Ibid., 227.
[84] Ibid., 255.
[85] Ibid., 263.
[86] Ibid., 282.

'calligraphic freedom and elegance of line'.[87] For the Kuwait National Assembly, Weston cited Philip Drew's suggestion of the urban form being inspired from the mud-brick Arab courtyard houses and transformed into 'modern building technique'.[88] Furthermore, for specific examples from Isfahan, Weston stated:

> "More specifically, Isfahan provided a direct model: Utzon's covered square fulfils a similar role to the *talar*, or open portal, situated above the Ali Kapi or Sacred Gate at the centre of the western side of the city's vast ceremonial square, known as the Meidan. The *talar* was the interface between the royal precinct and the rest of the city, and from it the Shah would view polo games, horse races and other entertainments as well as give audiences to foreign ambassadors – much as Utzon envisaged the Amir meeting his people."[89]

Weston thus states Utzon's inspiration from the Arab saying: "When a great leader dies, his shadow disappears"[90], portraying the role of shaded space for the project from Utzon's view. For the plan, Weston provided the plan of Isfahan bazaar[91], expressing the similarity to the plan of the Kuwait. For the design of the offices, Weston mentioned the inspiration from Topkapı Palace in Istanbul with the expressive beams of the first floor.[92] For the color selection of the cover of Kuwait National Assembly Building's "Blue Book", Weston mentioned the inspiration from *Haft Rang*, 'Seven Colors' of traditional Persian ornamentation.[93] For the architect's house, Can Lis, Weston mentions the material selection and texture – the sand stone – as well as Utzon's use of tiles, mentioning their similarity to the Islamic architecture and also Mediterranean villages.[94]

These interpretations and investigations of Weston were not part of a critical analysis and could not go further of mere rhetorical references. The images of the Middle Eastern examples were not systematically

[87] Ibid., 282.
[88] Ibid., 304.
[89] Ibid., 305
[90] Ibid., 305
[91] Ibid., 315.
[92] Ibid., 330
[93] Ibid., 317.
[94] Ibid., 370-378.

presented, furthermore were not provided with clear explanations and sources, which renders 'Islamic' influences as part of the mystic inspiration.

2.2.3.3 Middle East in the *Logbook Series* (2004-9)

After *Utzon: Inspiration, Vision, Architecture*, Torsten Bløndal published *the Logbook Series* as monographs to be able to document Utzon's work in five volumes. The two volumes, *Logbook vol. IV Prefab: Kuwait National Assembly* and *Logbook vol. V: Additive Architecture* are of significance for conveying the role of Middle East in the Kuwait National Assembly and "Additive" projects, besides several images of Middle East were selected by Utzon from his collection and included.

The *Logbook vol. IV Prefab: Kuwait National Assembly* begins with a section that includes Utzon's views on tradition, and then an interview with Utzon that reflects his inspiration from Islamic bazaar for the Kuwait National Assembly. In the section "The Place is the Partner", Munk Hansen expresses how Utzon received Middle East through his study trips:

> "He was incredibly interested in the vast material contrasts between the surfaces of the ordinary houses in softly fashioned clay and the ceramic cladding of the monumental buildings with their precise shape and their sheen, the spatial patterns, the sensitively measured daylight, sounds and smells and much more besides."[95]

Munk Hansen also mentions his interest in "the entire city's combination of simple spatial units", which were built with "a square ground plan with walls and columns bearing a dome".[96] Besides his descriptions, there were several images of historical monuments selected: Georg Gerster's aerial photographs of a traditional village and the domes of bazaar in Sirjan at south of Iran[97], plan of the Maidan-I Shah (Naqshe-Jahan Square)[98], dome and minarets of

[95] Utzon, *Logbook vol. IV Prefab: Kuwait National Assembly*, 22.
[96] Ibid., 22.
[97] Georg Gerster was a Swiss photographer and journalist. He was pioneer in aerial photography; in 1976 and 1978 he took aerial photographs in Iran which were to be published in *Paradise Lost: Persia from Above* (New York: Phaidon, 2009). In the *Logbook vol. IV and V*, these pictures were not referenced, however, Munk Hansen must have acquired the photographs from Gerster and selected to be published with Utzon.
[98] The plan was taken from *The Sense of Unity* from Utzon's reading, which was not referenced in the *Logbook*.

the Masjid-I Shah[99], Ali Qapu Palace and Chehel Sutun Palace, typical tent of the Arab tribes, as well as two images of the interior of Great Bazaar of Isfahan that Munk Hansen and Utzon photographed.

The next section of the book was titled "Early Utzon Bazaar-Projects", which included the following projects with brief descriptions; the 1967 Odense University Competition, 1971 Silkeborg Museum II, 1966 Farum Town Center Competition, 1979 Health High School Diget. This was followed by a section that was extracted from Stephen Gardiner's *The Making of a City*, which describes the Kuwait National Assembly project and gives credit to Utzon, complimenting the Kuwait National Assembly with its 'purity of form' and "the solidity of their white walls closing interiors to the light and inner stillness that is the essence of the traditional international style of Islamic architecture"[100]. Another section of the book of significance is Johan Fogh's "The Genesis of the Kuwait Project", which conveys aspects of the project process such as the architectonic formation, design process, office life and routines. This section included selected photography[101] of Dieuzaide that was scanned from Utzon's own copy of the book *Tresors de la Turque* from his readings. These photographs were of minarets and domes of the Ince Minare Mosque in Konya, Selimiye Mosque in Konya, interiors spaces and decorations of the Grand Mosque in Bursa.

In *Logbook vol. V: Additive Architecture*, direct references to Middle East were inherent in the text mainly through Utzon's project descriptions. The Farum Town Center was referred to as a "closed bazaar site", and the Kuwait National Assembly building as "big bazaar streets" and "Arab towns". Furthermore, the images section at the end of the book included photography from Iran and Turkey. Two photographs were taken from Georg Gerster's aerial photography of southern Iran villages, first showing domical structures and the second courtyard villages. Thus, several photographs were included from Utzon and Munk Hansen's trip to Isfahan, including the exterior views, interiors and *iwan* of Masjid-i Jamii of Isfahan and Masjid-I Shah, interior photographs of the Grand Bazaar of Isfahan, and roofscape taken from the roof of the Masjid-i Jamii. Similar to the *Logbook vol IV.*, there were several images[102] scanned from Utzon's own copy of the book *Tresors de la Turque*: Mouzaffer Baroudjirdi Madrasah (Sivas), Çifte Minareli Madrasah (Sivas), Gok Madrasah (Sivas), Tomb of Sultan Mehmed I (Bursa), village near Konya, typical Taurus landscape

[99] This image was mislabeled as "Medresa, Isfahan 17th century".
[100] Utzon, *Logbook vol. IV Prefab: Kuwait National Assembly*, 39.
[101] The figures 184-186-187, 194-201 were taken to be used in Johan Fogh's essay "The Genesis of the Kuwait Project" in Utzon, *Logbook vol. IV Prefab: Kuwait National Assembly*, 86-91.
[102] The illustrations 171-174, 172-175, 206-210, 251, 252-253 were used in Utzon's *Logbook vol. V: Additive Architecture* (Hellerup, Denmark: Edition Blondal, 2008), 278-283.

CHAPTER 3

YOUNG UTZON IN THE MIDDLE EAST

3.1 Young Utzon and His Middle East

The perceived Middle-East should closely reflect Utzon's growth and changes, particularly seen in his architectural creation and its artistry, critically reflecting his self-interest, self-criticism and self-learning, through travel, reading and practice of architecture. While theorizing the mastery of design of young Utzon's early projects within the framework of cross-cultural influences, it should be noted that the Middle East could contribute the strength of his design, but as well as result in its weakness. These weaknesses could be detected in the differences between his early and mature work, reflecting his growth and questioning his changes.

Utzon's early works could be seen as how he absorbed and further adapted the specific ideas and ideals of the Middle-Eastern building culture, ultimately to refine his architectural synthesis through his maturation. Thus, it is important to note that the Middle Eastern ideas were much closer to Utzon himself, in which Utzon had no intention to imitate the Middle East with historicist manners; not only at his early stage but also throughout his career. Although being only a part of Utzon's world, the Middle East is important for us to examine young Utzon's career from a very specific perspective to illuminate the complex between cross-cultural inspiration and mastery of design

in the history and theories of modern architecture, with a non-Eurocentric world-view[103] and have a more sophisticated approach to Utzon's work.[104]

Utzon's early receiving and application of Middle East will be discussed through a series of analogical studies; the Sydney Opera House (1956-68) and the Masjid-i Jamii of Isfahan (مسجد جامع اصفهان)[105]; the Fredensborg houses (1959-65) and housing in the Middle East; the Melli Bank (1959-60) and the Masjid-i Shaikh Lutfullah (مسجد شیخ لطف الله)[106]; the Market in Elineberg (1960) and the Grand Bazaar of Isfahan (بازار بزرگ)[107]; the Silkeborg Museum of Art (1963) and the Bazaar of Kashan (بازار کاشان)[108]; the Elviria Housing (1960), Bayview House (1963-65) and experimental roof forms; the Zurich Theatre (1964) and the Masjid-i Jamii of Isfahan, the Wolfsburg Theatre (1965) and the Masjid-I Shah[109] (مسجد شاه).

[103] Kenneth Frampton (in *Studies in Tectonic Culture: The Poetics of Construction in Nineteenth and Twentieth Century Architecture*, 287) mentions the possibility of the influences of other architects of Utzon's generation referencing to the Orient.

[104] As mentioned, the Middle East was only part of Utzon's world building culture interest and only provided a perspective to see the cross-cultural references of his architectural creation. Besides Iran and Kuwait, Utzon had journeys and study trips to other countries such as Morocco, India, Mallorca, China, Japan and Mexico. In this thesis, the influences of other cultures which may belong to these countries Utzon travelled, were not intended to be ignored.

[105] The Masjid-i Jamii of Isfahan, (also known as the Great Mosque or Friday Mosque of Isfahan) was firstly founded in the 8th century by the Taym Arabs. The earliest version of the mosque had an Arabesque style hypostyle hall with a front court. In 1072, Seljuks reconstructed the mosque which we are able to observe today, with its *4-iwan* scheme. It was widely decorated in the Safavid era in early 16th century with tilework, *muqarnas* and minarets were added to the south-iwan. See; Sussan Babaie, *Encyclopedia Iranica*. vol. XIV, Fasc. 1 (2007): 20-33.

[106] The Masjid-I Shaikh Lotfollah was designed by architect Muhammad Reza ibn Ustad Hosein Banna Isfahani in 1602, by the rule of Shah Abbas I of the Safavids, in the capital city Isfahan. The mosque was completed in 1618-1619 and was dedicated to the father-in-law of Shah Abbas I, Shaikh Lotfollah. It was positioned next to the Naqsh-e Jehan square, which became the new royal square to represent the legitimacy and authority of the Safavid rule with its monumentality. Although the entrance *iwan* was directly facing the square, the prayer hall of the mosque was arranged diagonally facing the *qibla* direction. The single prayer chamber was covered with a single-shell dome with extensive tile decoration at the exterior alongside the monumental *iwan*, in blue, black and white color scheme.

[107] The Grand Bazaar of Isfahan, also known as Bazar-i Qaysariyyah, is the main commercial area of Isfahan located next to the Masjid-i Jamii, known to exist since early 11th century. The bazaar had evolved at a longer route in centuries, and with the constructions in 1603 it was interconnected to the new Naqsh-e Jehan Square with the Masterplan of the ruler Shah Abbas I of the Safavids.

[108] The Bazaar of Kashan is the old bazaar of the city of Kashan, located at the center of the old town near the Masjid-i Jamii of Kashan. It was built in the Seljuk period and was subject to restorations mostly in Safavid period. The structure of the bazaar is a great example of the continuity and complexity of the mud-straw roofs of the ancient Persian building tradition, with its interconnected domes and spatial flow of the plan organization.

[109] The Masjid-i Shah, as known as Shah Mosque, was a Safavid mosque constructed under the rule of Shah Abbas I, adjacent to the Naqshe Jahan Square, as known as the Shah Square. The plan of the mosque was formed with the *4-iwan* scheme with a central court, with four *iwan* portals facing the court. This monument was described in Utzon's reading with text and illustrations, see; Ardalan, Bakhtiar, 123-125.

3.2 The Sydney Opera House and the Masjid-i Jamii

Utzon's application of perceived ideas and ideals of the Middle Eastern building culture could be traced back to the Sydney Opera House project (1956-1968). This includes the design and construction of its shell-vault structure, ceramic roof tile cladding, and the geometrical principle of acoustic ceilings and walls. In 1962, the geometrical principle of the roof forms of the Sydney Opera House was resolved and finalized with two alternative proposals. One was to use the thin, light-weight and less-expensive steel frame structure with double sprayed concrete surface; and the other was the heavy ribbed structure **(Figure 1).** Arguably, Utzon's choice of the heavy ribbed structure was associated with his early perception of the Middle Eastern building culture.[110] In his study trip to Isfahan in 1959, what drew interest of him was the vault structure of the *iwan*[111] of the Masjid-i Jamii, which he photographed and filmed with his 8mm camera. Both in the Sydney Opera House and Masjid-I Jamii, the roof was constructed by a load-bearing pointed-arch structure. Beneath its soffit, the sculptural motifs - *muqarnas*- at Isfahan was recalling the ribs of Utzon's shell-vault structure.[112] From this formal analogy, the heaviness of the roof of the Sydney Opera House was an important strategy for Utzon achieving a Middle Eastern monumentality.[113] Although this pursued monumentality was also inspired by Utzon's perception of 'Chinese houses and temples'[114], the Masjid-i

Jamii delivered a much more direct precedent for Utzon, idealizing the physical form of his shell-vault structure **(Figure 2)**.[115] To this point, the interconnected vaulted structures with a bilateral symmetric formation of the southwest *iwan* of the Masjid-i Jamii were directly analogous to the composition of Utzon's shell-vault roofs, shaping a processional movement beneath.

[110] Yuzu Mikami, *Utzon's Sphere Sydney Opera House-How It Was Designed and Built* (Tokyo: Shokokusha, 2001).
[111] Iwan is an architectural unit widely used in traditional architecture of the Middle East, consisting of an empty vaulted space that projects to an open central courtyard. Despite the precise roots of this unit is unknown, Tuncel considers Phrygian, Lycian and Urartian cave niches to be the precedent of the *iwan*, which was decorated with *muqarnas* and transformed to an 'Islamic' typology. See; Burcu Tuncel, *Trajectory of Iwan: Origin, Use and Meaning from Ancient Anatolia to Islamic Period* (Thesis, Middle East Technical University, 2019), 41-65.
[112] Utzon's receiving of monumental *iwan* was not only through his on-site studies, but also via his reading of the Middle Eastern building culture. Kühnel's *Die Moschee*, Ardalan and Bakhtiar's *The Sense of Unity*, Saint-Pierre's *Tresors de la Turque* included detailed images of *iwan* used in Persian and Seljuk monuments.
[113] Some of the ideas of the Sydney Opera House such as the platform and floating roof were referred to Utzon's China. (See Chiu, "China Receives Utzon: The Role of Jørn Utzon's 1958 Study Trip to China in His Architectural Maturity"). However, ideas of the Middle East were more inherently related to the heavy, vaulted structure with the pointed arch form, covered with glazed tiles at the exterior and acoustic panels with stalactite connotations at the interior.
[114] Utzon's 1962 Platforms and Plateaus manifesto conveyed the idea of the Chinese houses and temples within the dualism of the earthwork and monumental roof (see; Chiu, "China Receives Utzon: The Role of Jørn Utzon's 1958 Study Trip to China in His Architectural Maturity").
[115] In Chiu, "China Receives Utzon: The Role of Jørn Utzon's 1958 Study Trip to China in His Architectural Maturity ", the authors only conveyed the importance of traditional Chinese architecture in Utzon's work, however, the Middle Eastern influences were not mentioned.

For the glazed-tiles of the Sydney Opera House, Utzon sent his own photograph of the tilework of Masjid-i Jamii to the Swedish tile-producing company C. C. Höganäs, to state his demand for the similar expressivity of ceramic work **(Figure 3)**.[116] Utzon was fascinated with the tilework of Masjid-i Jamii, first built during the Ummayad dynasty around the 8th century. He conveyed the importance of reflectivity and vibrancy of the glazed tiles in order to achieve a further dynamism combined with the form of the lightweight-appearing shell-vault design.[117] His own camera films, photographs[118] and literature collection[119] demonstrate his interest in the façade decoration and geometrically-patterned glazed tilework of the south and west *iwans* in general, and the formation of traditional Islamic *muqarnas*[120] (مقرنس) in particular **(Figures 4, 5, 6**). What is more, the geometrical system of the tile cladding of the *muqarnas* should also be a source of inspiration for Utzon. Firstly, the tiles are made of square pieces, which accumulate horizontal and vertically to create surfaces. Secondly, to be able to clade the spherical surface of the *muqarnas*, they are arranged within diagonal patterns. In parallel, the cladding of the spherical roof of the Sydney Opera house was also arranged with squares and facilitated within a diagonal system. These similarities explained why Utzon sent his own photograph of the tilework of Masjid-i Jamii to C. C. Höganäs to state his source of inspiration for design.

For the color selection of these tilework, his early design proposal had a color palette consisting of black, white and dark blue; proving a similar approach to the tiles of side-frame decoration of Masjid-I Jami's *iwan*s **(Figure 7)**. Furthermore, the Masjid-i Jamii's multi-leveled color schemes and their use in *iwans* are also described in Utzon's reading[121], mentioning the use of juxtaposed colors and their perception to the viewer. According to the Islamic thought, white color represents the light and the unity of beings, while black represents the hidden aspects of divine and the veil from interior to exterior, and blue represents the earth, together within the cold/dry of 4-color system[122] in ancient Islamic world. At Isfahan, these colors of black, white and blue were combined together at the internal wall surfaces and *iwans* of the Masjid-i Jamii, creating a contrast to the dark yellow regional setting. Utzon photographed and recorded these color schemes with his 8mm camera **(Figure 8)**. The color scheme of the

[116] From Utzon Archives, Aalborg University Library.
[117] Forés, 166.
[118] Utzon Archives, Aalborg University Library.
[119] Ardalan and Bakhtiar, 54,55,104-106,
[120] *Muqarnas* is a geometrical decorative element that was originated from Mesopotamia around 10th century, composed from layers of repetitive squinches and vaults. It was widely used in Islamic architecture, to create smooth and gradual transitions between the roof and earthwork. Besides its complex geometrical character, *muqarnas* also referred to cosmological and religious beliefs such as *Tawhid*, the oneness of God and the unity of the multiplicity. See; Elena Imani, "Historical and Geometrical Analysis of Muqarnas and Prospect Of Its Reflection On Today's Architecture" (PhD diss., Middle East Technical University, 2017), 18.
[121] Ardalan and Bakhtiar, 54.
[122] The four-color system was an ancient thought of corresponding the four main colors of red, yellow, green and blue, to the 4 elements of Aristo; fire, air, water and earth, respectively. These colors eventually attain the qualities of hot-dry, hot-wet, wet-cold and dry-cold, representing four seasons of spring, summer, fall and winter. This thought is described in Ardalan and Bakhtiar, 50.

Sydney Opera House was later abandoned and further transformed into a monochrome white scheme, but still embodied with reflectivity feature.[123]

Besides the tilework fashion and quality, Utzon's receiving of the *muqarnas* of *iwans* of the Masjid-i Jamii could be the precedent for his early design proposal of acoustic ceilings and walls of the Major Hall of the Sydney Opera House[124]. This design involved triangulated, elongating surface geometry that was formed as a secondary layer beneath hyperbolic shells[125], which in section and elevation views becomes reminiscent of an Islamic pointed arch, with its decorative *muqarnas* **(Figures 3, 9)**. Both *muqarnas* at Isfahan and the acoustic ceilings and walls of the Sydney Opera House created an internal layer which fragments the external shape to create a mediator between the earthwork and the roof. The basic component of Persian *muqarnas* decoration was consisted of a *bayt* (بيت) incorporating two facets to create a cell and intermediary elements, which are located between the cells in variations of triangular geometrical forms.[126] In Utzon's drawings, one can observe the similar utilization of triangular geometry with variations in height and scale, interconnecting horizontal and vertical dimensions while creating cell-like niches. This can arguably identify Utzon's perception of decorative *muqarnas* as a solution both for a basic architectonic element and geometrical composition of the interior of the Sydney Opera House.

In the Persian architectonic setting, the composition of *muqarnas* was applied to construct a continuous ceiling below the interconnected vaulted and domed structures. The continuity and smooth transition between different geometrical forms were achieved by utilizing its interconnected geometry of facets, and most importantly their organization in *tabaqas* (طبقة) in which multiple tiers/levels arranged in horizontal motifs.[127] Utzon's use of facets for the acoustic ceilings of the Sydney Opera House in horizontal layers suggests an identical transitional feature of the acoustic ceilings with articulated plasticity **(Figure 10)**. The transition between two distinctive geometric systems - hyperbolic shells and fan-shaped plan of platform - was resolved by applying the modular pattern of faceted surfaces, both horizontally and vertically. By these means, Utzon was able to articulate the ceilings as floating in the air, similar to the use of *muqarnas* to give light-weight appearance to the heavy masonry

[123] Weston, *Utzon: Inspiration, Vision, Architecture*, 152-156.
[124] The acoustic ceilings proposal that invokes the Islamic *muqarnas* was prepared in 1960 for the Major Hall. In the meantime, the Minor Hall ceilings were designed in radial fragments that referred to clouds. The drawings of these proposals were published in the *Yellow Book* in 1962.
[125] After the 1957 competition scheme of the shells of the Sydney Opera House, the following preliminary designs involved 1958 parabolic, May 1961 circular and June 1961 elliptical geometries to resolve the structural properties analogous to the competition scheme. In October 1961, the spherical scheme became the solution, enabling use of mass production.
[126] Elena Imani, "Historical and Geometrical Analysis of Muqarnas and Prospect Of Its Reflection On Today's Architecture," (PhD diss., Middle East Technical University, 2017).
[127] *Tabaqa* is a horizontal layer that gradually increases or decreases repetitively, beneath the original layer of tiers (see Imani's *Historical and Geometrical Analysis of Muqarnas and Prospect of Its Reflection on Today's Architecture*). In Utzon's acoustical ceilings proposal, different from the Islamic examples, the scale of *tabaqas* were manipulated vertically at each layer, to be able to create an extended transition to earthwork.

structures.[128] As a result, the heavy and monolithic roof structure embodied with light-weight appearing internal surfaces demonstrated a contrast between internal and external forms, analogous to *iwans* of Masjid-i Jamii, adding to the perception of historical monumentality.

Besides architectonic quality, the faceted scheme for the acoustic ceilings of the Sydney Opera House should demonstrate an analogy to the monumental *iwan* with *muqarnas* in terms of sound efficiency and diffusing the sound. The monumental *iwans* of Masjid-i Jamii, similar to a *mihrab* (محراب) located at the interior of a mosque, were able to collect and reflect the sound to the prayers during the communal Friday pray. The use of the form would prevent any inefficiency in the loudness of *imam's* preach, as well as whenever *adhan* (أَذَان) is needed to be recited, and well heard by the Muslims at the court or inside the mosque. Moreover, the *muqarnas* of the *iwans* were to disperse the sound with its irregular geometry in order not to create a focal point of sound at the court, so that the voice of *imam* could be clearly heard by every individual with correct reverberance.[129] The acoustic ceilings of the Sydney Opera house could utilize similar features of *iwan* form, diffusing and dispersing the sound similar to the *iwan* with *muqarnas* as well as *mihrab* at its interior setting.[130]

3.3 The Housing Complex in Fredensborg

The housing complex in Fredensborg is another project that was designed and realized between 1959 and 1965 alongside the Sydney Opera House. The complex consisted of 47 patio-houses, 30 one-family houses with terraces, a social center and housing units for guests. The patio house of the Fredensborg complex was a continuation of the previous courtyard house scheme, developed in the 1953 housing scheme for Skanska Hustyper competition and in 1956 Kingo houses **(Figures 11,12)**. The housing units of Fredensborg, especially the A and B types of the patio-houses, have an identical separation of internal living area from external surrounding, occurred with carefully regulated visual connections to the outdoor nature. In both Kingo and Fredensborg houses, it is possible to trace the inspiration received from Alvar Aalto's Säynätsalo Town Hall (1952), for Utzon interpreting isolated housing

[128] See Imani, 14.
[129] For more information on the acoustics of muqarnas, see; Hanan Al Jumaily, "Muqarnas form efficiency in diffusing Sound waves within the Space," *International Journal of Innovative Science, Engineering & Technology* vol. 4, issue 12 (December 2017).
[130] The faceted scheme was later replaced with the suspended plywood box-beam elements, analogous to the shapes of bracketing units of traditional Chinese architecture. (See; Chen-Yu Chiu, *Utzon's China. The Reinterpretation of Traditional Chinese Art and Architecture in the work of Jørn Utzon (1918-2008),* (PhD diss., University of Melbourne, 2011), 184-186.) This replacement could be associated with the re-designing of the scheme in relation to added balconies and configured seating, as well as the intention to embody structural features with the ceilings' sole skin.

units within a staggered plan composition in a rural setting, while creating a metaphorical nature at the central court **(Figures 13, 14)**.

In Fredensborg houses, the observed uniformity of material between walls and court floors could refer to many different vernacular building cultures seen in such as Morocco, Libya and possibly Iran, as well as with the influence of Aalto's proposal for Säynätsalo Town Hall. In Utzon's housing scheme for Skanska, the use of central court was analogous to Säynätsalo, while this unrealized scheme was forming the basis of Utzon's later projects such as Kingo and Fredensborg houses. However, after his trip in 1957, Utzon had sent his own photograph of the vernacular house of Morocco to Aalto **(Figure 15)**, conveying his source of inspiration regarding the built form and uniformity of materials. The use of uniform material for walls and floors is also known to Iranian vernacular houses, specifically in old Kashan courtyard houses were described in Utzon's reading, which Utzon visited. As observed, the wide use either mud bricks or mud-straw cladding was applied within a single-level color system[131], occurred with a uniformity of material of roof, walls and floor of the central court. Analogously, in Fredensborg houses uniform brick tiles were used for earthwork, internal walls and the roof in parallel to the Kingo houses. The mixed use of brick tiles, wood frames and ceramic tiles for the roof of Kingo and Skanska made it possible that Utzon decided to follow the principle of uniformity in Fredensborg houses after his trip to Iran in 1959 as well, while additionally manipulating the built form.

Comparing the differences of Utzon's architectural undertakings, it is possible to observe in the Kingo Houses there were chimneys allocated. This was also a followed principle in Fredensborg complex, in contrast to Aalto's Säynätsalo and housing projects where a chimney is not allocated. In both Fredensborg houses and Kingo houses, the typical housing unit featured chimneys as identical vertical elements to accentuate each house in the layout, carefully placed at the edge of the building footprint. Importantly, comparing Utzon's Fredensborg houses to the Kingo houses; one can observe that the chimney height was increased in the housing units of Fredensborg, designed after Utzon's trip to Iran. The chimneys of the Fredensborg houses eventually resembled the Persian wind-tower (بادگیر , bâdgir) form, which were built to cool down the temperature inside the houses **(Figure 16)**. Furthermore, the chimney height of the community center of the Fredensborg complex was further increased, became the highest among all units. This feature is in parallel to the allocation and proportion of wind towers in

[131] The single-level color system was a uniform use of color and material for the traditional buildings appropriated to bring character with the surface, patterns and geometry in harmony. The single-level and multi-level color systems were described in Utzon's reading, giving examples of Kashan roofscape and Varamin Masjid-i Jamii. See; Ardalan and Bakhtiar, 53-55.

Iran,[132] varying from small to larger scale according to the volumetric conditions of the rooms. From both formal and compositional point of view, the rhythmicity and harmonicity in the silhouette of Fredensborg houses becomes more reminiscent of the wind towers of Madrasah-yi-Sultani in Kashan (نمای مدرسه ی سلطانی), regarding the vertical proportion and peripheral allocation at the roof (**Figure 16**). Madrasah-yi Sultani and the typical wind-towers of the roofscape of Kerman city were described in Utzon's reading, and it is very possible that Utzon had visited these monuments.

3.4 The Melli Bank and Islamic Roof/Earthwork Juxtaposition

In spite of the fact that Utzon's Middle East was inherent in his ideas for projects in different regions, he had the first opportunity to build in Iran with the Melli Bank project in Tehran between 1959-1960. The built form of this project was to establish a hierarchical area in terms of furniture, openings and room partitions covered by a sculptural roof form, in contrast to the solidity of two gable side walls. The notion of providing a flexible and indirectly-lit, elaborated space is not unfamiliar to the space of Islamic religious tradition - this becomes the case in mosques. One can observe that in the Melli Bank, the contrast between low-ceilinged, shaded entrance space and high-ceilinged, smoothly illuminated main space was in parallel to the experience in Iran. The sequence of larger and higher roof forms and decreasing floor levels was referred to the Masjid-i Sheikh Lutfullah (مسجد شیخ لطف الله) in Isfahan, Iran, first built during the Safavid period in the 17th century by the chief architect, Shaikh Bahai[133] (شیخ بهایی) **(Figure 17)**. Utzon meticulously studied this masterpiece via his reading[134] after his 1959 study onsite.

The entrance space of the Masjid-I Sheikh Lutfullah is an elongated axial progression, enclosed by two blank, structural side-walls. This space is lit only by the light-catchers, constituting a low-ceilinged, shaded and elongated space before one reaches the squared main prayer hall. Its centralized, domical main prayer hall space is reminiscent of Utzon's main hall of the Melli Bank. This space is centralized by his suspended roof beams that referred to the name of Melli Bank written in Persian calligraphic forms **(Figure 18)**. Furthermore, the ending of the roof form that expands to transform the top ceiling into a side enclosure was identical to Masjid-I Shaikh

[132] The resemblance of Persian wind towers to the chimneys of Utzon was mentioned in Weston, 91.
[133] Bahāʾ al-Dīn Muḥammad ibn Ḥusayn al-ʿĀmilī (also known as Shaikh Bahai, Persian: شیخ بهایی) (18 February 1547 – 1 September 1621) was a renowned Arab architect, mathematician, scholar of astronomy, cosmology and Islamic philosophy, lived in the Safavid Iran.
[134] Masjid-I Shaikh Lotfollah was described in Ardalan and Bakhtiar, *The Sense of Unity* and Ernst Kühnel, *Die Moschee*.

Lutfullah's *mihrab* formation. In terms of illumination, the ray of light of main prayer hall of Masjid-i Shaikh Lutfullah is "doubly broken" and "clarified"[135], which is an effect that is pursued in the Melli Bank as well.

The spatial organization of the Melli Bank follows a downward sequence to centralize the main area by longitudinal axis after the entrance foyer. This spatial organization strategy is well described by Utzon himself: "A world has been created within the bank, pertaining to both present-day and ancient Persian tradition".[136] In ancient Persian cosmology, the universe is created within three domains; the underworld, the earth and the sky.[137] In Utzon's Melli Bank, the projection of the roof form proceeds against gravity, while the earthwork follows gravity through downwards; a representation of sky and underworld respectively, while the 'world' is created as the space in between. According to Utzon, the interior world was illuminated akin to the light beam coming from clouds.[138] Analogously, in Islamic architecture, this world that is conceived at the interior with formal connotations, the central dome representing the sky for instance, attests cosmological meanings to create religious, qualitative space. Similar ideology could also be seen in the Bagsværd Church, the curvilinear roof form of internal layer attested meaning as clouds in an open sky.[139]

The cosmological connotations in Iranian tradition could be traced back to the ancient times as Utzon himself mentioned, where the vertical, centralized cosmic axis becomes the linkage of the three celestial domains. In ancient Persian cosmology, this central cosmic axis can be represented with not only the vertical dimension of *minaret,* but also with mountain. The early Dome of the Rock (قبة الصخرة) for example, was associated to Mount Moriah, which was embodied with the notion considering as the center of the world, representing verticality[140]. According to Utzon, in terms of materializing and representing his 'world', the surfaces of two side walls had also needed to be referenced to the Iranian tradition, in a subtle way. The side walls of the main hall are cladded with travertines in the form of a mountain, starting from the bottom earthwork and ending just below the sky **(Figure 19).** The vertical axis of this mountain form on surface is also aligned with the geometric center of roof form of main hall, reinforcing the idea of a vertical cosmic axis within the bank, which is the center of the 'world' created by Utzon. The juxtaposition of travertine claddings and in-situ concrete walls in the Melli Bank also shows and

[135] Arthur Upham Pope, *Persian Architecture* (New York: George Braziller, 1965), 217.
[136] Forés, 210.
[137] Forés, 210.
[138] Ibid., 210.
[139] See Chiu, et. al., "My Country and My People and Sydney Opera House: The missing link," 136-153.
[140] Samer Akkach, "Aspect of the Traditional Islamic Philosophy of Art," in *The Islamic Quarterly,* 37 (1993): 96.

re-imitates the contrast between rough surface of bricks, and smooth, glazed surface of tiles of Persian architecture.[141]

More precisely, on the lower surface of two lateral walls inside the Melli Bank, there was a horizontal extruding stone-cladding. This layer was corresponding to human scale and separated from wall decoration on the upper surface. This was analogous to the walls Utzon studied and photographed inside the *iwan* space of Masjid-i Jamii of Isfahan **(Figures 19, 20).** The lower wall surfaces both of the Jamii and the Melli Bank were cladded horizontally with sand stone and travertine stone, respectively. The Masjid-i Jamii's lower wall surface is slightly decorated with engraved squares and rectangles, while surfaces of the Melli Bank had two horizontal lines. Nonetheless, this interior design was never realized due to the client's disapproval.

The interior furniture design and arrangement of the Melli Bank suggest a further analogy to the artistic forms of *Kufic* calligraphy (ٱلْكُوفِيّ ٱلْمُرَبَّع). Utzon studied the ornamentations of Masjid-i Jamii's walls and domes, photographed the *Kufic* calligraphy art at the semi-enclosed space of an *iwan* located inside the ogive frames, right below horizontally framed Persian calligraphy **(Figure 20).** In parallel, the Melli Bank's plan scheme features a furniture arrangement akin to the perpendicular lines of *Kufic* calligraphy **(Figure 21)**. In the meantime, Utzon's roof form connotes "the Melli Bank" name in Persian calligraphic form, in line with the same writing style in Masjid-i Jamii he photographed.

3.5 The Market in Elineborg and Islamic Roof Composition

In 1960, Utzon prepared the competition proposal for the Market in Elineborg, which established a typology to form a synthesis of indoor and outdoor spaces for commercial function for the first time in his career. Before the Market in Elineborg, Utzon designed the 1960 Herneryd House **(Figure 22)**, which had its courtyard scheme and had a movement of decreasing floor levels. For the Market in Elineborg, Utzon had combined a central court and an elongated roof form for this new typology, to realize the idea of a shaded outdoor area for the first time, while incorporating the movement through decreasing floor levels. The building area of Market in Elineborg was firstly elevated several steps on a platform signifying the public area **(Figure 23)**, and followingly, people were directed downward to the underground level to reach the public commercial area. The allocation of commercial space on a

[141] Weston, *Utzon: Inspiration, Vision, Architecture*, 228.

lower level in a gradually decreasing fashion was a feature of the Islamic bazaars of Iran, especially which are built during the Safavid period (1501-1736). The Grand Bazaar of Isfahan (بازار بزرگ) was a specific example that Utzon had visited, which allocated a series of commercial spaces in a downward sequence, in a similar manner to the Elineberg **(see Figures 25, 26)**.

Not only the typology, but also the geometrical composition of spaces of the Market in Elineborg could be affected by Utzon's perception of the Middle Eastern building culture. The commercial court of Market in Elineborg was Utzon's first time to shape a central space in a perfect square shape and covered by the roof forms. This became the geometrical principle to be followed in the Herneryd House and was further elaborated in the early scheme of the Bayview House design **(Figures 22, 24)**. Utzon's arrival to the centrality of the plan in a square fashion could be related to his observations in Iran from his 1959 trip and his readings. In *the Sense of Unity*, the idea of the square plan covered with a dome is conveyed to be an Iranian building tradition since ancient times, where the *Chahar-Taq*[142] (4-arches) structure was used to be the place of worship that consists of 4 arches creating a square space, covered with a dome. With the emerging of Islam in Iran, this scheme was evolved and utilized in both religious and secular architecture, including the examples such as the Masjid-i Jamii, the Sheikh Lotfollah Mosque and the Grand Bazaar of Isfahan[143].

In Iran, the square plan could not only be used as a base for the geometry of the traditional mosques, but also to utilize as an urban unit to create Bazaars and plazas, which to be called a *Chahar-su* (4-ways). Comparably with the Elineberg, the roof becomes a composition of fragmented elements for the first time, allowing to array the prefabricated columns and beams in line. This could be considered as the first idiom of Utzon's urbanism under the "additive" umbrella, which developed later and implemented at the Silkeborg Museum I and the Farum Town Center. The square plan and roof arrangement seen in the Market in Elineborg was distinctive from the Herneryd and Bayview, because of the roof form that compliments the centrality of the earthwork. The heights of the roof elements of the Elineberg gradually increase towards the center to centralize the square plan, creating a consecution of spaces that in lateral section view, aggregate like a domical space. This was a similar spatial strategy compared to the *Chahar-Taq* based mosques and bazaars as well. Being parallel to the Melli Bank, yet more radically

[142] *Chahar*-taq, as known as 4-arches, is an ancient form that was developed to create the Fire Temples of ancient Iranian Zoroastrianism religion. This form consisted of a perfect square plan with 4 arches on 4 sides, carrying a dome with 4 squinches on corners for support and transition of geometries. This basic and powerful form has continued to be used today, to create mosques and carry their *maqsurah* dome, instead of using the pendentive system of the west.

[143] The *Chahar*-taq form was used not only in religious, but also secular buildings such as the Bazaars. The 4-sided nature of the form was facilitated to create a movement system that let two sides of the *Chahar-taq* to house the shops with interconnected vaults, while the other two sides provided the directional movement. The structure and architectonics of this form is discussed in Chapter 5.

implemented on a perfect square earthwork, Elineberg's arrangement could represent the central-domed commercial plazas of the Grand Bazaar. The *Aminoddole Plaza* of the Bazaar of Kashan could be an accurate example that Utzon studied onsite, where the domical structures of the roof aggregate and emphasize the centrality of the plan with the roof as a whole.

It must be noted that Utzon's ideas for the roof structure of the Market in Elineborg was also influenced from historical monuments, not only from the Middle East but also from China[144]. Utzon arranged the longitudinal elements of the roof carried on free-standing columns, with a bracket system to connect the columns and roof, referring to Chinese architecture, which was interpreted as a modular system and further developed in the Bayview House. As the form is concerned, the roof consists of extended and folded repetitive elements suspended above the brackets. However, the identical modular roof form resembled a fragmented and simplified version of a series of divisions of vaults, referencing to the use of vault structures in traditional Islamic bazaars. Utzon's similar fragmented roof form was first observed in the Melli Bank, where the illumination was arranged indirectly according to the climatic condition of Iran. If one receives the roof form of Market in Elineborg, in contrast to the Melli Bank, the fragmented nature of the vault forms provides direct light beams similar to the Bazaar of Isfahan Utzon visited in 1959 **(Figures 25, 26)**. In Isfahan, the *oculi* and light-catchers of the Grand Bazaar allows indirect lighting, whereas the gap between the fragmented roof elements allows direct light beams to illuminate the interior with sunrays, from the top points of the pointed arches. The roof being contributed to the lighting of the interior should be an inspiration of Utzon from his trips to Iran, instead of China where the roof was monolithic and does not involve sky-lighting. Consequently, the Market in Elineborg could suggest that, regarding the roof and the earthwork compositions, Utzon was closer to his studies in Iran compared to China.

The interior organization of the Market in Elineborg was also referred to the interpretation of Middle Eastern culture, through written form. The pattern of shops located in the interior commercial space of the market was analogous to the oriental patterns of Islamic decoration, *Kufic* calligraphy in specific **(Figures 20, 23)**. These patterns were developed firstly in the furniture of the Melli Bank, and later could be seen in the interior arrangement of the Bayview House **(Figures 21, 24)**. However, the column arrangement of the Elineberg had a questionable alignment with this feature, the Islamic pattern of the shops was disrupted by the 2 rows of free-standing column arrangement. In this case, the Market in Elineborg was the first proposal of Utzon which embodied the use of free-

[144] See Chiu, *Utzon's China. The Reinterpretation of Traditional Chinese Art and Architecture in the work of Jørn Utzon*, 154-156.

standing columns to connect the earthwork and the monumental roof. This was contrary to the previous projects, most importantly the Melli Bank, where the use of columns was avoided and the roof was suspended only between the side walls. One could still observe the impact of the Melli Bank on the organization of columns of the Market in Elineborg, imitating the 2 gable sides instead of a flexible column organization. Thus, the shape of the columns of the Market in Elineborg did not display a certainty in the form to be able to guide organizing the internal volume. A similar situation could be seen in the 1964 Zurich Theatre as well, where the columns were used analogous to the Melli Bank, as two straight rows of colonnades at the parallel sides, with an uncertain strategy to connect and integrate the roof and earthwork while aiming the roof form to 'float' in the air. This situation regarding the ambiguity of shaping and organizing columns and spaces began to be resolved with the becoming of the "additive" principle.

3.6 The Silkeborg Museum of Art and the Centralized Space

One of the first experiments of Utzon that involved a spherical fashion as an integration of earthwork and roof form was his 1963 Silkeborg Museum of Art, which was to be built to accommodate the Danish artist Asger Jorn's works. In contrast to the previous projects related to his "Plateaus and Platforms" theme, the roof form and earthwork of the Silkeborg Museum were carefully integrated, representing an inward-concentrated character **(Figure 27)**. For the first time in Utzon's career, the earthwork and the roof form became united while involving a spherical and volumetric continuity, as a way of eliminating issues of architectonic connections seen in the Sydney Opera House[145]. In terms of plan schematics, the multiplicity of centers within the building was a new feature compared to the previous projects.

The designation of multiple roof forms to cover a monolithic earthwork should be inspired from the conceptual sketch of the Bayview House **(Figure 29)** – where according to Utzon, many small leaps could become one major leap. The three domical-shaped art display rooms of the museum are significance, because of their form and lighting; the three-story-height volumes expose themselves to the above-ground only at upper part, housing one circular skylight per each one at their peak point. This three-domical-shaped design approach resembles the roofscape morphology of the Aminoddole Plaza[146] (تیمچه عزیزالدوله) of the Bazaar of Kashan (بازار کاشان), which

[145] Those issues were later resolved within the principle of prefabrication and mass production of elements, could be seen with the 'additive' projects in both architectural and urban scales.
[146] Aminoddole Plaza and its roof form were demonstrated and described several times in Utzon's readings; 1973 *the Sense of Unity*, Jean. Dethier, *Lehmarchitektur: Die Zukunft Einer Vergessenen Bautradition* (Clay Architecture: The Future of A Forgotten Building Tradition).

was built in the Seljuk era and renovated in the Safavid era **(Figure 28)**. The interlocking domes of the bazaar of Kashan were studied onsite by Utzon as well as depicted in his reading[147]. This section of the bazaar accommodates three domical roof forms that are integrated to each other, and reveal themselves above-ground to bring sunlight to the interior from the light-catchers at their top points. The interior space of the plaza was also concealed from outside with an inward-concentrated approach, and well-integrated in form regarding the earthwork and roof.

The interaction between three spherical volumes and the roof forms of elongated entrance corridor could be influenced from Utzon's receiving of the south-west dome of Masjid-i Jamii as well, which he photographed and studied from his reading[148] **(Figure 28)**. Firstly, both buildings have the specific feature of revealing the large gallery-volumes in contrast to the low-ceilinged entrance/corridor experience. Secondly, the entrance volumes are designated as elongated and hierarchical spaces, directing the visitor to the large gallery-volume covered with a domical roof. Thirdly, the structures are located partially below-ground, creating a continuity with the ground floor level and the roof form, as the spherical roof form emerges upwards from the ground. Fourthly, similar to the examples in Kashan, the lighting of both of the entrance and gallery volumes are arranged with skylights. In terms of the surface treatment, Utzon's decision was to appropriate shiny ceramic tiles with strong colors for the exterior cladding of the Silkeborg, while keeping the interior walls white-washed[149]. This approach was similar to the Sydney Opera House, which was analogous to the glazed tiles of Masjid-i Jamii of Isfahan.

[147] In 9th and 11th chapters of Dethier's book *Lehmarchitektur: Die Zukunft Einer Vergessenen Bautradition* from Utzon's reading, there are various examples of building curvilinear architectural forms with earth, depicted with a brief thematical text and photographs. Some of these examples include the Bazaar of Kashan in Iran (page 107), Bazaar of Yazd in Iran (page 108), Zoroastrian sanctuaries at Yazd in Iran (page 89), Friday Mosque at San in Mali (page 100) and Tomb of Sayid Merza Khoja in Afghanistan (page 108).
[148] Southwest dome of Masjid-i Jamii is described in Utzon's reading Ardalan and Bakhtiar, *The Sense of Unity*, 110. A similar formation of interlocking domes was inherent in the Friday Mosque of Veramin, Iran as well, which was included in Kühnel, *Die Moschee*, 16.
[149] Forés, 233.

3.7 The Elviria Housing, the Bayview House and Experimental Roof Forms

According to Utzon, "the roof can be hanging above, it can be spanning across or jumping over in one big leap or in many small ones".[150] Unlike imperial Chinese and Japanese architecture in which one roof form covers each division of spaces, in the Middle Eastern architectural culture, every division of space is covered with its own stereophonic roof form, commonly with one dome structure for each room of the building. In the 1960 Elviria Housing competition project, published in 1962, Utzon had experimented with the curved roof form of the Civic and Leisure Center in what he calls 'one big leap', over the earthwork of a series of platforms **(Figure 29)**. The roof had a large suspended domical form implying the notion of centralized space. This form was experimental for Utzon and it was developed from the 1958 Hojstrup School project as a first scheme, transformed into a monolith. In the Hojstrup, the domical roof was shaped as a double-layered form for the platform, which should be inspired from the Persian *iwan* setting perceived firstly in Utzon's reading and later in the Masjid-i Jamii with his onsite studies. In Elviria housing, one can perceive this idea of double-layered yet separated form, evolved into interconnected side enclosures, similar to the Sydney Opera House and Utzon's perceiving of the south *iwan* of Masjid-i Jamii. It is also possible that regarding his trip to Majorca[151], Utzon was inspired by the Islamic culture legacy and Arab influenced monuments of Majorca dating back to as early as the 8th century, while designing the Elviria project.

The preliminary sketches of the Bayview house in Sydney (1963-1965) displayed a development from the Elviria housing scheme, furthermore the 'many small leaps' approach for the roof was to be well apparent after Utzon's experiences in the Middle East **(Figure. 29)**. The curved planes of the roof of this house are juxtaposed on a rectangular plan, with a contrast of organicity and defined geometry. The flower-like composed roof form was resonating the domical roof of the Middle East with an experimental approach, reflecting "unity in multiplicity" principle of *Sufi*[152] tradition in roof form. Thus, the roof was housing sky-lighting as the main illumination strategy, similar to the Sheikh Lotfollah mosque. Nonetheless, Utzon's concern about the multiplicity and unity of roof form can be still read through his progress and the design process of the Bayview House.

[150] Forés, 230.
[151] Utzon visited Majorca firstly in 1957 and bought a plot of land near Santanyi. After the resignation from Sydney Opera House, he retreated to Majorca in 1966. He built his two renowned houses, 1971-73 Can Lis and 1994 Can Feliz in Majorca for his family. For more information, see; Utzon, *Logbook vol. 3, Two Houses on Majorca*.
[152] Sufism, as known as Islamic mysticism, is a religious practice of Islam that gave definitions of *tasawwuf* through teachings of the holy Quran. Sufism is widely practiced in Persia as a doctrine and principles of way of life through Islam and Islamic tradition. In *The Sense of Unity*, the manifestation of this doctrine was investigated within spaces of the traditional man in Persian architecture. See;

The plan schematics of the preliminary Bayview house were essentially developed from the 1960-1962 Herneryd house. The plan of the Herneryd house had a square footprint and was based on a central square courtyard, which was also reminiscent of the vernacular courtyard houses in Iran. The old houses in Kashan could be an example of inspiration which Utzon had visited – the square layout with central courtyard as well as the movement of going down inside the house could be observed both in Kashan houses[153] and in the Herneryd house. Earlier versions of the plan of the Bayview House differs from the Herneryd house, because of the substantiality of and coordination in between elongated transition spaces and squared rooms. This approach reminds one of the principles for the linkage of spaces in traditional Iranian architecture along with different cultures, which follows the rhythm of connection, transition and culmination, described in Utzon's reading[154]. Followingly, the walls play an important role to define the space through this rhythm as well as to represent monumentality. The monumentality achieved with the use of walls is followed by having no columns at the interior space, parallel to Utzon's earlier housing projects. The embodiment of Middle Eastern ideas in Utzon's planning strategy was accompanied by the monumental setting of the walls in both the Herneryd and the preliminary Bayview. Thus, in the early Bayview Utzon had arranged the internal walls and libraries together referencing to *Kufic* calligraphic form by using perpendicular lines, similar to the furniture arrangement of the Melli Bank and the Market of Elineborg.

In contrast to the roof of the Bayview's early sketches, the roof of the Herneryd house was embodied with horizontal continuity, with an intention of shaping the form of the extruded eaves against gravity. It is possible to observe the transformation of the notion of the roof to represent monumentality from earlier sketches of Bayview to its built scheme and Herneryd, which was combined with the central court. Thus, Herneryd should be the key point in transforming the idea of the roof pertained to gain its monumental character while comprising horizontality. In the early design of the Bayview House, what further draws attention in Utzon's drawings is the lack of interior furniture **(Figure 24)**. The idea of having no furniture under a monumental roof should be an approach that is developed in parallel to his receiving of the Islamic building tradition, especially the mosque interiors. It should also be noted that there might be a linkage to vernacular Japanese houses as well[155], without free-standing furniture – the furniture allocated only adjacent to the internal walls.

[153] The fundamental layout of traditional Kashan houses was described in Hansen, *Traditional Houses and Bazaars*, who accompanied Utzon couple at their 1959 trip to Iran.
[154] Ardalan and Bakhtiar, 4.
[155] For more information about Utzon and his Japan, see; Chen-Yu Chiu, Philip Goad, Peter Myers, and Nur Yıldız Kılınçer, "Jørn Utzon's synthesis of Chinese and Japanese architecture in the design for Bagsværd Church," *arq* vol. 22 issue 4 (2019).

3.8 The Zurich Theatre, the Wolfsburg Theatre and the Courtyard Space

The notion of centralized space manifested itself in Utzon's later projects as well, in Zurich Theatre competition proposal (1964) which he was awarded with the first prize. The stage area of the Zurich Theatre involved a central design enclosed in a rectangular plan with a processional movement. The profoundly different elements in this project compared to Utzon's previous designs were the water pools that were located at the front court **(Figure 31).** In the traditional Iranian architecture, the pools called *howz* (حوض) are placed in the courtyards of family houses or (front) courts (*Sahns*) of mosques, as both symbolic and functional elements. An example of such could be the Masjid-I Shah of Isfahan that Utzon observed[156] and photographed, with water facility in the middle of the court **(Figure 30)**. [157] In the Zurich Theatre, three pools were aligned with the entrance axis of the building with a symmetric portion, delivering an impression of purity and silence before entering, akin to the Islamic architectural tradition. Firstly, the entrance area of the Zurich Theatre was reminiscent of the Melli Bank's entrance area with its low-ceilinged roof referenced to Iranian architectural tradition. Afterwards, the users were directed to the stage area through the same linear axis, without any rotational movement of circulation, which could also be observed in the internal movement of the Sydney Opera House. The straight processional movement through symmetrical layout suggests the users an approach to the main auditorium after being purified by the water features symbolically.[158] What further intensifies this experience in terms of morphology is the floor level that goes downwards while moving to the main auditorium, as the roof height gradually increases and reaches its top level in centralized stage area, in parallel to traditional Iranian mosques. Masjid-i Jamii in Isfahan embodied similar features; welcoming visitors with water element located at the internal court (*sahn)* following straight processional movement directly towards the *qibla-iwan* within the symmetrical 4-*iwan* scheme[159]. Receiving of the central stage area of Zurich Theatre after descending floor levels, thus the central hall combined with an elevated roof suggests a further analogy to Iranian architectural tradition.

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[156] Utzon's reading had included the use of *howz* within central court in Persian historical monuments as well, some of which were: Pool of Naqshe Jahan Square in Sablier, 155; pool of Naqshe Jahan (102), Masjid-I Ali (114), Madrasah-I Nimawar in Isfahan (115), Masjid-I Shah (124) in Ardalan and Bakhtiar.

[157] Water plays a prominent role in Islam as mentioned in the holy book *Quran,* in terms of symbolizing cleanness and purity of the body and the soul, therefore, it is frequently placed as a holy element in *howz,* while indicating the centrality of the courtyard. *Howz* with stagnant water also gives impression of the purity of mind, the state of peace and silence in both Persian architecture and gardens. The *howz* can be used for not only its spiritual meaning, but also bathing or ablution in mosques, regarding functionality, can be also used for theatral plays where people sit all together around it for entertainment.

[158] Esmaeil Zarghami, Dorsa Fatourehchi, "The Symbolic Role of Water in Iranian- Islamic Architecture Based on Spirituality," in *European Online Journal of Natural and Social Sciences* no. 3 (2015): 121-127.
Symbolic value of water element located centrally at the court was also described in Ardalan & Bakhtiar, 35.

[159] The *4-iwan* scheme was a courtyard formation that was composed with 4 *iwans*/hollow vaults located cross-axially around the central open court. The use of the *4-iwan* scheme could be traced back to the palaces of Mesopotamia. In Seljukid era, this scheme was utilized for mosque architecture for the first time, which continued as a Persian mosque typology. See; Ali Uzay Peker, "The Monumental Iwan: A Symbolic Space or A Functional Device?" *Metu Journal of the Faculty of Architecture*, no. 1 (1991): 7-8.

Another project that Utzon had emphasized the water element in a rectangular pool is the competition project for the Wolfsburg Theatre (1965), which had the fourth prize. The front plaza of the building houses one urban-scale pool between the urban fabric and small hill **(Fig. 31).** This scheme was identical to the urban *howz* at Naqsh-e Jehan square (میدان نقش جهان) in Isfahan, in front of the Masjid-I Shah (مسجد شاه) in particular, regarding its rectangular and central *howz* allocation juxtaposed with oblique axis of the rectangular building in a symmetrical layout. Both buildings were obliquely aligned within the plaza where the two main axes were interlocked; the Masjid was aligned to the *qibla* directed to the sacred domain, whereas Wolfsburg Theatre oriented itself towards nature, orthogonal to the cliff. The nature of the urban fabric of Wolfsburg with two interlocking axes inherited regulated lines, creating separated units with individual courts – this manner of regulated lines could be traced in *Kufic* calligraphy references of which are described in the earlier projects of Utzon.

The entrance of the front court of the Wolfsburg Theatre had a decreasing roof form opening up to a curved domical space, reminiscent of the entrance *iwan* of the Masjid-I Shah, directing to the courtyard through interconnected dome and vault structures **(Figures 31, 32)**. After the entrance to the court, the circulation route of Wolfsburg was divided into two symmetrical approaches, identical to the movement at the internal court of Masjid-I Shah after the entrance from the Maidan. At the interior structure of the Wolsfburg, the roof height firstly increases and decreases to cover the entrance hall. This form should refer to the interconnected domical structure and the entrance *iwan* of the Masjid-I Shah **(Figure 32)**. The roof system was consisted of an array of semi-detached circular elements, which is parallel to the sense of rhythm and procession achieved in the side halls of Masjid-I Shah, where small-scale domes are placed per each individual room. To arrive at the main auditorium of the main theatre hall, users were directed to a series of spaces that in floor level descends, analogous to the interior organization of the traditional Iranian mosques. In parallel, the roof form increased upwards as the floor level of the main auditorium decreased towards the stage area, a concept referenced to the Iranian examples pursued previously in the Zurich Theatre. In the Wolfsburg Theatre, interiors were illuminated indirectly by the skylights above that emerged from the roof form itself, similar to the traditional examples referenced in Melli Bank's roof.

3.9 Conclusion

Throughout his lifetime career, Utzon had a perpetual interest in world cultures in which Middle East being one of them and bearing an important role in his architectural creation, such as China and Japan. Young Utzon not only gathered a collection of readings about the Middle Eastern building culture, but also studied prominent historical monuments and places onsite. This resulted in his interpreting the ideas and ideals of the Middle East inherent in his work as a source of inspiration. However, Utzon had no intention to imitate the Middle East in any way, but to refine his architectural synthesis through his perception of the studied subjects.

In his 1959 trip, Utzon studied the Masjid-i Jamii of Isfahan onsite before the design process of the Melli Bank, during revisions of the Sydney Opera House. His receiving of the *iwan* form, *four-iwan* scheme and *muqarnas* of the Masjid-i Jamii provided sources of inspiration for the shell structure and internal arrangement of the Sydney Opera House, besides the expressive tilework quality. For the Melli Bank, Utzon was able to create a hierarchical internal space organization and processional movement referring to the Masjid-i Jamii of Isfahan. Furthermore, the roof form and ceiling of the Melli Bank created a whole, defining the space underneath while providing illumination, akin to the Islamic architecture he perceived in Iran. The Market in Elineborg was the first commercial project in Utzon's career, which he allocated under the ground level similar to the Grand Bazaar of Isfahan. It was organized within a central square plan, and covered with a roof form ascending to the central point in section and carried with columns for the first time, inspired by the use of columns and domical roofs in Islamic architecture. In Silkeborg Museum of Art, one could observe the use of curvilinear form where the roof and earthwork were fused as a whole around a central space, resembling the *Aminoddole Plaza* of the Bazaar of Kashan that Utzon visited.

Utzon perceived that, in Islamic architecture, especially in the historical buildings survived from the Safavid period in Iran, the ceiling was composed with the roof form as a whole, composed with circular patterns. At the same time, Utzon further experimented with the roof form, combining curvilinear surface geometry and circular form, inspired from the vernacular, domical roofs of historic Isfahan. This resulted in the early transformation of his "Plateaus and Platforms": the ceiling was added between the roof-earthwork juxtaposition and representing roof forms. Furthermore, the roof form was combined and further fused with the earthwork to present the building with a smooth transition between two geometrical systems – roof/sphere and podium/square, such as arches and

squinches in *iwans* and *muqarnas*. What is more, the internal organizational aspects of the historical monuments in Iran became an inspirational source for Utzon: the use of centralized plan and a processional movement through a hierarchical arrangement of spaces and built forms and a coherent expressivity between the roof forms and interior spaces was designated similarly. Within this articulated arrangement, the floor level of the building was formed to descend after entering the building while the roof form ascends, akin to the congregational mosques Utzon perceived.

CHAPTER 4

FROM “PLATEAUS AND PLATFORMS”

TO “ADDITIVE ARCHITECTURE”

4.1 The limitation and weaknesses of the “Plateaus and Platforms”

In his 1962 “Plateaus and Platforms” manifesto, Utzon conveyed the importance of his travels and cross-cultural experiences as profound sources of inspiration. This publication included his iconic Sydney Opera House (1956) which inherited the Chinese dualistic principles and was based on the notion of historical monumentality above the urban-scale platform. With the shell roof structure and the podium, the roof form and the earthwork could be totally separated and add to its monumentality. Another project from his manifesto was the 1959 Melli Bank, another institutional building with a narrow front embodied with the idea of the platform, with historical references to the ancient Persian building culture. The following project, 1960 Market in Elineborg continued to inherit similar references from historical bazaars located partially underground, while combining a modular and Chinese inspired roof within the dualistic setting of “Plateaus and Platforms”. As visible from this Market, Utzon not only published buildings within the monumental institutional scale but also at an urban scale, such as the 1958 High School in Elsinore project, the competition projects for the Copenhagen World Exhibition at Amager (1959) and Development of Elviria project (1960). For the High School in Elsinore project, Utzon created a square court and juxtaposed curvilinear roof forms to the urban scale platform to emphasize the contours of the landscape. The

Copenhagen Exhibition was developed around a similar central urban scale podium, enveloped with continuous platforms and extended modular roof elements. The Elviria project, on the other hand, was composed with cascading platforms over topographic contours and arrayed modular roof elements, without a central court.

In 1970, Utzon published his "Additive Architecture" manifesto, which was an 'anti-thesis'[160] of the "Plateaus and Platforms". The monumental and monolithic roof/earthwork juxtaposition of Utzon for his institutional buildings began to be dissolved, especially after the three theatrical projects; namely the 1962 Madrid Theatre, 1964 Zurich Theatre, and 1965 Wolfsburg Theatre[161]. In the manifesto, the 1966 Farum Town Center was an urban development that truly embodied the additive idea, while having the natural phenomenon represented within its principle of natural 'growth'. Followingly, the 1969 Espansiva building system added to this 'growth' theme by allowing for a unit-based, prefabricated modular construction, as part of a solution for the housing.[162] The 1969 Export College in Herning further utilized the prefabricated modules for an institutional complex, combining middle eastern ideas for the roof-earthwork connection and urban planning. Lastly, the 1969 Stadium in Jedda was composed of prefabricated concrete units and as Utzon stated, was created to respond to the climatic conditions and movement patterns.[163]

In 1995 *Studies in Tectonic Culture*, Kenneth Frampton mentioned Utzon's anti-Eurocentric world view being ingrained in his ideas for the projects, accompanied by his cross-culturation.[164] However, Utzon's cross-culturation should be deeply rooted in his reading of the Chinese writer Lin Yutang. Lin Yutang conveyed the importance of experiencing different cultures through travel and appreciating their historical monuments.[165] Utzon had study trips to Japan and China, in 1957 and 1958 respectively, with the knowledge he gained from Osvald Sirén's books together with Tobias Faber. Furthermore, Lin Yutang's idea of receiving nature through architecture from his 1937 *My Country and My People*[166] could be the origin of Utzon's criticism towards superficial historicism and functionalism. Utzon's platform reflected Lin Yutang's idea of receiving nature through created architectural space, especially in his Langelinie Pavilion and Sydney Opera House. In "My Country and my People and Sydney Opera House: The missing link", Chiu argues the role of Lin Yutang's ideas on Utzon's travelling and receiving nature through his platform. Regarding his 'Plateaus and Platforms', Utzon's iconic dualism was achieved between

[160] Frampton, 260.
[161] The three theatrical projects were published in 1965 *Zodiac* alongside Sydney Opera House.
[162] Utzon, *Logbook vol. V, Additive Architecture*, 54-55.
[163] Utzon, *Logbook vol. V, Additive Architecture*, 54.
[164] Frampton, 247-248.
[165] Chiu, Goad, and Myers, "Ideas and Ideals inside Utzon's Courtyard Houses: Dwellings, Nature and Chinese Architecture," 5-8.
[166] Lin Yutang, *My Country and My People* (London: W. Heinemann, 1936)

his platform and also the monumental roof. Utzon's receiving of the Chinese Dualism should be mainly through his readings of Sirén, especially from his *1929 Early History of Chinese Art*. As the Yin and Yang, Utzon could represent nature through the dualistic setting of his roof-earthwork juxtaposition. The earthwork could be referred to the historical monument and human culture, whereas the roof could represent the natural phenomena. Followingly, through dualism, a similar monumentality was achieved compared to classical Chinese architecture. Utzon's conceptual sketches for the 'Plateaus and Platforms' represented this notion, with the platform totally separated from the floating pagoda roof corresponding to the floating clouds over the natural plateau. In "The metaphorical expression of Nature in Jørn Utzon's design for the Sydney Opera House", Chiu further exemplifies the role of Chinese dualism received from Osvald Sirén in the "Plateaus and Platforms" buildings.[167]

In "Ideas and Ideals inside Utzon's Courtyard Houses: Dwellings, Nature and Chinese Architecture", Chiu studied two of the houses within his 'additive' theme, namely the 1969 Espansiva housing system and 1969-77 Prototype for Uno-X in Herning.[168] The Espansiva reflected traditional Japanese houses[169], and the Uno-X was more related to the historical houses of Iran where a single room embodied a single individual roof form. Regarding 'Additive', it should be investigated why and how the monumental roof-earthwork juxtaposition was resolved as only these two houses were previously studied carefully. The 'Additive' theme introduced different and distinct terms such as prefabrication and on-site assembly, which would allow for the building complex to organically grow and be modified after the construction was complete. The disappearance of Chinese dualism and references to classical Chinese architecture was followed by the references of natural growth and architectonic expression of a historical settlement. Regarding architectural form, the monolithic and monumental roof form was dissolved, the roof was strongly integrated and bound to the earthwork.

This chapter will try to answer the following questions: What is the relationship between the 1962 "Plateaus and Platforms" and the 1970 "Additive Architecture" manifestoes, and why and how Utzon transformed his ideas and ideals between the two manifestoes? What was Utzon's motivation to develop 'additive' system after his iconic dualism? Why did Utzon discontinue the use of monumental, monolithic roof form and instead dissolved the

[167] Peter Myers, "Une histoire inachevée," *l'Architecture d'Aujourd'hui* no. 285 (Paris: Fevrier, 1993), 60–68.
Peter Myers, transcript from Skyver, *Joern Utzon*, a film by Pi Michael for Danmarks Radio, Copenhagen, 1994.
Peter Myers, "Joern Utzon," *The Journal of Architecture*, 3:4(1998), 301-309.
Tobias Faber, Johannes Prip-Møller, *A Danish Architect in China* (Hong Kong: Tao-Fong-Shan Christian Center, 1994).
Francoise Fromonot, *Jørn Utzon: The Sydney Opera House*, (Milan: Electa, 2000).
Philip Drew, *The Masterpiece, Jørn Utzon: A Secret Life* (South Yarra: Hardie Grant Books, 1999).
[168] Chiu, Goad, and Myers, "Ideas and Ideals inside Utzon's Courtyard Houses: Dwellings, Nature and Chinese Architecture," 15-19.
[169] Weston, *Utzon: Inspiration, Vision, Architecture*, 252-253.

roof/earthwork juxtaposition? To be able to argue the rationale behind the transformation between Utzon's two manifestos, this chapter specifically focuses on the time period between the 1956 Sydney Opera House and 1968 Silkeborg Museum of Art. For the built and unbuilt projects within this period, comparative analyses are served to indicate the development and diversity of his ideas. The 'additive' should be served as the solution of different architectural typologies within three scales; firstly, the housing, secondly the institutional buildings, and thirdly the urban complexes.

4.2 The Courtyard Houses

After the initial design schemes of the Sydney Opera House, the evolution of Utzon's 'Plateaus and Platforms' design principle was developed within two different idioms: the square courtyard plan; and the processional movement with a narrow front plan. Utzon's use of the courtyard with a central square plan could be traced back to his 1953 Skanska Housing Competition scheme (**Figure 11**). This was developed with the idea of living in nature similar to the 1950 Hellebaek house, to create an ideal of private family life in nature[170] combined with the dualistic setting of the plan[171]. In 1956, his idea of the square plan continued to develop with the Kingo Houses (**Figure 13**), and housing units were added to each other following curvilinear topographic lines. This idea allowed him to create an urban scale courtyard, to "protect and preserve nature"[172]. In 1959 Fredensborg houses, the courtyard was developed to preserve and represent nature, similar to the Kingo houses (**Figures 12, 13, 14**). The rooms faced inward to view the preserved nature of the courtyard, and the housing units viewed and interrelated to the natural surroundings of the urban courts. In both Kingo and Fredensborg houses, it was possible to observe clear Chinese dualistic principles. Following Sirén's approach, not only the architectonics and material selection, but also the planning of Kingo houses represented the dualism.[173] In Fredensborg houses, similarly, the public/served and private/serving areas mirrored each other diagonally within a dualistic setting[174]. Furthermore, these internal spaces could directly receive and be interrelated with the metaphorical nature of the court. This composition could represent the fundamental concept and the courtyard arrangement of Utzon's 'Plateaus and Platforms'.

[170] For Lin Yutang's influence, See; Utzon, *Logbook vol. I: The Courtyard Houses*, 517. For inspiration from Aalto's Saynatsolo central court, see; Jørn Utzon, *Logbook vol. I: The Courtyard Houses*, 524.
[171] For inspiration of Lin Yutang and Osvald Siren, see Utzon, *Logbook vol. I: The Courtyard Houses*, 537.
[172] Utzon, *Logbook vol. I: The Courtyard Houses*, 537.
[173] Ibid.
[174] Ibid.

In 1958, Utzon designed the Banck House, which transformed the idea of the central square courtyard (**Figure 34**). It was developed from his 1950 Hellebæk House and further enlarged by interconnecting two additional courtyard settings **(Figure 68)**. In the Banck House, as the scale of the building enlarged, firstly the relationship between internal spaces and the nature was transformed. The private areas of the house were not planned to view the natural surroundings and the preserved nature. Instead, the one using the corridor path could simultaneously view inside the private spaces. Secondly, the distinctive dualistic principles of Utzon's planning were changed and became unclear. The serving and served areas were not mirrored or counterbalanced as previous, conveying that the dualistic principles might not suffice for the larger scale housing scheme. And thirdly, the spatial organization and hierarchy of spaces were transformed. The sequence of earthwork and lack of transitional space did not complement the internal organization. The circulation inside the house was transformed to one longer and continuous corridor, it was utilized to serve every user without a clear spatial hierarchy.

Following the Banck house, the 1960 Herneryd House was formulated with the idea of monumental roof-earthwork juxtaposition for Utzon's larger scale housing (**Figure 22**). The continuous and monolithic roof with extended curvilinear eaves was juxtaposed to the descending earthwork, as monumental roof form marked the roof/earthwork dualism. As the earthwork was cascaded, however, the roof did not ascend or descend to follow that transformation of the earthwork. As the built form was concerned, Utzon located one large central courtyard in contrast to the Banck house, which was transformed and totally enclosed within the complete square layout. Nonetheless, the central courtyard was to formulate the circulation of the house, instead of directly receiving preserved nature. Because of the courtyard being eventually surrounded by the circulating corridor, the purpose and ideal of the courtyard were totally transformed from the earlier 'Plateaus and Platforms' theme. Meanwhile, this allocation of spaces struggled to provide the views of preserved nature of the central court and interrelate to the natural surroundings. Unlike Utzon's earlier houses that followed Lin Yutang's notion of receiving nature[175], the courtyard was transformed and was not a means of receiving the preserved nature. Furthermore, not only previous ideas and ideals from China, but also the internal spatial qualities such as circulation and spatial organization were transformed. The orientation of circulation was transformed into a rotational movement around the center with the circulating corridor. However, the progression of the horizontal roof was axial and was similar to earlier projects with the processional plan and narrow front, which did not follow the new rotational internal circulation.

[175] Chiu, Goad, and Myers, "Ideas and Ideals inside Utzon's Courtyard Houses: Dwellings, Nature and Chinese Architecture," 5-8.

From the Skanska housing competition to the Herneryd house, the roof was gradually separated from the earthwork and the platform. The roof evolved to a monumental and expressive form with extended eaves within the courtyard scheme. Eventually, the ideas and ideals of Utzon's earlier courtyard houses were diverted, especially after the growing significance of his iconic dualism and roof/earthwork juxtaposition, following the Sydney Opera House. This could imply that, during these larger scale courtyard housing projects, Utzon's 3 fundamental ideas of earlier courtyard scheme were changed. The first was to incorporate monumental roof-earthwork juxtaposition to the housing scheme, which resulted in transformed internal organization and lack of spatial hierarchy. The second, the larger scale housing scheme could not follow Lin Yutang's principle of 'a place of receiving the preserved nature'[176]. The rooms did not respond to natural surroundings and did not view and relate to the preserved nature of the courtyard. The third, the use and ideal of the courtyard were transformed to formulate the internal organization and circulation rather than preserving and receiving nature, while the use of dualistic principles to organize space was no more efficient.

4.3 Institutional Projects and the Courtyard Scheme

The central courtyard scheme of Utzon was not only used for courtyard houses, but also for the following institutional projects. The first example was the final scheme of the 1958 Hojstrup High School Competition entry **(Figure 35)**. Utzon's central square court was combined with the ideas of dualistic principles to organize both the built form and spaces. This could lead to a lack of hierarchy and clarity in both of forms and spaces. Within the site context, the building complex was totally isolated from the surroundings as a whole, due to its monolithic and monumental urban-scale podium. Moreover, the complete classrooms around the central square court had an inward character and were not to relate to the site and its climatic references, such as the orientation of the sun and the prevailing winds. The platform had descending levels to the central court, where the modular flat roof did not follow the transition of the floor. Meanwhile, the geometric principle of the paralleled roof slabs is not following the square central court, and the two orientations of the roof slabs did not respond to the shapes of public areas and corridors between classrooms surrounding the central court. Moreover, the roof itself utilized two different geometries of angular and spherical. The angular roof forms were for the classrooms and public areas surrounding them, and the spherical roof was for the lecture hall. However, if examined as a whole, the roof composition was

[176] Chiu, Goad, and Myers, "Ideas and Ideals inside Utzon's Courtyard Houses: Dwellings, Nature and Chinese Architecture," 6-8.

not coherent. The transition from angular to curvilinear form for the roof was not clearly resolved. As the built form was concerned, the housing tower was juxtaposed to the lecture hall in a dualistic manner. This further created two major movements inside the complex. From the main entrance to the central court and then to the housing tower, there was no well-organized spatial transition from public to semi-public and to the private domains. The movement through the main entrance to the private area required passing through the public plaza, corridors and central atrium to reach housing units. On the other hand, the lecture hall was situated adjacent to the main entrance without clear transition or processional movement seen in the Sydney Opera House. In the Sydney Opera House, the guests were directed towards the main entrance and through a processional movement to reach the hall; at Hojstrup, the square plan and central courtyard scheme had a drastic impact on the movement and hierarchy of spaces.

Utzon's following institutional project, the 1959 Amager World Exhibition Competition Scheme was also organized around an urban-scale square central court **(Figure 36)**. The dualistic principle was inherent in planning and allocation of the two sides of the court, the western side for the meeting spaces and atriums; and the eastern side shells for the cinemas and theatres. The implementation of dualistic principles to the planning could cause the complex lacking clarity and practicality. The dualistic architectural programming of two sides resulted in the un-practicality of the complex. There are no direct links between the atriums and theatres. Besides, the processional movement was established along the North-South central axis/passage outside the building complex. However, inside the building complex, the movement was dismantled by the circulation around the central piazza. This circulation made the links between the atriums and theatres difficult. Meanwhile, the two dualistic sides were enclosed around the large-scale piazza for public outdoor activities; however, the central piazza was not articulate enough to respond and relate to the internal spaces. Within the dualistic setting of the two sides, the urban-scale podium was transformed into two different platform surfaces of the east and west as solid and open. Those two surfaces were juxtaposed as completely open at the west side and completely obstructed at the east side, which could unveil spatial issues, as well as lighting and interaction to the site are concerned. For the roof, two different systems of flat-roof and shell were applied. Nonetheless, the connections between flat-roof elements to the shell structures were not clearly resolved. There was no connection indicated between roof and earthwork, which could convey the idea of the floating roof above the platform. Furthermore, the structural system to carry the roof was ambiguous, whether to use columns or structural walls.

In 1960, Utzon designed the Market in Elineborg, the first time a commercial project with a square plan situated underground of an urban-scale podium combined with projecting roof forms **(Figure 23)**. However, Utzon's iconic dualism with monumental roof/earthwork juxtaposition was interrupted by the two rows of supporting columns. The platform ascending and descending to the underground for commercial space could create an impractical movement of users and less attraction to shops, isolating the public space from the surrounding context. In contrast to the centrally organized space, the roof was still a progression and did not follow the centralized plan of the podium. This resulted not only in the conflicts between two geometric principles of the built forms but also in the tension between the roof/earthwork juxtaposition. Externally, the axial ascending/descending roof created two closed and two completely open surfaces responding to four directions of the square plan, which did not follow the podium ascending from all four sides. Internally, the two rows of columns were following the roof's progression, which interrupted the centrality of the square plan. Furthermore, commercial space was situated underground similar to the traditional Islamic bazaar, however, unlike the bazaar plan it lacked spatial expandability and growth principles. Unfortunately, the modularized roof would not purpose for expansion and addition because of the solidarity of the podium.

The institutional projects that utilized the central courtyard scheme demonstrated several weaknesses of Utzon's design. Firstly, as the scale of the building increased, the planning centered around the square courtyard was not able to provide a clear processional movement and hierarchy between spaces. Secondly, the dualism implemented on the plan and forms could result in weaknesses. The allocation of spaces according to the dualistic principle created issues of impractical or indefinite movement. The dualism between roof form and earthwork was apparent at some of the institutional projects, as well as the dualism between different types of roofs. Thirdly, following this aspect, the structure and form between roof elements and the earthwork were unclear. Fourthly, the roof forms usually did not follow the progression of the internal movement and were unable to represent the geometric principle of the central courtyard plan. Fifthly, even though the roofs were mostly composed of modular elements, monolithic podium and sculptural roof could not be modified or expanded accordingly to the future needs. These issues could result in the 'additive' principles, emerging from Utzon's staggered-plan design idiom, paralleling with his courtyard projects[177].

[177] For more information about Utzon's staggered plan for courtyard houses, see; Chiu, Goad, and Myers, "Ideas and Ideals inside Utzon's Courtyard Houses: Dwellings, Nature and Chinese Architecture," 10-11.

4.4 Urban Projects and the Courtyard Scheme

Utzon's formulation of square courtyard units within a staggered urban-scale-court plan could be traced back to his 1956 Kingo houses **(Figure 12, 13)**. His approach to formulating a master plan to perceive and preserve nature was complemented by adjoining the courtyard units. The facades with lower walls of the houses were facing the preserved nature; however, the ones with higher walls were creating negative surfaces shaping the communal paths. For the walk paths, this was unfavorable to experience nature and to the aim of shaping the sense of community. The units were not planned to have a clear spatial connection to each other, in which the courtyards became completely isolated without external space relationship. The units were intended to be strongly bound to the preserved nature, nonetheless, the views of nature from internal space could be rendered insufficient.

In 1959, Utzon designed the Fredensborg houses, which was another implementation of the staggered plan with square courtyard units **(Figure 12, 14)**. The Fredensborg houses had a more institutional background compared to the Kingo houses, therefore the organization of the houses followed a rigid curvilinear path in contrast to Kingo.[178] Within this organization, compared to the Kingo houses, the open areas allowed for a symbolic processional movement at the front where houses face nature, combined with the inclination of landscape.[179] Firstly, despite facing nature, the walls of the courtyards were high and did not provide a strong visual connection to the outside space. Secondly, the processional movement was interrupted and ended by the central square court of the public dining hall, which was not expanded through the dining hall interior. The dining hall had a back entrance at its north side to prolong the movement, however, internally it was not able to utilize the progression because of the lack of hierarchy between the back entrance and the courtyard. The dining hall's relationship to its square courtyard resembled Utzon's earlier institutional square plan schemes; the court was isolated from the housing units, and there was no transition from private units to the public dining space.

In 1966, Utzon designed the complex for the Odense University Centre competition, including faculty buildings on a spacious platform on the south and staggered faculty units on the north **(Figure 37)**. There was an irregularity in the organization of the square courtyards of the units. The articulation of spaces and walls around the courts were not to create strong spatial connections despite being utilized as a part of an urban pattern. The pattern was

[178] Utzon stated that, rather than an organic village formation, this principle could awake the sense of a historical Mediterranean town, with its houses and a 'castle'. See; Utzon, *Logbook vol. I: The Courtyard Houses*, 66.
[179] The configuration of the units created an axial progression with views at the front within preserved nature, however, the areas at the back created an unpleasant movement between negative surfaces of the house walls similar to the Kingo houses.

created by adding and rotating the wings of the units around central courts without a hierarchical rule. Eventually, units were oriented towards north, east and west irregularly. Because of the curved layout of staggered units, the growth principle of the housing complex would not follow a clear path of organization, because of the undetermined direction of growth. Another weakness of this curved layout could be the negative surfaces in-between each curvilinear row. The users approached the site from those outer spaces using vehicle and enter the house, which could not reflect the experience of preserved nature and receiving nature. The curved row of the units not only lacked a relation between the back-side of units, but also was unable to establish a hierarchy between spaces. The homogenous composition of positive spaces was different from the processional movement of the Fredensborg houses, regardless of the institutional background of the Odense University that could benefit from private to public hierarchy.

The Kingo houses represented the isolated, urban-sale court village settlement without articulation of progression movement or hierarchical master plan, which was transformed into an ambiguity between courtyard and procession with the Fredensborg houses. The courtyard of the dining hall of the Fredensborg complex was combined with the processional movement at the front, however was not able to expand the movement to the back entrance. In Odense University, the two ideas of the urban podium and staggered courtyard units were combined, and the processional movement was ended with bridges to connect with the platform. These ideas could imply Utzon's gradual implementation of processional movement to the development of courtyard units, and why 'Additive' could respond to these limitations.

4.5 "Additive" and the Axial Scheme

As discussed in previous chapters, Utzon developed his axial scheme with a processional movement for 'Plateaus and Platforms', fundamentally from his iconic 1956 Sydney Opera House. The axial progression created within the iconic dualism of roof-earthwork juxtaposition was served as a solution for the movement of thousands of guests coming to the Sydney Opera House **(Figure 38)**. Utilizing the ascending earthwork and urban-scale platform, the processional movement was followed by a sequence of spaces from the concourse area to the interior circulation of two Main Halls, to create a clear hierarchy as opposed to the central courtyard scheme. In 1959, Utzon implemented the axial scheme and processional movement for another institutional scale building, the Melli Bank **(Figure 21)**. Developed from both the Sydney Opera House and earlier courtyard schemes, Melli Bank was

composed as a progression of representational, interconnected courts[180] with a narrow front, which allowed for a transition from public to private areas in a sequence[181]. Arrangement of the processional movement within institutional scale could allow a clear hierarchy between spaces, and resolve how to combine and interconnect several courts without isolation.

The sequence and processional movement of the Melli Bank was further developed in 1963 with the Bayview House[182], as the first implementation of the axial scheme for a housing project **(Figure 33)**. For earlier large-scale housing projects, Utzon's strategy was either the addition of courtyards as wings such as the Banck house **(Figure 34)**, or the use of a single and larger courtyard at the center, such as the Herneryd house **(Figure 22)**. Consequently, the processional movement of the plan could be served as a solution for the Bayview house, which responded to the lack of hierarchy and unclear circulation route of earlier courtyard houses. The spaces of living, sleeping and working were separated into three blocks, each had its axial composition to clearly divide the serving and served areas. This allowed for the processional movement within one axis inside the house to transfer between spaces as interconnected courtyards, and using a bridge to connect the two blocks of living and sleeping. The narrow front and processional movement complimented the orientation of the volumes and the views of rooms that were not as efficient in the Banck house and the Herneryd house.

Utzon utilized the processional movement with narrow a front at an institutional scale for his theatrical projects as well, namely the 1962 Madrid Opera House, 1964 Zurich Theatre and 1965 Wolfsburg Theatre **(Figure 39)**. Similar to the Melli Bank composition, each project was organized with a series of spaces following through the main axis combined with the processional movement. Utzon's iconic monumental roof-earthwork juxtaposition was inherent in these projects, furthermore, the roof form and platform could ascend and descend to articulate the movement and the space **(Figure 40)**. Another step towards the 'additive' could be the modularized roofs, as the elongated roof beams were developed in future for 1972 Kuwait National Assembly **(Figure 41)**.[183] However, there were still different types of roof geometries for the entrance halls, internal spaces and the theatrical halls. In the 1968 Bagsværd Church, the roof and ceiling were uniform, and the earthwork was synthesized from the processional movement and interconnected courtyard ideas from the theatrical proposals[184] **(Figure 42)**. The

[180] Chiu, Goad, and Myers, "Ideas and Ideals inside Utzon's Courtyard Houses: Dwellings, Nature and Chinese Architecture," 16.
[181] Utzon's receiving of China had a profound impact on his Melli Bank formulation, besides Middle East. See; Chiu, Goad, and Myers, "Ideas and Ideals inside Utzon's Courtyard Houses: Dwellings, Nature and Chinese Architecture," 544.
[182] Chiu, Goad, and Myers, "Ideas and Ideals inside Utzon's Courtyard Houses: Dwellings, Nature and Chinese Architecture," 546.
[183] Utzon, *Logbook Vol. IV Prefab. Kuwait National Assembly*, 118.
[184] Chiu, Goad, and Myers, "Ideas and Ideals inside Utzon's Courtyard Houses: Dwellings, Nature and Chinese Architecture," 548.

precast concrete earthwork of the Bagsværd Church was closer to "additive" because of two features; the plan being oriented within two axes, and the expandability of spaces. Nonetheless, the monolithic and monumental roof form followed a single axis, therefore was not able to let the built form expand for future additions. This monolithic, cast-in-air roof form was eventually dissolved after the Bagsværd Church for later "additive" buildings and projects.

In 1969, Utzon designed the Espansiva building system, which transformed his earlier courtyard ideas into the 'Additive' theme while totally dissolving the iconic monumental roof-earthwork juxtaposition.[185] **(Figures 43, 44)** The system allowed for a modular construction that utilized wooden posts and beams anchored on a concrete beam foundation, which was capable of creating different variations of spaces to build prefabricated houses. Even if the 1969 prototype was built following the Kingo house scheme, the system could create more complex units while allowing for flexible combinations of spaces. Different Espansiva housing examples demonstrated that the axial scheme from the Bayview house was to transform into two perpendicular axes, and the roof allowed for expansion of earthwork for the first time. Compared to the single-axis processional movement, the 2-axes organization dissolved the dualistic planning and featured a clearer circulation and separation between serving and served spaces in any given setting. The modules could create a single courtyard similar to Kingo, multiple courtyards similar to the Banck house, or smaller units without a courtyard. Both of those settings could expand and grow, to be modified into more complex houses. The urban formation of these variations was not planned to be strongly related to each other, sustaining the private life within isolated setting of the courtyard house.

In 1969 after Espansiva, a similar modular building system was to be implemented for the prototype for Uno-X, at an institutional scale rather than housing scale **(Figure 45)**. The modules of this system could be arranged to create the campus for the Export College in Herning, including classrooms, halls, residences and circulation areas **(Figure 46)**. The major difference of the single unit for the Uno-X compared to the Espansiva was the roof, which was truly separated from the earthwork above the door height. The earthwork followed the horizontal line of the door height all-throughout the building so that the roof forms could be easily prefabricated and located accordingly to be able to "resolve the desired volumetric quality and lighting of the rooms" [186]. Furthermore, this dissolved roof idea with single forms for each room could favor the earthwork to be expanded and modified freely in

[185] For the role of China and Japan in Espansiva, see; Chen-Yu Chiu, Philip Goad, Peter Myers, "Ideas and Ideals inside Utzon's Courtyard Houses: Dwellings, Nature and Chinese Architecture," 17-19.
[186] Forés, 254.

comparison to his earlier Institutional projects such as the Hojstrup Highschool. The consistency of roof and earthwork geometry allowed for a better connection and articulation of spaces both vertically and horizontally, as the juxtaposition between the roof and earthwork continued at the same time. These ideas behind the Uno-X system should be closer to Utzon's receiving of the historical monuments of Iran, compared to the Espansiva which embodied influences from China and Japan.[187]

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n the same year, the Uno-X system was to be utilized for the scheme of the Export College in Herning, a campus complex centered around the "additive" principle **(Figure 46)**. The complex was composed of groups of buildings functioning as students' residences and the principal's house at the North, and classrooms at the South. Similar to the Odense University complex, the entrance of site was from the residential area, followed by the public area without a gradual transition. The houses were similar to Utzon's staggered plan with courtyards and walls. At South, the classrooms were organized within growing blocks, each surrounded with walls and interconnected to each other with long corridors. The smallest unit was the representative of the final form, with growing wings on two perpendicular axes and forming a central courtyard. Internally, the "additive" principle and the plan lay-out within two axes provided a clearer circulation system for the plan compared to the Hojstrup High School. Nonetheless, as Utzon's courtyard idea from the Hojstrup was still embedded during the transformation towards "additive", which resulted in the ambiguity on how to utilize the courtyard space. The ideas of modularity and linkage between expandible building volumes were referred to the 'organic growth', a typology that provided a connection between institutional building and urban development. However, when combined with the previous ideas from the courtyard scheme, the three blocks lacked a clear spatial connection and movement experience in between. The corridor system that transformed into internal spaces was not able to provide more than a passage, without the experience of processional movement or hierarchy of spaces. Furthermore, each block was surrounded with walls, isolated from surrounding spaces and only provided views to the internal court. The idea of the monumental walls could be referred to the historical town to respond to the urban surrounding. However, the enclosing and obstruction of the flexible units were not coherent with "additive" principle and receiving nature. On the opposite, the walls added to the isolation of classrooms and common areas, which would require interrelation differently from the staggered houses.

[187] The growth principle of "additive" theme, combined with the continuous movement, and articulation of spaces by manipulation of the roof form could be generalized as features of the traditional public architecture of Persia and the Islamic city. In Espansiva, the influences of China and Japan were mentioned in; Chen-Yu Chiu, Philip Goad, Peter Myers, "Ideas and Ideals inside Utzon's Courtyard Houses: Dwellings, Nature and Chinese Architecture," 17-19.

The idea for the urban solution within "additive" was from the 1966 competition scheme for the Farum Town Center **(Figures 47, 48, 49, 50)**. The prefabricated units were flexibly composed to create an urban structure that could organically expand around a central urban-scale plaza, similar to the Grand Bazaar of Isfahan. The unit of the Farum Town Center had several differences and strengths compared to the unit for the Uno-X system. The spherical form for the street units were from the *muqarnas,* a decorative unit used at the ceilings of domes and vaults in historical monuments of Iran.[188] This form allowed for an integration to the earthwork, hence to the vaulted structure of the shops of the Farum Town Center. Another strength of this form was to add to the flexibility of the unit compared to the Uno-X, which could compose a curvilinear plan to respond to the two axes from the Uno-X composition. The "additive" layout was combined with the historical sense of the curvilinear streets, which was a transition from the composition with monumental walls and corridors. These features evoked the sense of the historical Bazaars which Utzon had studied onsite in Isfahan and possibly Kashan, to establish the "additive" theme and the processional movement at urban scale.[189] The implementation of "additive" at resolved several weaknesses of earlier "Plateaus and Platforms" schemes. Firstly, the dualism of the plan was dissolved and a continuity of processional movement was established, which was improved from the Amager World Exhibition. Secondly, the practicality of the movement was improved because of the merging of two axes composition and with strong interaction to the urban plaza. And thirdly, the composition of spaces was transformed to have a clearer hierarchy, allowing for a defined composition compared to the Odense University Center. Furthermore, the articulation of internal spaces and streets combined with the hierarchical composition became more suitable to expand within certain directions. The experience of space within negative surfaces of the Odense University was transformed from the dualistic setting to the bazaar setting, in which the user had no need for interaction with the back-side of shops or the parking spaces.

Following the Farum Town Center's ideas, Utzon's central courtyard idea was finally replaced by the processional movement for institutional scale as well, in 1969 Silkeborg Museum of Art II **(Figures 51, 52)**. The original idea for the Silkeborg II was from the 1966 Farum Town Center, to use the prefabricated units to create diverse movements within branches, representing the organic growth. There were two major types of units; the smaller unit was to be utilized for serving spaces, facility cores, and corridors; and the larger unit for the exhibitions and

[188] For Utzon, *Muqarnas* should be to help composing a smooth transition between the earthwork and roof, as Utzon observed in Masjid-i Jamii of Isfahan.
[189] In regards of his observation of Isfahan onsite, for the Farum Town Center, Utzon himself stated: "…In consequence, the town center has been designed as a closed bazaar with a few architecturally emphasized entrances, but otherwise turning its back to the surroundings." Source: Forés, 246.

dining area. The earthwork and the roof were well integrated for each unit, and the units were able to be combined in a curvilinear composition. In comparison with the Herning, this feature allowed for the integration of two perpendicular axes and used for creating smooth and gradual transition between spaces. The entrance area, which could be the root form of the branches, directed the user to the exhibition halls, and ended with the dining hall that receives nature as an extending platform over terrain, after the processional movement. The plan demonstrated a sequence and hierarchy of spaces, to be grown with clear steps of phases of the building as exhibition halls and restaurant were to be added. As the courtyard was becoming dissolved, the preserved nature was relocated in between the branches of the exhibition halls; a gesture that made the built form respond in a more open way towards the natural surroundings. Compared to the Herning, the need of the monumental walls disappeared, hence the added spaces were strongly connected to each other, continuing the processional movement. Instead of the walls, the sense of the historical city could be referred with the curvature and branching of the plan.

In 1967, Utzon designed the Stadium in Jeddah to implement his "additive" ideas and ideals further from the Farum, combined with new formal characteristics to respond to the climatic condition of Saudi Arabia **(Figures 53, 54, 55)**. In the Jeddah, the idea of the courtyard was further transformed to integrate within the urban surrounding similar to the Farum. Each of the courts and units were carefully located to respond to the surroundings and the function of the complex varying in size and form, developing the "additive" ideas further in 3 different aspects. Firstly, the difference of the formation of units around flexible courts created a structural and spatial hierarchy while corresponding more flexibly to the functions. The monumental units were utilized to create larger courts and smaller units to create courts of utility and served spaces. Secondly, connection between units were improved to emerge the curvature of the plan with less triangular left-over space in-between the units. The movement areas and seating were covered with the prefabricated faceted structure, rooted from Utzon's receiving of the Islamic *muqarnas*, which allowed the form to be flexible to create curvilinear compositions. Different curvatures with decreased radius from the Farum were implemented for complexes of different functions, and as the unit typology changed, better implementation of *muqarnas* were improved in comparison to the Farum and the Silkeborg. Hence, the movement connecting these courts were more directional with processional movement compared to the Farum, as in contrast to the Farum the user was directed through the facilities/serving areas of the complexes. Thirdly, following these aspects, the complex responded to the surroundings with positive surfaces compared to the Farum, with a more functional execution of the bazaar formation idea. Courtyards could be formed

in variance between the isolated setting and with an outward character according to function, followingly, the units could respond openly without an enclosure of a wall system.

As the 'Additive' plan was compartmentalized within the 2 perpendicular axes, the narrow front form was transformed and the iconic monumental roof of the "Plateaus and Platforms" was dissolved into plural single roofs for each room. The disappearance of the roof-earthwork juxtaposition helped to establish the 'additive' theme, which introduced 4 different improvements to the earlier schemes of the "Plateaus and Platforms". Firstly, the idea of the urban scale plaza was transformed into multiple courtyard units combined with the ability to expand within certain composition. Secondly, the dualistic principles for planning and architectural planning disappeared, which improved the quality and practicality of movement. Thirdly, the courtyards became strongly interconnected to each other utilizing two perpendicular axes, which gradually dissolved the isolated setting. Thirdly, the courtyards responded to the functional requirements of the complexes and the surroundings, becoming open or shaded, enclosed or semi-enclosed. And fourthly, a processional movement was incorporated through courtyard units, accompanied with a clearer hierarchy of spaces.

4.6 Conclusion

Utzon's ideas and ideals for the courtyard house from the 1953 Skanska competition continued to be developed with 1956 Kingo and 1959 Fredensborg houses, and began to be transformed with the 1958 Banck house following the enlarged scale of the scheme. The early implementation of the processional movement was combined with the multiple courtyards, resulted in the change of the ideal of the courtyard scheme. With the multiple courtyards served as an addition to the 1950 Hellebæk house scheme, the clear hierarchy of the plan was reduced, and courtyard idea of receiving the preserved nature was replaced by utilizing courtyard within circulation of the house. The idea of multiple courtyards was transformed into a single and larger-scale courtyard with the 1960 Herneryd House, creating a rotational circulation. The lacking clarity of the courtyard idea regarding the nature was continued, while Utzon implemented his iconic dualism from the 1959 Sydney Opera House. Eventually, monumental roof-earthwork juxtaposition was utilized for the new housing scheme, as well as the dualistic principles for the planning of the house, which could transform the ideal of the courtyard house scheme.

Utzon's courtyard scheme was served as a foundation for several institutional-scale projects, firstly for the 1958 Hojstrup High School Competition entry. The dualistic principles were inherent for the planning and architectural programming, which combined with the urban-scale central plaza, could create an impractical and indefinite movement and lack of hierarchy between spaces. Furthermore, the isolated setting of the courtyard house was combined with the monolithic and monumental urban-scale podium, and the dualistic roof composition. For the 1959 Amager World Exhibition Competition Scheme, a similar dualism was inherent for the planning as well as roof systems and surfaces. Both projects were planned as a combination of the urban plaza and the processional movement, within the dualistic principles. These not only affected functional and practical requirements of the complex, but also the interaction and definition of the central plaza. In 1960, Market in Elineborg, the idea of the central, isolated court was combined with the progression of modular roof, which could create structural ambiguities as well as the monolithic podium restricting the modular roof to be expanded or modified.

The courtyard scheme was partially contributing to Utzon's urban formation especially from his staggered plan, tracing back to the 1956 Kingo houses. Symbolically, the processional movement was incorporated to the staggered plan for the 1959 Fredensborg houses, emerging from the institutional background of the project compared to the Kingo. The processional movement was ended with the isolated central court of the dining hall which could not expand the movement towards back entrance, also lacking transition from public to private spaces. The lack of transition and hierarchy was continued with the 1966 Odense University Center competition scheme, creating an unclear path of organization within urban development. Furthermore, the use of the urban podium for the Odense University was concluded with bridges connecting to the staggered courtyard units as part of processional movement, which in overall created an ambiguity between processional movement and the courtyard.

The "additive" was a response to resolve the previous weaknesses of the "Plateaus and Platforms" scheme, to implement the processional movement within axial scheme, to create a hierarchical urban development centered around the idea of 'growth'. Utzon implemented the axial scheme for processional movement, which was from the 1956 Sydney Opera House and developed in the 1959 Melli Bank as an interconnection of courts with narrow front. This formula was served as a solution of the previous housing schemes with the 1963 Bayview House, to respond to the lack of hierarchy, views towards nature and unclear circulation routes. Combined with the Melli Bank formula, the roof was being transformed to be modular with elongated elements, implemented for the theatrical projects of the 1962 Madrid Opera House, 1964 Zurich Theatre and 1965 Wolfsburg Theatre. On the

other hand, the two-axes scheme was implemented for the planning of the 1968 Bagsværd Church, which would be the key idea to make the earthwork be able to expand, while the roof was still monumental and cast-in-air.

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he "additive" implemented on housing system in 1969 for the Espansiva building system, as the roof and the earthwork both allowed for expansion and modification of spaces within 2-axes planning. With the dualistic plan being dissolved, the circulation and programming became clearer, and the roof was able to complement the spaces with one-roof per one-room strategy. After the Espansiva, a similar modular system was developed for an institutional building for the 1969 prototype for Uno-X. This system was for the 1969 Export College in Herning, transforming the 2-axes plan into urban scale to represent the natural 'growth'. For the Herning, a corridor system was to linkage between modular blocks isolated with monumental walls referring to the historical town phenomenon, which were not coherent to establish the experience of processional movement and result in ambiguity between representation of nature and human culture.

The differences and weaknesses seen in the Herning were changed and progressed within the urban scale, for the 1966 competition scheme for the Farum town center. Inspired from the historical Iranian bazaar, the units were composed for a continuous processional movement, with well-integrated, flexible prefabricated units similar to Islamic muqarnas. The historical walls from the Herning were transformed to evoke the sense of historical city with curvilinear streets, and the corridors were replaced by the bazaar units with branches for organic growth. This established a continuous processional movement and clear hierarchy of spaces, and resolved the issue of experiencing negative surfaces. The urban plazas of the Farum were replaced by semi enclosed courts representing preserved nature for the 1969 Silkeborg Museum of Art. These courts were located in between branches and in strong connection with natural surroundings, in contrast to the Farum.

In 1967, Utzon designed the Stadium in Jeddah, as the "additive" theme was developed to its synthesis form, corresponding to the weaknesses seen in the Farum Town Center. For the Jeddah, the 2-axes plan composition was combined with a processional movement within an urban complex, within the largest urban scale Utzon had designed. The processional movement was more directional and arranged through facility cores, which allowed the courts to respond to functional requirements and surroundings in a more flexible way. with enhanced structural and spatial hierarchy within the urban development. The courtyards and units became more flexible to accommodate different functions, while unit-to-unit integration was improved. The relatively high-radius

curvature of the Farum was compromised and left-over spaces in-between units were resolved with stronger integration, combined with the further developed use of *muqarnas* forms. With these aspects combined, the Jeddah complex could respond to the surroundings with positive surface in contrast to the Farum, while having the flexibility to have the courts open or isolated. As the monumental roof-earthwork juxtaposition from the “Plateaus and Platforms” was dissolved and replaced by the flexible and expandible bazaar formation, the Stadium in Jeddah could mark the end of Utzon’s transformation of ideas to the” Additive”, from the Chinese dualism and representational nature to a form of pluralism and human culture.

CHAPTER 5

THE MIDDLE EAST IN UTZON'S FARUM TOWN CENTER

5.1 Introduction

"The town center is conceived as a growing structure, composed of uniform particles which can be produced from prefabricated components. The center is composed of units designed to a geometrical principle so that the components can be prefabricated in a strictly limited number of variants."

Jorn Utzon, 1970 "Additive Architecture"[190]

In 1970, Utzon had published the "Additive Architecture" manifesto, including several of his selected projects[191] from his late career. The 1966 Farum Town Center was one of the most significant, since the public space was shaped within an institutional building complex at an urban scale for the first time in his lifetime career. This planning strategy was combined with the "additive" theme, as Utzon states: "The units can be combined to form a gently curved bazaar street from which the shops and other premises can be built in stages as required".[192] This displayed a new approach to urban form, consisting of a continuous and expanding structure to configure the urban

[190] *Arkitektur* 14, 1970.
[191] In the "Additive Architecture", the projects published were the Espansiva Housing System, High School in Herning, Farum Town Center, Jeddah Stadium, Utsep Furniture and A New Angle. See; Utzon, *Logbook vol. V: Additive Architecture*, 26.
[192] Forés, 246.

fabric, centered around the urban plaza. Furthermore, the planning and shaping of the complex and the unit could be related to a deeper understanding of the specific ideas or ideals of traditional Islamic architecture in general and traditional Iranian architecture in particular, not only within the formation of individual units but also within their urban composition.

5.2 Dissolving of the Roof- Earthwork Juxtaposition

Utzon's previous "Plateaus and Platforms" projects were conceived around the idea of the monolithic platform which was juxtaposed to the monumental roof form, inspired by and implemented through Chinese dualism.[193] This approach had displayed strengths as well as its weaknesses in the context of design and construction processes, which is discussed to be fundamentally changed and therefore resolved eventually through the design process of the "additive" projects.

Several projects of Utzon either achieved or attempted to achieve a composition of fragmented roof elements to replace the monolithic roof after the Sydney Opera House. However, the Farum Town Center could connote the first time to dissolve both the roof and the monolithic and expressive platform in Utzon's lifetime career. This transformation and the role of the Grand Bazaar will be evaluated with 3 groups of analogical analysis. Firstly, the 1959 Amager World Exhibition, 1966 Odense University and 1966 Farum Town Center demonstrate the transformation in the urban context. Secondly, 1960 Market in Elineborg, 1963 Silkeborg Museum, 1965 Berkeley University Art Museum and Farum Town Center exhibit the transformation in building scale. Thirdly, 1969 Espansiva Building System, 1969 Uno-X Prototype in Herning and Farum Town Center could demonstrate the transformation in unit scale.

5.2.1 1959 Amager World Exhibition, 1966 Odense University and 1966 Farum Town Center

When Utzon's larger-scale urban plaza firstly appeared in 1959 Amager World Exhibition, it merely represented the monumental roof-earthwork juxtaposition **(Figure 36)**. The central court of the Amager World Exhibition was situated without interaction with the internal surface of the building volume, and the singular, monolithic court

[193] Chiu, Goad, and Myers, "The Metaphorical Expression of Nature in Jørn Utzon's design for the Sydney Opera House," arq 19, no. 4 (December 2015): 392-394.

composed with the monumental platform was not able to be articulated and be part of an architectural promenade to the user. In 1966, Utzon designed the University Center in Odense as an urban development to combine his courtyard scheme for teaching blocks and his roof-platform juxtaposition for communal activity spaces, juxtaposed with a dualistic approach **(Figure 37)**. The disconnection that emerged from this dualism was resolved in the Farum Town Center by dissolving the roof-earthwork juxtaposition; the need for bridges disappeared as a typical bazaar system was utilized throughout the complex. Utzon's receiving of the Grand Bazaar's strong interconnection between earthwork and roofscape could represent his idea of this transformation.

The public corridor surrounding the urban plaza of the Odense University was transformed into a flexible system at the Farum Town Center, which replaced the singular, large-scale plaza with multiple, smaller scale and well-defined plazas **(Figure 50)**. Eventually, the courtyard and platform typologies of the Odense University that were separated were able to be linked and interconnected through processional movement. In the Grand Bazaar, this linkage was made via the public corridor directly connecting a series of indoor plazas, such as *Chahar-su*s and *Timcheh*s, indirectly connecting outdoor courtyards of *Masjid*s and *Caravanserai*s, before resolving through the Naqshe Jahan Square.[194]

In the Farum Town Center, each unit of public and private domains were arranged on the ground level instead of differentiated levels for the elevated podium of the public domain **(Figure 47)**, which was disconnected from the private domain at the Odense University. In the Grand Bazaar, a similar approach was utilized for the processional movement and integration of public and private domains. As seen in the connection of the Grand Bazaar to Naqshe Jahan Square **(Figure 56)**, Farum Town Center transformed the elevated platform of the Odense University into a sunken plaza while keeping the public corridor at the same ground level.

Juxtaposed to the platform, the roof of the public domain of the Odense University was an expandable system, however, the platform would be the limitation for expandability and addition of spaces. For the private domain, the expandable courtyard scheme was served as a solution by Utzon, however with an approach route of negative surfaces, also disconnected from the platform. For the Farum Town Center, both public and private domains could expand with the "one roof-per-one room" formula as seen in the Grand Bazaar, without depending on the typology of space such as centralized or linear, open plaza or atrium. The public unit of the Grand Bazaar created a strong

[194] The connection and sequence of spaces can be seen in the plan and axonometric drawings from Klaus Herdeg, 13-20.

bond between spherical roof and earthwork per each module, utilizing the *Chahar Taq* structure[195] **(Figure 57)**, which could inspire emerging the "additive" theme to expand and add spaces through the public corridor **(Figure 58)**. In parallel to the Grand Bazaar, Utzon utilized modularized units for both public and private domains, with analogous plan schematics and connection with the roof via structural frames.

5.2.2 1960 Market in Elineborg, 1963 Silkeborg Museum II, 1965 Berkeley University Art Museum and 1966 Farum Town Center

Utzon designed the Market in Elineborg in 1960; even though Utzon's roof-earthwork juxtaposition was still inherent, the 'monumental' roof was composed of modular, repetitive, extended elements carried by individual columns **(Figures 23, 25)**. Followingly, the roof composition was closer to 'additive' in that it could be freely expanded within one system. However, the earthwork was composed of a monolithic platform that is square in plan which could not be expanded as the roof. In the 1963 Silkeborg Museum, the central planned halls were bound with roofs, which were juxtaposed to the modular roof system **(Figure 59)**. Because of the 3 different types of roofs that were either modular and crossing over halls or bound with the central planned underground halls, the spaces would not be able to expand. A parallel situation occurred for the design of the 1965 Berkeley University Art Museum; the roof was crossing over the centrally planned hall, in which the modular extended roof elements could not be expanded **(Figure 60)**. In the 1966 Farum Town Center it was resolved following the "one-roof per one-room" formula; the roof did not have to cross over multiple spaces; therefore, the roof and room could expand together as a whole. Therefore, there was a single type of roof per public and private domains separately for both linear and central-planned spaces, which allowed the complex to be expanded. This feature should be from the Grand Bazaar of Isfahan as the public unit of the bazaar was unified with a domical roof and private units had vaulted roofs, which followed the "one roof per one room" formula **(Figure 56)**.

In the Market of Elineborg, the roof was juxtaposed to the earthwork as part of the "Plateaus and Platforms" theme, which created an ambiguity to connect the roof to the platform **(Figure 25)**. This was tried to be resolved with a column system instead of a wall system, which could interrupt the central plan and provide insufficient and inequivalent enclosure of space. In the Silkeborg Museum II, these issues were resolved especially with the unified

[195] For the use of *Chahar Taq* and *Chahar Su* in Grand Bazaar of Isfahan, see; Ardalan and Bakhtiar, 105-106.

roof-earthwork composition for the first time for the exhibition halls, however, it could be impossible to adapt this solution to create an urban, 'additive' arrangement **(Figure 27)**. For the Berkeley, the roof was drastically separated from the earthwork which was very similar to the Market in Elineborg; both of the projects had a centralized square plan and axial crossing-over roof **(Figure 60)**. For the Farum Town Center, the connection between roof and earthwork was resolved at the unit scale, and the use of a singular axis for either roof or earthwork disappeared as the two axes were merged for the urban scale **(Figure 50)**. The merging of the two axes at an urban scale could be traced back to the planning principle of the Grand Bazaar which organically occurred as part of the city plan arrangement **(Figure 56)**.

The transformation to the "Additive" could also signify Utzon's transformation in the use of the angular and curved geometries. In the Market in Elineborg, the use of a curvilinear roof in sectional design was indirectly referred to the spherical roof, with ascending and descending brackets **(Figure 25)**. In the Silkeborg Museum II exhibition halls, this was transformed into a continuous curvature to compose the roof and earthwork together **(Figure 27)**, however, the curvilinear ramp circulation and spherical walls of the east and south elevations were still juxtaposed to the angular walls of the west and north entrance elevations **(Figure 59)**. The curvilinear above-ground forms of the halls were thus juxtaposed to the angular, extended roof elements, which created an issue of connection between two different roof systems and two different wall systems. In the Berkeley, the curvilinear ramp system from the Silkeborg Musum II was encapsulated within an angular plan and covered with the angular extended roof **(Figure 60)**. For the Berkeley the curvilinear geometry was not utilized to create a connection between roof and earthwork as in Silkeborg Museum II; despite the footprint and roof being both angular, the connection was still not clear similar to the Market in Elineborg. For the Farum Town Center, this was resolved by curvilinear and angular geometries being appropriated for public and private domains separately. The public domain was curved and the private domain was angular, in which the roof could interlock to earthwork in unit scale and adjust together with the curvature of the public domain. This resolution should be part of the application of the Grand Bazaar as the curvature of the bazaar street was adjusted with linear shops **(Figure 56)**. What is more, the *Chahar-Taq* was utilized for the public domain separately, while linear shops were suited with vaulted structures that could linearly expand.

For the Market in Elineborg, the central public space was situated below-ground, surrounded by an elevated platform **(Figure 23)**. A stair system was used to ascend to the platform and then descend to the underground space which partially disconnected the public space from the surroundings. For the Silkeborg Museum, the disconnection of underground halls was resolved with the ramp system **(Figure 59)**, and this solution was repeated for the Berkeley in combination with the use of cascading levels that provides better visual connection **(Figure 60)**. In the Farum Town Center, the public plaza was also situated only a few steps below ground level, thus, for the streets and entering the shops of the public domain, there was no stair or ramp system involved **(Figure 47)**. This created a direct connection and a continuous processional movement within the complex, similar to the Grand Bazaar, especially from the bazaar streets to the Naqshe-Jahan Square which was situated only a few steps below ground level. The shops of both of the Farum Town Center and the Grand Bazaar were also located at ground level for easy access, and the stair system was only used in the Farum Town Center for accessing the underground halls of several spaces of the private domain only.

5.2.3 1966 Farum Town Center, 1969 Espansiva System and 1969 Uno-X Prototype

The dissolving of the roof-earthwork juxtaposition with the "one-roof per one-room" formula of the Farum Town Center could be the precedent of the 1969 Espansiva system for the housing and the 1969 Export College in Herning and its prototype for Uno-X. In all three projects, there was an individual roof form per unit, however, the roof forms were appropriated according to the specific spaces with different strategies. In the Farum Town Center, each type of unit had its distinctive roof form according to the public and private domains **(Figure 47)**, whereas it was transformed into a compositional roof for the Espansiva System with identical pent roofs **(Figure 43)**. In the Uno-X, the roof was separated from the wall system in comparison to the Espansiva System, and it was able to define the spatial characteristics of each room by itself **(Figure 45)**. For Uno-X, even though the roof and wall system were bound to each other per unit, they were spatially divided by the horizontal frame at the door level. Therefore, the composition of roof forms could greatly differ while the earthwork is unified and more systematized **(Figure 46)** – a transformation from the Farum Town Center that combines characteristics of the "Plateaus and Platforms" theme. The uniformity of the earthwork, however, could create the issue of definition for the public space, because of the corridor system, since the unit was not differentiated as a whole for the public and private domains similar to the Farum Town Center and Grand Bazaar as well.

Not only the roof but also the unit plan of the Farum Town Center had similarities and differences to the following projects for the Espansiva System and Uno-X Prototype. The plan and footprint of the units of Farum Town Center were also differentiated according to the public and private domains. The public unit was to create a module with two units laterally combined, a single unit consisting of two posts **(Figure 49)**. This enabled the public space to be freely defined by the public modules being manipulated, and the private unit of the Farum Town Center had 4 posts and a linear plan to be expanded at the rear space. For the Espansiva and Uno-X systems, each unit had 4 posts and an identical square plan **(Figures 44, 46)**. For the Uno-X, the public corridor and private domains were composed of the same unit plan, which should be a factor for the public court being less interactive with the user **(Figure 46)**.

5.3 Utzon's Search for Monumentality

With the dissolving of the monumental roof-earthwork juxtaposition, Utzon's search for monumentality could be shifted from the "Plateaus and Platforms" to the "Additive" theme, especially from the 1956 Sydney Opera House to 1966 Farum Town Center. After the iconic monumental roof-earthwork juxtaposition of the Sydney Opera House, Utzon implemented a central courtyard for 1958-62 Competition Scheme for the High School in Højstrup. From the Højstrup High School to 1959 Amager World Exhibition, the courtyard was enlarged to an urban scale into its most monumental form, which could mean that Utzon's monumentality should depend on the size of the courtyard instead of the size of the roof. In 1966 Odense University, the site was divided into multiple urban courts within platform and arrangement of courtyard units, which could signify the transformation of the monumentality to "additive". In the 1966 Farum Town Center the platform was dissolved and monumentality was to be achieved solely with the quantity of units and the size of the development. In this transformation, the Islamic bazaar should play a fundamental role in signifying Utzon's monumentality, achieved through uniformity. The uniformity was achieved with the standardized low-rise forms within a growing urban structure that could replace the previous idea of monumentality of the "Plateaus and Platforms". Through "additive", historical monumentality was achieved not only with built forms but also with the compositional features, in contrast to the "Plateaus and Platforms". The compositional aspect of this new monumentality could be combined with an urban, anti-hierarchic

dimension of spaces, in contrast to the typical hierarchy of forms combined with the processional movement of the "Plateaus and Platforms".

As his iconic juxtaposition of the metaphors of cloud and oceanic horizon for the "Plateaus and Platforms" **(Figure 61)** was inspired by nature[196], one could still observe the reference of natural phenomena by the additional growth principle of "additive". Nonetheless, the roof-earthwork relationship no more expressed such juxtaposition, instead, a combination of circle and square geometries was established, which could represent nature and the human culture respectively. By these means, the Farum Town Center could mark the transformation of Utzon's monumentality, from nature to the human culture combined with natural phenomena.

5.4 Urban Configuration

Several important features of the urban configuration of the Farum Town Center could be inspired from the architectural tradition of the historical bazaars of Iran, specifically the Grand Bazaar of Isfahan, serving perceived ideas as solutions for former weaknesses of his earlier buildings and projects. These ideas from the bazaar and the Farum Town Center will be elaborated by in-depth analysis within four points; unification of functions, uniformity of built forms, expandability of the complex and units, and curvilinearity of public domain.

5.4.1 Unification of Functions

One can elaborate the analogy between the Farum Town Center and Grand Bazaar of Isfahan within the urban context, especially in terms of the formation of the urban fabric to investigate the roots of the bazaar idea. The structure of the Grand Bazaar in Isfahan was constructed before Islam, in between the two cities of Yahudiyya and Jayy (Sharestan) that were laying the origins of modern-day Isfahan[197]. As the Masjid-i Jamii was reconstructed by the Seljuks next to the Maydan-i Qadim (the old *maydan*), the bazaar developed and connected to the Masjid-i

[196] See; Chiu, "Utzon's China, The Reinterpretation of Traditional Chinese Art and Architecture in the work of Jorn Utzon (1918-2008)," 132-133.
[197] Josef W. Meri, *Mediaval Islamic Civilization: An Encyclopedia (*London: Routledge, 2005), 399.

Ali complex within the south-west axis **(Figure 26)**.[198] In the Safavid period, the new *maydan*, Naqshe-Jahan Square was constructed, and the bazaar structure organically linked the old and the new *maydans*[199].

The new *maydan* acted as the origin of the social, political and religious activities in Isfahan, to replace the role of the old *maydan* constructed by the Seljuks. Even though the traditional bazaar was rooted in the Achaemenid period when the use of money had emerged, its integrative nature was majorly developed in the Sassanid period.[200] As Pourjafar cites Assari et al., the bazaar usually is composed in a linear fashion, with the purpose of providing spatial connection within the urban fabric as a spinal column.[201] The Isfahan bazaar created a route from the city gates to the Shahrestan area, while including spaces for "*dokkan"* (shop), "*Hojreh*" (small shop), "*Sarai*", and "*Caravanserai*", as well as incorporating "*Madrasah*" (school), "*Masjid*" (mosque), "*Hammam*" (bathhouse) and "*Assarkhaneh*" (oil factory). The main axis of the bazaar was called *Qaysariyye* which incorporates the King's House and "*Zarrabkhane*" (mint building)[202]; the continuity of this axis could be categorized as the primary movement system, while the spaces such as *madrasah* and *masjid*s create nodal spaces to connect to the secondary movement system for residential pathways[203].

The fundamental concept of the traditional bazaar could be of influence for the Farum Town Center, which should be to create a series of articulated urban spaces within a unified high-dense and low-rise complex for social, political, economic, cultural, religious and civic activities combined together similar to the Isfahan bazaar.[204] These functions were not only interconnected spatially and architectonically but also linked by indoor ceremonial pedestrian paths. The Farum Town Center complex included; small-scale and large-scale shops, libraries, supermarkets and grocery stores, restaurants, communal administration offices, event rooms, a church, a hotel, a police station, a health center, cafés, a pharmacy, a kindergarten, banks, an art gallery, cinemas and an amphitheater. The most public functions were centered around the plaza while administration offices and public utility services were located at the outer sections. The street units were totally integrated to the buildings combined with the repetitive spherical roofs with the skylights, similar to the traditional bazaars.

[198] Mohammadreza Pourjafar, et. al., "Role of bazaars as a unifying factor in the traditional cities of Iran". *Frontiers of Architectural Research* 3(1) (2014), 12.
[199] The evolution of the Isfahan bazaar structure is described in Pourjafar, et. al., 14.
[200] Pourjafar, et. al., 13.
[201] Pourjafar, et. al., 12.
[202] Pourjafar, et. al., 14.
[203] Ardalan and Bakhtiar, 113.
[204] Pourjafar, et. al., 11.

The street units of the Farum Town Center could be either combined or used separately to form primary and secondary movement systems consisting of larger units and smaller units, analogous to the traditional bazaars **(Figure 50)**. In parallel to the connection of *Qaysariyye* to the Naqshe-Jahan square **(Figure 56)**, the streets merge with the curvilinear geometry of the open space as the large street units surround the plaza. The plaza therefore could be the access point to different directions of the bazaar streets, with three entrances to the east, west and northern streets and a direct pedestrian entrance from the southern parking space. Except for the direct southern entrance to the plaza, the street units create the linkage from the access points to the plaza and give access to the buildings and secondary streets all along the processional movement, similar to the traditional bazaars.

5.4.2 Uniformity of Built Forms

Utzon stated: "The complex has been fashioned with facades facing toward the covered streets and squares, and the division into sectors is emphasized so that the individual shops and displays are subordinated to the totality"[205]. The complex of the Farum Town Center demonstrated a uniform appropriation of built-forms which could as well be related to the idea of the "additive" theme. This idea could have emerged from the reinterpretation of uniformity of built forms that Utzon perceived from the Middle East, especially from the Islamic bazaars.

For the Farum Town Center, the public and private domains were interconnected with processional movement, and they can be evaluated separately for the uniformity principle. For the private domain, all of the shops and semi-public buildings were designed according to standardized shell-vault form **(Figure 49)**. In contrast to the curvilinearity of the public domain, the layout of private units was rectangular with a narrow front. As the units had longer depth, they could be expanded by adding more units on the rear side. For the private domains, forms were standardized, furthermore, internal spaces were bound to the built forms. The private units were shaped as shell-vaults with skylights, in which, one shell-vault was corresponding to one bay of each shop. Each unit was two-floor height with extruded areas of higher floors, similar to the Isfahan bazaar formations. The internal floor levels of the private units could differ at the back of the two-floor front, according to function. However, each unit had similar decreasing floor levels, several units featuring a sunken courtyard with a centrally focused plan.[206]

[205] Utzøn, *Logbook vol. V: Additive Architecture*, 36.
[206] Several private units of the Farum Town Center were composed with a specific plan schematic. The library had a central courtyard that was two floors below ground with cascading levels around the center. The event rooms could go up and down half-levels with extended balconies.

The private domain of the Isfahan bazaar shared similar characteristics with the Farum Town Center. One private unit consisted of a heavy vault structure housing a single shop, the vault being able to be expanded longitudinally while the shop fronts were identical for each unit **(Figures 25, 26)**.[207] For the semi-public buildings such as madrasahs and masjids, the typical central courtyard scheme was used similar to the *4-iwan* scheme with decreasing floor levels, interconnected to the bazaar with one or two entrances **(Figure 56)**. For the indoor plazas or several *chahar-su* places, private units shaped the public domain with two-floor height units[208]. The ground floor included displays of shops as well as entrances to other directions of pedestrian paths or semi-public buildings, while the upper floor included shops and offices.[209] For the upper floor of the Aminoddole plaza, for example, several bays were designed as balconies that directly views the central court **(Figure 62)**. Besides the lighting from the oculus of the domes, several private units could utilize either skylights or windows to the light wells.

For the public domain of the Farum Town Center, identical street units were used to create main paths in a curvilinear layout throughout the complex, with a pair of two standardized units. One unit was composed of three interconnected shell membranes and a structural frame, and the interconnection of two units represented a single domical structure of the bazaar **(Figure 49)**. Furthermore, the modules of the public units created the modules of public spaces, interconnected to the shell-vaults of the shops. The public unit was also used to compose several semi-public buildings partially or completely, such as the Amphitheatre, information offices and church.

For the public domain of the Grand Bazaar, one street unit was composed of a *Chahar-Taq*; a typical domical roof carried with four arches on four sides to create the module of the public space **(Figure 57)**. This public unit was connected to the vault structure of the shops, bilateral symmetrically interconnected on both sides of the unit. The internal plazas of the Grand Bazaar of Isfahan had shops on all four sides, creating nodal spaces. As seen in the Farum Town Center, the unit for the public domain was bound to the dimension of the private units. Therefore, for the indoor plazas such as the Aminoddole Plaza, the public domain was bound to the composition of private units, i.e., the vaults of the units were interconnected to create the double-story-height arches to carry the domical

The earthwork of the church was located below ground, and some shops had a back storage area going down one level below ground usually at the back of the unit, as well as the art gallery was below-ground accessed with stairs.

[207] The shop fronts were approximately 4 meters, while length of the shops could differ between 4-7 meters as well as expand at the rear side.

[208] As Hansen states, the two-story configuration and larger dome for *Chahar-sus* helped to bring more air and light to the nodal spaces. See; Munk Hansen, *Isfahan, A Millennium of Magnificent Architecture*, 182.

[209] See; Ali Bakhtiar, "The Royal Bazaar of Isfahan", *Iranian Studies*, Winter-Spring vol. 7, no. 1/2, Studies on Isfahan: Proceedings of the Isfahan Colloquium, Part I (1974), 324.

roof of the plaza. At the intersection points of different paths of public units, a *Chahar-Su*[210] was created as a nodal space with shops on four sides under a larger dome.

5.4.3 Expandability of the Complex

Several design principles of the Farum Town Center could be the key points for rendering the complex expandable within the "additive" theme. Firstly, the public and private domains both being composed of identical, standardized units allowed to create the expandability of the complex. Secondly, the two units of the private and the public were interlocked together. Thirdly, the public units being shaped in curvilinear paths allowed the public corridor to be composed, in which the curvature could shape the public area to be larger or smaller. Fourthly, the principle to have the private domain in rectangular geometry for the whole complex allowed the units to be linearly expanded in an elongated fashion. Fifthly, the expandable form and space were combined; the module of the structure was equal to the module of space, as well as to the module of the form. Sixthly, the units were capable of being mass-produced and site-assembled.

Even though the Grand Bazaar of Isfahan was firstly constructed in the 11th century, a large number of rooms and arcades were constructed prior to being transformed into its present known condition. Similar design principles and standardized built-forms of the bazaar allowed it to be organically expanded, which could influence the idea of the Farum Town Center, therefore the "additive"[211]. Firstly, the private units were standardized barrel vaults and the public units were identical *Chahar-Taq*s all throughout the complex[212]. **(Figures 56, 58)** Secondly, the private and public units were bound to each other, the pointed arch projection of the vault form being interlocked with the pointed arch of the *Chahar-Taq*s. Thirdly, a curvilinear geometry was utilized for the public corridor to link, interconnect, and control public domains. Fourthly, the private units had rectangular layouts which could freely expand following the longitudinal axis of vault form. Fifthly, as the structures of both *Chahar-Taq* and barrel vault were meant to constitute the relative spaces, the module of the structure was always equal to the

[210] A *chahar-su* (four-ways) is further application of a *chahar-taq*, where 2 pedestrian paths are intersected. The geometrical composition of *Chahar-su* will be evaluated in following sections.
[211] The term "additive" was actually used in *The Sense of Unity*, when describing the Grand Bazaar of Isfahan. The bazaar was described to be a cumulative work of thousand years of 'additive growth', followed by the explanation of the role of *Chahar-taq* and culmination of 'cube-like' volumes. See; Ardalan and Bakhtiar, 105.
[212] The public units could differ in size for the nodal points with a larger dome, the structure being identical as a *chahar-taq*.

module of the space and the form. These modules did not serve for mass production, however, could enable the unit to be built by any constructor.

The planning of the historical Isfahan and the bazaar could be examples of the harmonic order[213] to achieve multiplicity within unity, combined with the natural growth referring to the growing branches of a tree.[214] One could observe that a similar order was achieved in the Farum Town Center to allow the complex to be expanded in different directions and constructed in stages[215]. As Utzon stated in his 1970 "Additive Architecture" manifesto: "Such a pure addition principle produces a new form of architecture, a new architectonic expression with the same qualities and same effect as the addition of, for instance, the trees in the forest, groups of animals, stones on the shore…"[216]

For the Farum Town Center, the four points of expandability were combined with several principles for the urban composition to reflect Utzon's reinterpretation of the bazaar ideas. Firstly, the pedestrian path was located inside the city block with the urban plaza being at the center, which created an inside-out approach in terms of the public-private relationship **(Figure 50)**. Secondly, this path did not respond to the existing streets; the sense of the old streets would disappear as the parking spaces were located in the outer section. Therefore, the entrance of the path was moved from the corner of the city block to the center. Thirdly, serving corridors were created for the shops located at the back of the units, combined with the parking spaces and negative surfaces of private units. Eventually, the surroundings and the elements of modern society such as cars and boulevards would not be seen by the visitor of the Farum Town Center, to recreate the sense of the bazaar. In parallel to the design philosophy of the Kingo houses, this could as well reflect Utzon's personality and desire to disintegrate from modern society.

[213] Ardalan and Bakhtiar conveys the role of *Sufi* doctrines to express unity within organizations of human settlements, with the three orders of natural, geometric and harmonic. See; Ardalan and Bakhtiar, 79.
[214] Ardalan and Bakhtiar, 89-93.
[215] For the first stage planning of the Farum, the street units were arranged in linear rows of 6 followed by 2 or 3 smaller units for curvature points; the branching to take place for later stages after one or two curvature points. The second stage was to expand towards Bregnerødvej street on east, involving two additional car parking spaces and two rows of shops, southern section facing the street. The third stage plan could cross the Bregnerødvej street via a bridge and link to the second urban plaza with a longitudinal, linear bazaar street.
[216] Utzon, *Logbook vol. V: Additive Architecture*, 28.

5.4.4 Curvilinearity of the Public Domain

Before the advent of Islam, the bazaar of Isfahan was extended in a linear fashion at the old town center Maydan-e Kohne, which was followed by the organic extension towards the north-east axis with the construction of Masjid-i Jamii in the Seljuk period.[217] As Shah Abbas proclaimed Isfahan as the capital of the Safavids, the old *maydan* was connected to the new Naqshe Jahan Square by the expansion and addition of the Bazaar. For this expansion, the bazaar could utilize a curvilinear fashion, linking the new *maydan* through the single shifted axis towards southwest. In contrast to the earlier periods, in the Safavid period the curvilinearity was combined with the organic form as the bazaar evolved. This should have allowed to shape the public space as well as determine the direction and orientation of public space in relation to the private domains, combined with the natural growth of the residential areas along its southwest axis. The Safavid development combined the organic evolution of the bazaar with a planned strategy for the shops at the Naqshe Jahan Square and its surroundings, with rectilinear arcades of the shops and connected bazaar lines.[218]

In the Farum Town Center, the curvilinearity of the bazaar was represented with the curvilinear arrangement of the public domain to address to the sense of historical development and organic evolution. The strategy implemented will be discussed in four points: Firstly, similar to the Isfahan bazaar, curvilinearity allowed to shape the public domain providing a negotiation between public and private domains. Secondly, through this negotiation, the individual and the state were meant to be in collaboration through curvilinearity and evolution of the form, in contrast to the rectilinearity and rigidity of the previously designated and uncompromised plan scheme. Thirdly, the public investor and the private investor collaborated within the relationship of public and private domains, representing a means of integration for the civilization. Fourthly, through the way it was formed, the curvilinearity of the public domain could signify and represent the fusion of the human culture and nature.[219]

For the Farum Town Center complex to achieve curvilinearity, fan-shaped units were used in combination with the public units **(Figure 49)**. One fan-shaped unit consisted of one shell roof and a smaller frame, usually used in groups of two or three. The structural frame for the larger public unit had two parallel elements, while the elements

[217] Pourjafar et. al., 15-17.
[218] Pourjafar et. al, 15.
[219] Utzon's metaphorical expression of nature and culture could be traced back to the Plateaus and Platforms for his roof form referring to the sky and the platform referring to the human culture. The curvilinear composition of the Farum Town Center could refer to the expandable branching of the tree or the organic evolution and composition of the traditional bazaar. This could be from Utzon's perception of the bazaar as nature and his interpretation of the bazaar as a fusion of culture and nature.

for the smaller unit were angled. For less amount of curvature of public domain, small units were utilized in combination with large units; whereas for a higher amount of curvature as much as 90 degrees, three fan-shaped units were used.[220] For the Grand Bazaar, slight curvature was achieved by manipulating the dimensions of the *Chahar-Taq* form, while *Chahar-Su* of the plazas were used instead of a 90 degrees curvature.

In the Farum Town Center, the curvilinearity of the public domain was replaced with the axial pedestrian path for the administration offices with a ceremonial setting **(Figure 50)**. This idea could represent the Naqshe Jahan Square where the curvilinear bazaar corridor and governmental axis merged **(Figure 56)**. The axial district to the royal precinct was connected through gate of Ali Qapu Palace directly to the public plaza, in contrast to the two main connections of curvilinear bazaar streets in opposing directions at north-east and south-east. In the Farum Town Center, the northern branch was the administration path, while curvilinear bazaar streets connected to the plaza from opposing directions of eastern and western entrances.

5.5 Geometry and Space

As discussed in the earlier chapters, the formalistic experiments conducted in the 1963 Silkeborg Museum of Art to connect roof and earthwork should be served as a foundation for comprising the ideas for the Farum Town Center. In both designs, the spherical surface of the roof form was shaping a semi-enclosed space. The three exhibition halls at the Silkeborg Museum included integration of the curved lines of spherical roof form and the earthwork within one geometrical system, which was observed in the roof form of the street elements of the Farum Town Center. In the Silkeborg Museum, the eastern and southern side walls were connected and curved over to the roof as a continuation to create a whole. This sort of continuation principle between surfaces was further developed in the Farum Town Center, for both the public and private units. Some of the specific forms and geometries could refer to and be inspired by the structures of the historical monuments Utzon had perceived in Isfahan. The geometry and space will be investigated within three different concepts; public units, private units, and urban composition.

[220] The geometry of the units is discussed in following section. Forhe formation of units were drawn by Utzon, see; Utzon, *Logbook vol. V, Additive Architecture*, 44-45.

5.5.1 Geometry of Public Units

The fundamental geometry of the public unit of the Islamic bazaar was rooted in the basic forms of an arch and dome while combining a square plan and circular roof for the 'squaring of the circle'[221]. This combination would represent the interconnection of the earthly and the divine; one of the first examples being the *Chahar-Taq* structure. The *Chahar-Taq* (4-arches) was the most significant example of this act, which was used as the structure for the Zoroastrian Fire Temples (*Atashgah)*, 2nd or 3rd century BC and was continuously used in Safavid architecture as the structural element mainly for the mosques.[222] The plan of the *Chahar-Taq* was originated from the *Mandala*[223], referring to the four cardinal directions with four arches forming a square plan, combined with the central domical roof **(Figure 57)**. The *Chahar-Taq* structure was not only used for the *Atashgah*, but also for different public structures of Persia, especially after the advent of Islam. The 4-sided nature of the structure was specifically utilized for the traditional bazaar, as the *Chahar-Taq* became the main structure of a single public unit. The longitudinal axis of the bazaar could accommodate a path for processional movement while secondary axis could allow access to shops on lateral sides **(Figure 63)**. The dome was centralized, signifying each nodal point of interconnecting axes, which was also used for larger encounter points with a larger dome. The dome was connected to the four arches with four squinches, and had an *oculus* for lighting and ventilation of the space. The Sassanian Atashgah of Niyassar in Kashan could be one of the most significant examples of this structure.[224]

The public unit of the Farum Town Center could refer to the *Chahar-Taq* structure in terms of its geometrical composition and utilization from four different points. First, the two juxtaposed public units created one module to refer to the Chahar Taq with a square plan with 4 support points at corners. Second, this module had a 4-sided nature with arches on all 4 sides. In the cross section, the contraposition of the spinal posts of structural frames was analogous to the pointed arches of the Grand Bazaar; in the longitudinal section, pointed arches projecting to the private units were combined with pointed arches at a higher elevation. Third, the spherical roof of two main shells combined together per module could refer to the singular dome of a public unit of the Grand Bazaar. Fourth,

[221] Ardalan and Bakhtiar conveys that since the Achaemenian period, the square represented earth and the circle represented heavenly paradise. The synthesis of the two geometries was resolved with *Chahar Taq* and Seljuk squinches as an archetype. See; Ardalan, Bakhtiar, 29-30.
[222] Ardalan and Bakhtiar, 75.
[223] Mandala is a cosmogram, a central geometric composition utilizing square and circle geometries that reflects the unity, layers, and inside (*Batin*)-outside (*Zahir*) relationship, representing cosmos. Mandala was described in Utzon's reading, see; Ardalan, Bakhtiar, 31.
[224] The structure of the Atashgah of Niyassar was not only significant for its pure representation of a *Chahar Taq*, but also for its structural behavior. The arches of this Chahar Taq were not created to carry the dome, therefore they structurally worked as 4 pillars. For the Atashgah of Niyasar, see; Michael Shenkar, "Temple Architecture in the Iranian World before the Macedonian Conquest", *Iran and the Caucasus*, no.11 (2007): 169-194.

the sky-lighting of the bazaar unit via oculi was achieved with the opening of the roof, in an indirect way with a height difference between two units.

Even though the pointed arch of the bazaar was not used in its common form for the public unit of the Farum Town Center, Utzon could utilize the cross-sectional features and abilities of the form. The transitional surface was created between the pointed arch and the round arch form as a vault to compose the roof of a single public unit between the spinal posts of the structural frame **(Figure 49)**. The vaulting of the pointed arch could be used for the public unit to be able to freely modify their dimensions compared to the pointed arch of the barrel vault of the private unit.[225] Integration of the two was made spatially between two public units, with the transformation of the height of the cross-sectional design of roofs for the public domain. The height difference created a lateral opening for not only sky-lighting but also ventilation of the public unit.

The *Chahar-Sus*, large connector spaces of the bazaar could be formed within an octagonal plan, forming an internal court called *Timchah*s with surrounding vaulted shops, covered with a larger dome. In the Grand Bazaar of Isfahan, the vaulted domical roof of the *Timchah* at the connection of Haji Karim Khan caravanserai could be a specific example, as the connection of the dome to the octagonal plan occurred with 16 interlocking segments of shells[226] **(Figure 64)**. This structure was called a *Karbandi* in traditional Persian architecture, generated by the division of a circle and rotating of an arch to create a composition of intersecting rib arches.[227] In the Farum Town Center, the two lateral shells that connect to the large central shell from the sides of the roof could be an interpretation of the structure of the interlocked segments of shells of the octagonal dome **(Figures 48, 49)**. This allows the roof of the Farum Town Center to be continuous in the order of one large and two small shells, and for the Grand Bazaar to conceive the dome with the order of one large and one small shell combined. For the Farum Town Center, the posts of the structural frame that carry the shells were continuous space-defining elements that curved at the upper part being connected to the spherical membranes of the roof and straight at the lower part of the structure. This could be reminiscent of the formation of the *Chahar-Su* in a similar way the dome and vaults were integrated.

[225] The selection of the basic forms of ogive, arch and barrel vault as ingredients of a more complex whole provides the desired flexibility while integrating and transforming particular modules according to the site formation. This flexibility feature of such forms and their adding to the sense of 'motion' are described in Utzon's reading. See; Ardalan and Bakhtiar, 67-75.
[226] Klaus Herdeg, *Formal Structure in Islamic Architecture of Iran and Turkistan* (New York: Rizzoli, 1990), 31.
[227] Amir Amjad Mohammadi, Ahad Nejad Ebrahimi and Yaser Shahbazi, "Geometric design of a masonry lattice space dome titled Karbandi in Persian architecture," International Journal of Space Structures vol. 34 (2019): 22–39.

5.5.2 Geometry of Private Units

The private units of the Farum Town Center were composed of the typical module with a square plan and vaulted roof, in a linear or central composition. The linear private unit was to form the vaulted shops similar to the bazaar, composed of projection of the round arch. Structurally, a framing was used which was not a load bearing vault like the historical bazaar vaults. In cross-section, the frame of the private unit was straight for the two-floor height and then combined with the round arch. In the front, the round arch was diagonally shifted to be able to integrate into the shell roof of the public unit. In plan, this shift corresponded to the projection of the terracing of the floors. In the Aminoddole Plaza of the Grand Bazaar of Isfahan, the terraces/balconies of the second floor did not cascade, however, the pointed arch of the second floor was shifted to integrate with the shell composition of the roof **(Figure 64)**.

The linear unit of Farum Town Center was to be composed of minimum of two structural modules, in which the supporting points at the corners of each module were exposed. This would signify the "additive" nature of the unit to divide the linear space into modules, in contrast to the unit of Grand Bazaar. The linear unit of the Farum Town Center could expand up to 4 units for shops and 10 modules for the administration area **(Figure 50)**. For the bazaars in general and Grand Bazaar in particular, the units could expand without a modular dimension. For the centralized private units, supporting points of the structural frame were still seen in the plan when units were combined. This gives a sense of the walls being excluded and the structural frame being intact; for the 4-module units, this could mean the structural posts occupying the center of the space. For the centralized private unit plan at Grand Bazaar, *hammam* plans could be an example in which the vast central space was eliminated from structural elements with a single domical roof.

Each of the private units was to accommodate a longitudinal skylight at the top of the round arch, which had a triangular prismatic form. Compared to the direct light beams of public units of both the Farum Town Center and Grand Bazaar, this feature could enable indirect lighting besides improved water-proofing. A similar prismatic skylight was inherent in the Bazaar of Kashan with either pyramid or triangle prism form or octagonal prism on top of a glass drum, which was also observed in Utzon's readings[228] **(Figure 65)**. This typology could however cause issues of connection to the vault form of the Farum Town Center; the two ends of the prism were drawn

[228] Dethier, 107; Ardalan and Bakhtiar, 52.

straight and not hence not possible to connect to the spherical surface of the vaulting. For the Bazaar of Kashan, the prism form of triangular or octagonal shape was used with a drum to integrate to the spherical surface, which was not utilized in the Farum Town Center.

Compositionally, the centralized planned private units accommodated identical linear skylights at the Farum Town Center, with the same composition of linear units. This could imply the linear composition feature, despite the units being combined with a centralized plan. For the Grand Bazaar, the *oculus* form was used for both linear and centralized private units while the size could depend on the size of the space. The oculus for the bathing hall of *hammam* could be double the size of the oculus of a single private unit.

5.5.3 Geometry of Urban Composition

The urban flexibility of the Islamic bazaar originated from the 4-sided nature of its typical unit; the direction of the sequence of domes defined a linear movement while two contrary side arches gave accesses to the vaulted shops. For the Grand Bazaar, the dimensions of the *Chahar-Taq* module could be slightly modified to create the curvilinear urban arrangement; this was done by transforming the layout of public units, from the square plan of the structural frame to a trapezoid plan. This could also be formed as manipulation of several walls of the units for where the slight curvature of the street could happen. For a higher amount of curvature close to 90 degrees, *Chahar-Su* would be formed to give access to several access points combined with the shops. The *Chahar-Su* was covered with a larger dome and usually with an octagonal or hexagonal plan to act as a place of encounter and plaza.[229]

The public and private domains of the Farum Town Center were composed of 5 different public and 6 different private unit typologies respectively **(Figure 49)**.[230] The different public unit types were to accommodate each kind of curvature, in a way to systematize the organic curvature of the Grand Bazaar. The public units interreacted with each other, designed to be used in combination with the big unit and small unit together as a pair. The structural frame of both the big and small units could have a parallel or trapezoid layout, and these could be combined with the fan-shaped units. The fan-shaped units of the Farum Town Center were the only public units that were not integrated into a private unit, only to compose the curvature as a part of the public corridor. For the curvature, the pivot point becomes the end of the small unit when fan-shaped unit is used allowing for the right-angle turn at the

[229] Ardalan and Bakhtiar, 102.
[230] Utzon, *Logbook vol. V, Additive Architecture*, 44-45.

smallest area; and the trapezoid unit had its pivot point outside the curvature itself, used for a larger area curve. These two combined together could form the branching of the public corridor and shaping of the urban plaza to freely arrange the complex.

The private units of the Farum Town Center had different typologies according to their function, without depending on the curvature or size of the public unit they were integrated into **(Figure 47)**. The first, simplest typology was for the offices, which was a two-floor unit with stairs in the front, without utilizing the underground. The second was supermarket type which was single-story, double-floor height to accommodate a crowd without level changes or stairs. The third, shop typology was flexible in terms of stories, however usually utilized 2 levels and a mezzanine floor, it always facilitated a partial underground level accessed via stairs at the back. The fourth, event rooms and library could be a single typology in which a central underground court was accommodated, with cascading levels around the court. The fifth was hotel typology which was different from all other types because of the private units being utilized perpendicular to the public units. The sixth typology was the church, which was composed of the shells of the public unit to create a central nave and smaller units at the sides.

Within the complex, depending on the curvature of the public corridor, several left-over spaces occurred on the rear side between private domains **(Figure 50)**. These areas were rectangular or triangular open spaces that were bound to the serving corridors to serve the private units, usually connected to the outer car parking spaces. These areas were undefined spaces without efficient interaction and sometimes difficult to access, and not systematized. Furthermore, because of the nature of the projection of curvature, the maximum length of the private unit, as well as its ability to expand, was restrained. This should be a reason why Utzon relocated several buildings within the complex[231], to adjust their need for maximum expandability, such as the cinema units, restaurant units and library.

[231] The different variations of the urban plan were included in Utzon, *Logbook vol. V, Additive Architecture*, 38-49.

5.6 Processional Movement

"…, the town center has been designed as a closed bazaar with a few architecturally emphasized entrances, but otherwise turning its back to the surroundings."[232]

Analogous to the bazaar, the Farum Town Center was composed of a series of units utilized not only to give access to the private units of shops but also to create a processional pedestrian movement **(Figure 50)**. Firstly, to be able to recreate the pedestrian-based movement of the traditional bazaars, the Farum Town Center was designed only for pedestrians. The pedestrian would begin experiencing the site after parking, through an elongated ceremonial entrance with processional movement combined with gardening. After the entrance, the complex welcomes the visitor with positive surfaces, with continuity of two rows of shop fronts combined with the processional movement, similar to the Grand Bazaar[233]. In the Farum Town Center, the processional movement was created within two fundamental typologies; the linear plan and the centralized plan, both utilized for the public and private domains.

For the public domain, the linear plan as an urban interpretation was composed with the public units mainly on the ground level without transitions such as escalators, staircases or elevators. The ceilings of the public units were higher than the private units with the sculptural roof form, allowing air ventilation while creating a shaded area for pedestrians.

As the visitor continued his/her promenade to the public domain, the pedestrian path would lead to the urban plaza combined with the amphitheater. The linear space could be interpreted as the continuous linear processional movement of the pedestrian path which was transformed to create and define the central urban space. The court was located a few steps below ground level, while linear planned units were elevated and arranged continuously to surround the court with positive surfaces. From the plaza, the visitor could either continue towards another branching of shops or direct towards the ceremonial entrance, in both options being received by the nature through processional movement.

[232] *Arkitektur*, 1/1970, 21.
[233] Ardalan states that the positive space continuity helped achieve the expansion of bazaar and the city. See; Ardalan and Bakhtiar, 123.

The private domain of the Farum Town Center was also composed of two types of plans; linear and centralized, with the narrow front private unit or a laterally integrated composition of private units by eliminating the lateral walls **(Figure 49)**. After entering to the complex, the visitor could access one of the linear planned shops from the ground level, to an internal processional movement beginning from the narrow front of the shop. This entrance was at the same height as ground level facing the street, below the projecting mezzanine floor which was not always utilized in the interior space. For such a linear planned shop, the level difference was only utilized for either giving access to the mezzanine floor or the underground storage level via stairs. The vault structure of the shop was combined with a linear skylight, creating a linear processional movement while still emphasizing centrality. As the visitor continues from the pedestrian path, the central planned buildings could also be accessed such as the library or the event rooms. An atrium was located at the center of such centrally planned buildings which was below ground level, while creating a processional movement around the center. The skylight of the linear shop was utilized the same way repetitively; the atrium could not be emphasized with the roof because of the nature of the laterally combined vaulting. However, the visitor could access different cascading levels via stairs around the atrium, experiencing the linear space utilized to define the central space.

Utzon's idea for the central and linear planned spaces could be interpreted from the Isfahan bazaar perspective for public and private domains. In Isfahan, the bazaar street system was combined with the open courtyard buildings of the private domain such as *madrasahs*, *masjids* and *caravanserais*. These courtyards were centrally planned with the *4-iwan* scheme, creating a processional movement surrounding the court. As also seen in the Farum Town Center, the courts were a few steps below ground level, as well as creating positive surface continuity with 2-floor height rooms and continuous niches facing the court. The clearest examples of this type could be the Mosque Al-Hakim **(Figure 66)** and Caravansarai-i-Gulshan **(Figure 67)** in the Grand Bazaar of Isfahan. The bazaar street was composed of continuous positive surfaces of linear planned shops. These shops and the shops of the central plan utilized the linear scheme for private domains with a narrow front. As also seen in the Farum Town Center, the shops were aligned with the bazaar street level and create an internal linear processional movement beginning from the narrow front. For the public domain, the linear planned public units were arranged with positive surface continuity while there was no transition of ground level. The public units had higher ceilings compared to the private units similar to the Farum Town Center, with domical roofs with *oculi* for ventilation and allowing light beams in the interior **(Figure 63)**. These were connected to the central planned space of the urban-scale plaza, the

Naqshe-Jahan Square, which utilized a continuous array of linear planned shops surrounding the court to create a processional movement, analogous to the plaza of the Farum Town Center.

A characteristic of the bazaar was the contrast between the different phenomena created between the courtyard scheme and linear scheme.[234] The linear scheme could firstly create a dynamic movement and secondly surround a court to create a static space at the center **(Figure 56)**. This was also observed and mentioned by Hans Munk Hansen[235] when he photographed a *madrasah* courtyard at his site study of the Isfahan bazaar.[236] A similar contrast could be achieved in the Farum Town Center by the juxtaposition of pedestrian streets and internal courtyards of private domains such as the library or art gallery.

The processional movement of the Farum Town Center could be considered as Utzon's reinterpretation of the ideas of the bazaar; therefore, the design inherited several different aspects compared to the intentions and applications of the historical bazaar. Firstly, in contrast to the bazaar, the Farum Town Center was planned to be mainly approached by a vehicle and accessed by pedestrians after the parking process. This access was from a ceremonial entrance which was combined with gardening, which signifies that the town center was a 'closed' movement system without connection to the outer movement systems. Followingly, in contrast, the Isfahan bazaar system could link different areas of the city from the main gates to the housing quarters and to the historical town center in relation to the old town. Secondly, for the private domain, the Isfahan bazaar housed open courtyards as a transitional space to the indoor areas, whereas the private domain of the Farum Town Center had an indoor setting for the courts with linear skylights. Thirdly, for the public domain, the linear scheme did not have a completely indoor setting as seen in Isfahan; lateral sides of the public units had openings with larger, continuous skylights.

[234] Ali Bakhtiar, 326.
[235] Hans Munk Hansen was Utzon's assistant architect during the Melli Bank project and his accompany for 1959 trip to Iran. See; Hans Munk Hansen, "Utzon and the Orient", *Jorn Utzon, the Architect's Universe* (2004), 66-71.
[236] See; Munk Hansen, *Isfahan, A Millennium of Magnificent Architecture*, 195-197.

5.7 Conclusion

Utzon's 1966 Farum Town Center was one of the first and most significant "additive" projects that represented his receiving of the Islamic Bazaar ideas, specifically from the Grand Bazaar of Isfahan. This consisted of a continuous, growing urban megastructure conceived as a Town Center complex, able to be built in stages. In this chapter, firstly, the dissolving of Utzon's monumental roof-earthwork juxtaposition and the role of Grand Bazaar of Isfahan in his transformation of ideas was investigated in three scales. 1959 Amager World Exhibition, 1966 Odense University proposals for the urban scale; 1960 Market in Elineborg, 1963 Silkeborg Museum II, and 1965 Berkeley University Art Museum proposals for the building scale; 1969 Espansiva System and 1969 Uno-X Prototype for the unit scale were served as case studies to convey the role of the Grand Bazaar of Isfahan in the transformation through the Farum Town Center.

Secondly, it was discussed that this transformation also represented a shifting in Utzon's search for monumentality, which was transformed from the monolithic form towards pluralism of high-density and low-rise forms. Thirdly, the urban configuration of the Farum Town Center was analyzed in four major concepts that were inspired from the Grand Bazaar; the unification of functions, uniformity of built forms, expandability of the complex and units, and curvilinearity of the public domain. These concepts were not utilized previously and highlighted the transformation of Utzon's ideas and ideals within his "additive" theme. Fourthly, the Farum Town Center was subject an in-depth technical analysis to precisely define Grand Bazaar's role in the geometrical features of the Farum Town Center, as seen in its public units, private units, and geometry of its urban composition. This section signified the utilization of traditional forms of Persian architecture such as the *Chahar-Taq* structure from Zoroastrian temples and *Chahar-Su* plazas. Fifthly, the processional movement created within the complex of the Farum Town Center proposal was reviewed through the user experience with its spatial and architectonic aspects to explore the expression of a historical settlement.

CHAPTER 6

THESIS CONCLUSION

"What is Utzon's Middle East?" has been the fundamental research question of this thesis. By investigating how he manipulated a series of ideas related to his Middle East, with a focus on the important time period between 1956 Sydney Opera House and 1966 Farum Town Center projects, the role of his Middle East was explored in the transformation between his two manifestos 1962 "Plateaus and Platforms" and 1970 "Additive Architecture. Studies conducted within the three main chapters suggested that Utzon's receiving and application of the Middle East displayed a continuity and discontinuity that underwent a transformation alongside his architectural idiom. This transformation also coincided and was portrayed with the transformation of his buildings and projects from the "Plateaus and Platforms" to the "Additive Architecture". During this transformation, Utzon's Middle East contributed to his motivation to resolve the weaknesses of his earlier works, as well as provided ideas and ideals.

Utzon's early perception and application of the Middle East was mainly through formal references, including exterior form, internal space and surfaces, encapsulated within the building scale. With the gradual emergence and application of the "additive" approach, his reinterpretation of the Middle East was transformed from being external, formalistic and superficial to a synthetic, in-depth approach. The Farum Town Center proposal could represent the end of this transformation and the maturity of his Middle East regarding the dissolving of his iconic dualism seen

in the monumental roof/earthwork juxtaposition. More prominent than the architectural form, the maturity of his Middle East was inherited within the compositional features encapsulated within a low-rise, high-density urban complex. This urban complex was designed to achieve the expression of a historical settlement to achieve monumentality which was inspired from the Islamic Bazaar.

In this thesis, it was not possible to explore the entirety of Utzon's Middle East, as it focused on the time period between the 1956 Sydney Opera House and 1966 Farum Town Center. The Middle East in Utzon's later buildings and projects, such as the 1969 Jeddah Stadium proposal in Saudi Arabia, 1970 Jeita Grotto Theater proposal in Lebanon, and his seminal work, 1972 National Assembly Building in Kuwait, needs further study and in-depth research, which this thesis was not able to address. Nonetheless, this study should provide a basis for future scholarship on exploring Utzon's Middle East.

FIGURES

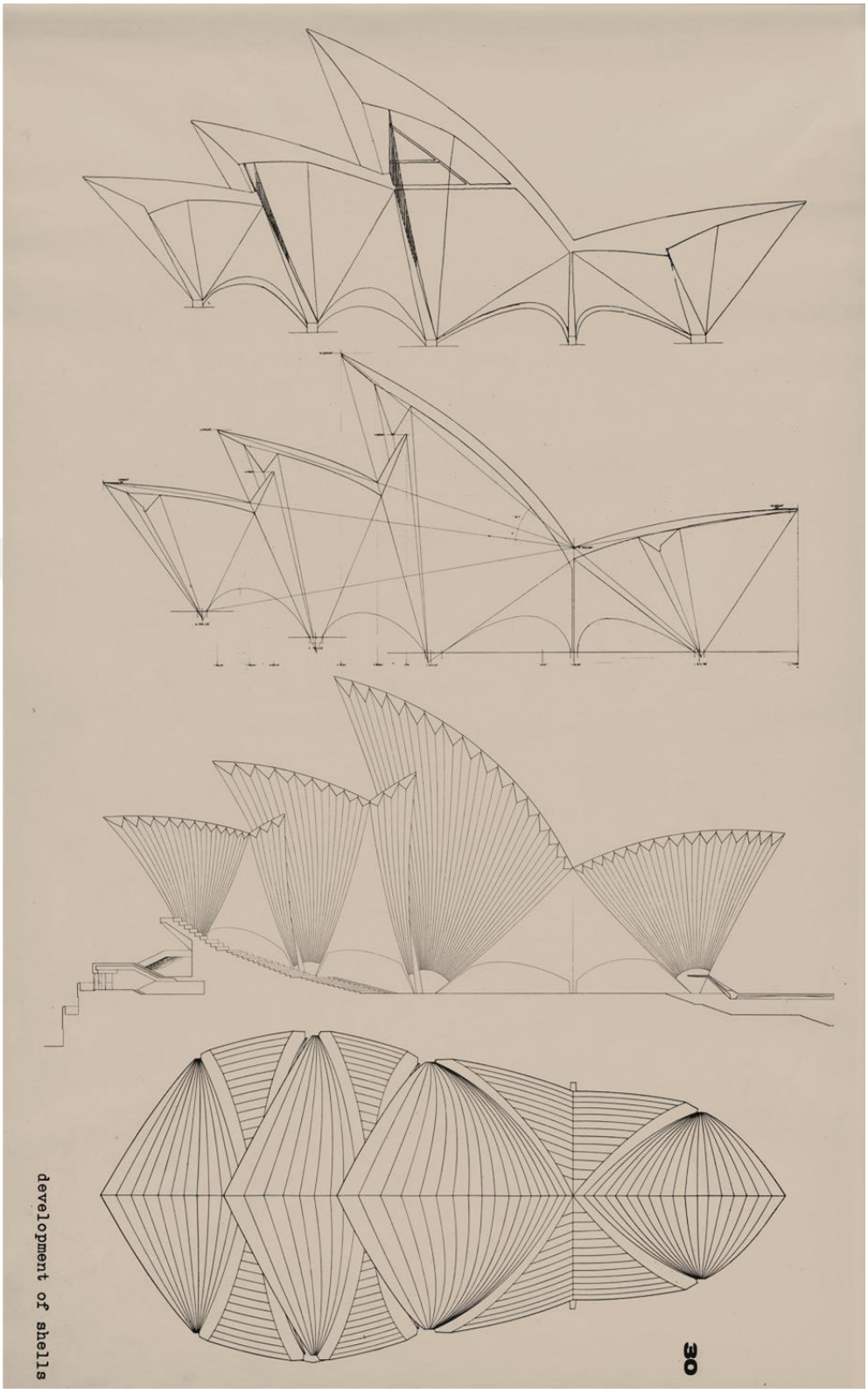


Figure 1: Utzon's drawing of the development of the shells of the Sydney Opera House. Above: May 1961 Circular scheme double shells with metal framework. Below: October 1961 Spherical scheme with rib structure. Source: © *Utzon Archives* / Aalborg University & Utzon Center

Figure 2: Above: Photograph of the western *iwan* of Masjid-i Jamii of Isfahan taken by Utzon at his 1959 study trip. Below: Photograph of the shell structures of the Sydney Opera House. Source: © *Utzon Archives* / Aalborg University & Utzon Center

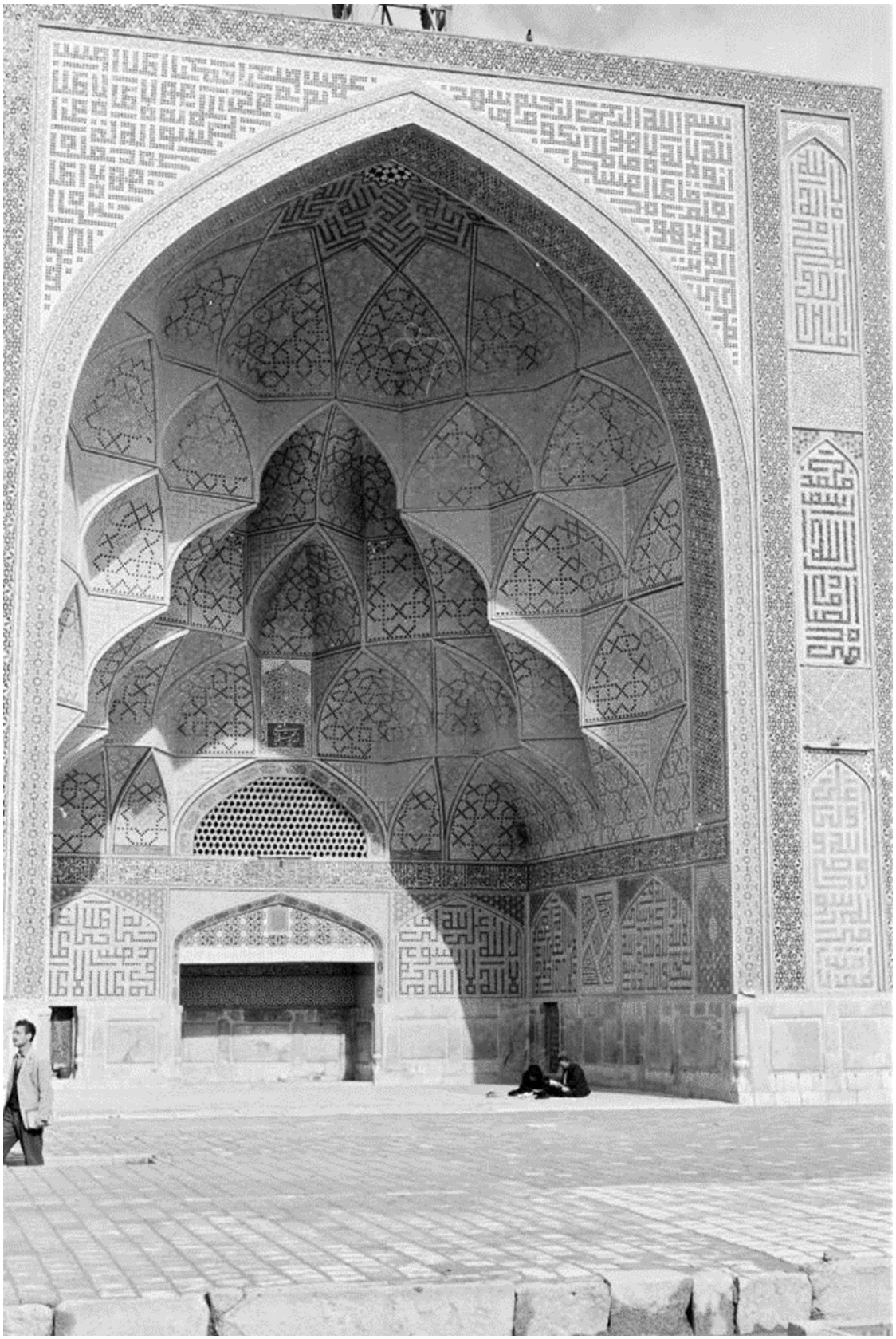


Figure 3: Utzon's own photograph showing the tilework of Masjid-i jamii of Isfahan, which was sent to the tilework company CC Höganas to demand a similar quality of product. Source: © *Utzon Archives* / Aalborg University & Utzon Center

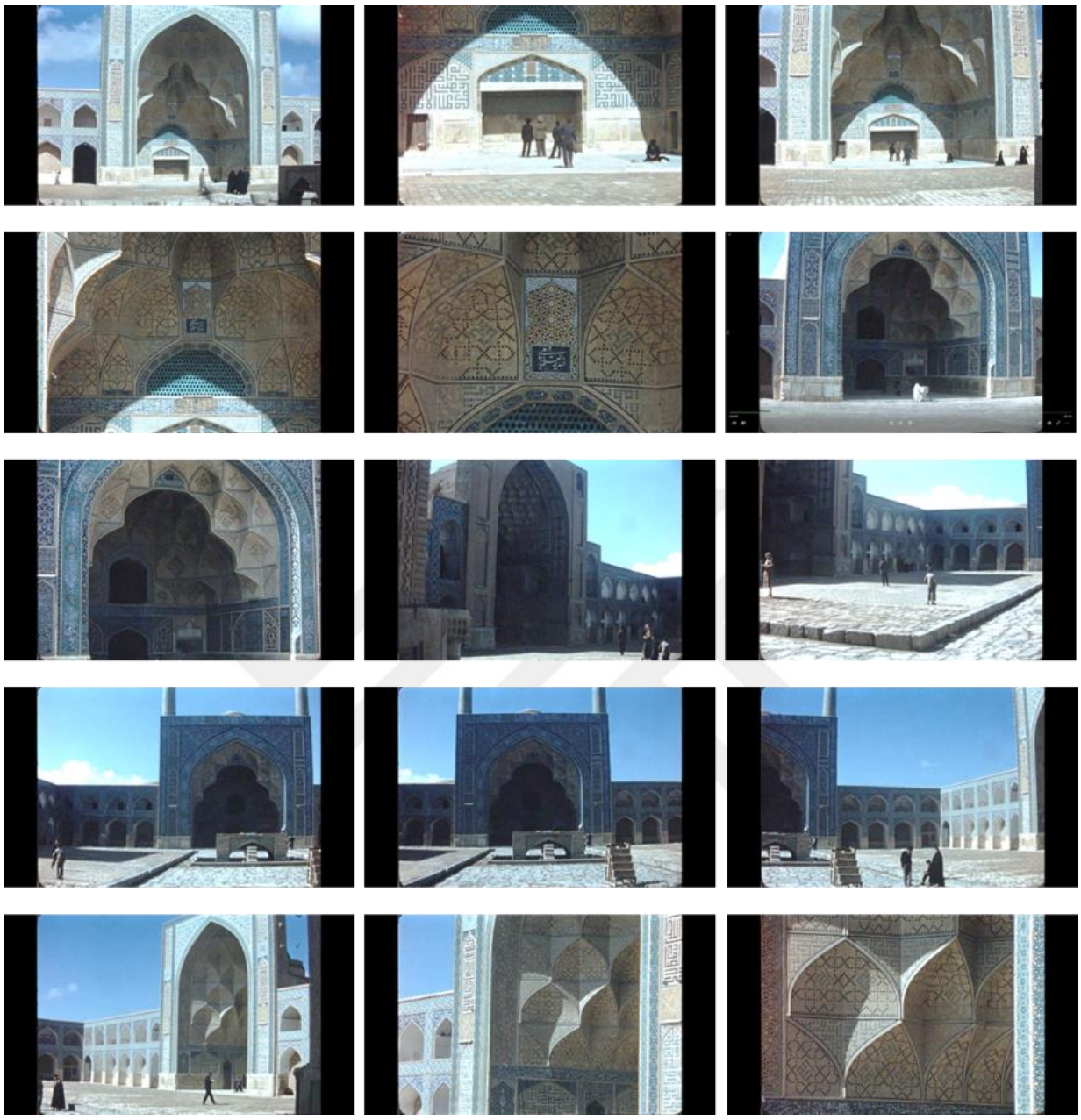


Figure 4: Picture sequence of Utzon's 8mm film at Masjid-i Jamii of Isfahan from his 1959 trip, showing the *4-iwan* scheme from the court, and *muqarnas* of the iwans. Source: © *Utzon Archives* / Aalborg University & Utzon Center

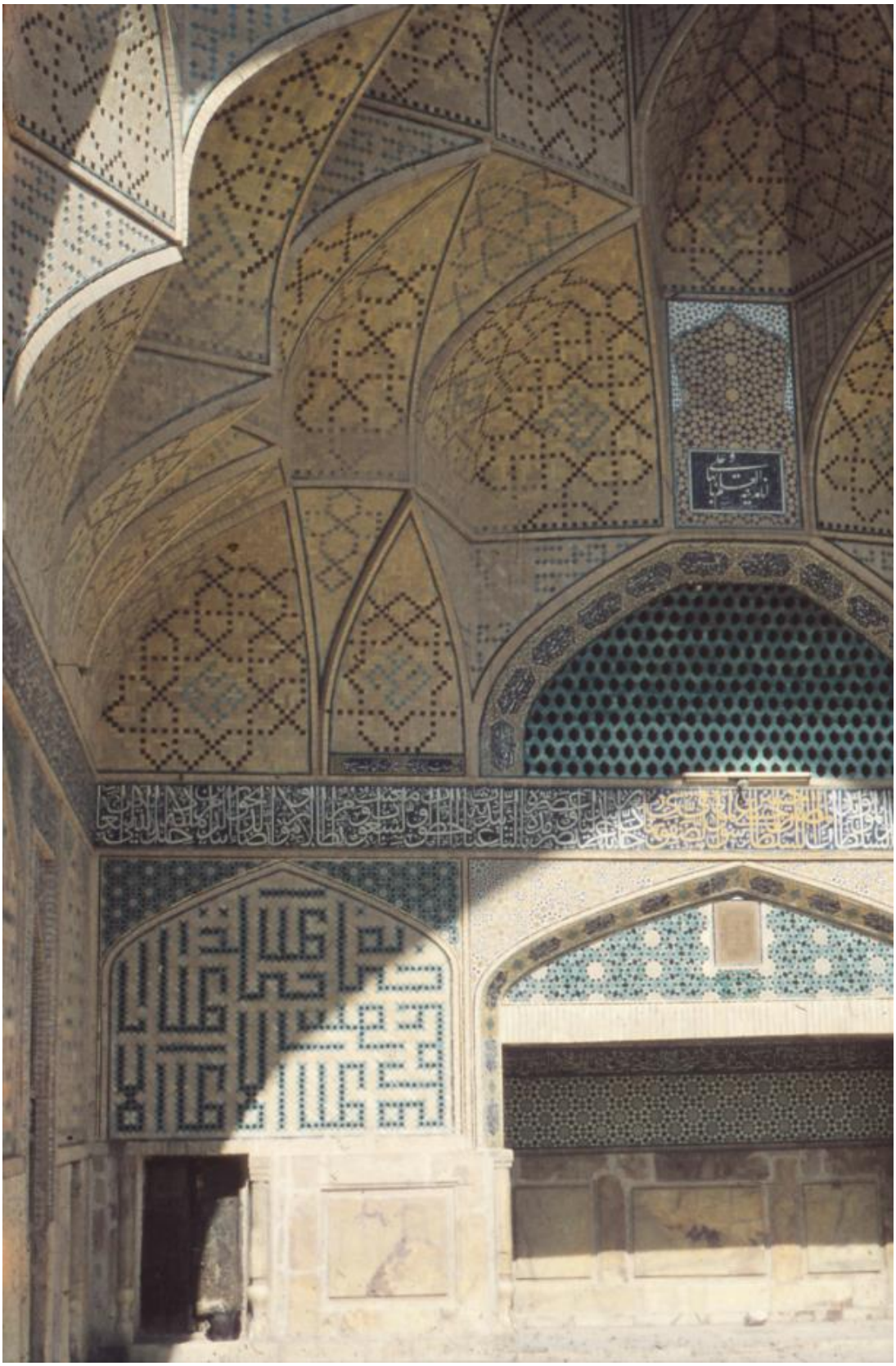


Figure 5: Utzon's photograph of squinch forms of *muqarnas* of Masjid-i Jamii of Isfahan arranged in *tabaqa* layers, above the calligraphic decoration. Source © *Utzon Archives* / Aalborg University & Utzon Center

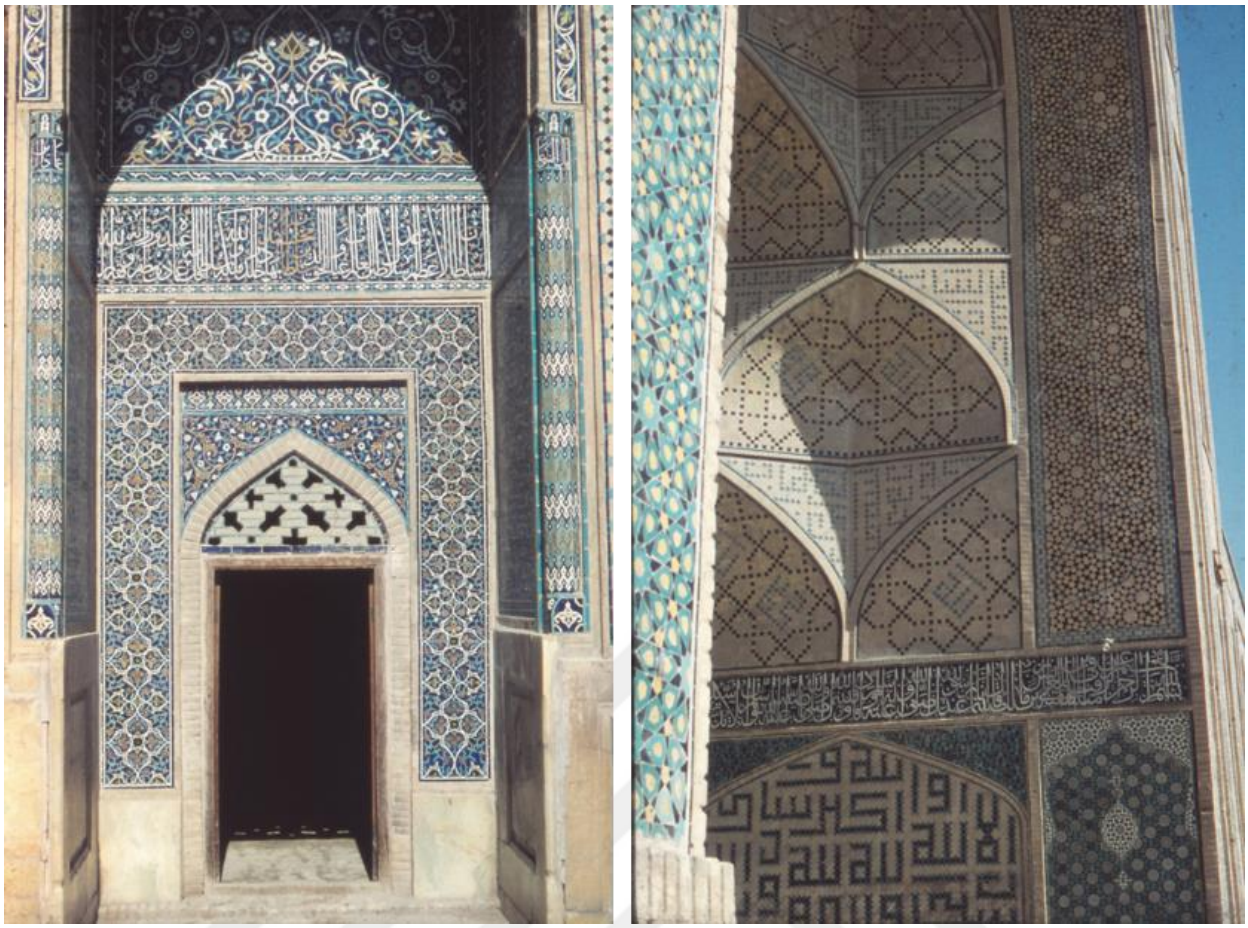


Figure 6: Photographs of Utzon at Masjid-i Jamii of Isfahan displaying ornamentation of external door and *muqarnas* with diagonal patterns. Source: © *Utzon Archives* / Aalborg University & Utzon Center

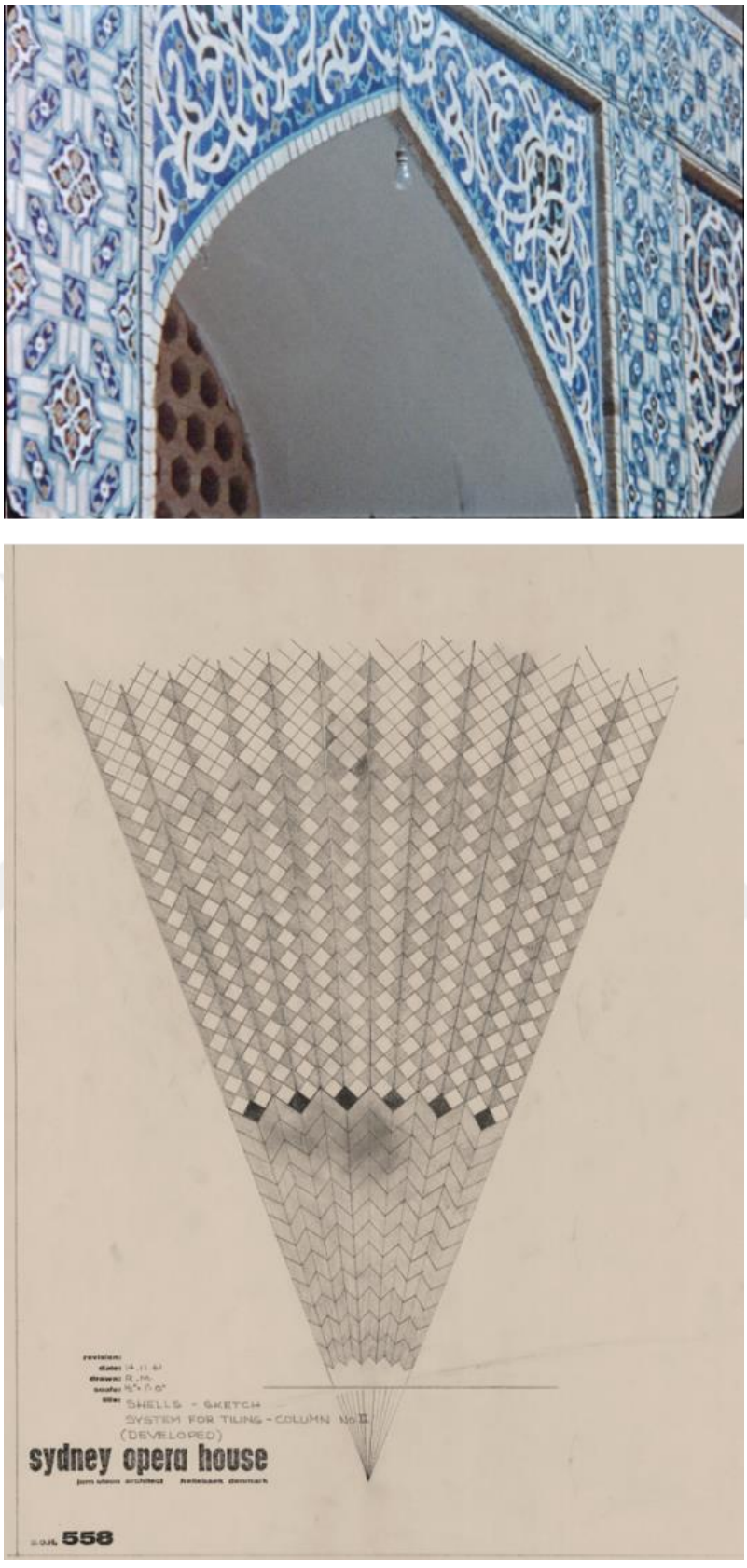


Figure 7: Above: Detail photograph of tilework of Masjid-i Jamii from Utzon's 8mm camera film. Below: Sydney Opera House shell-vault drawing representing the early black, white and blue color scheme. Source: © *Utzon Archives* / Aalborg University & Utzon Center

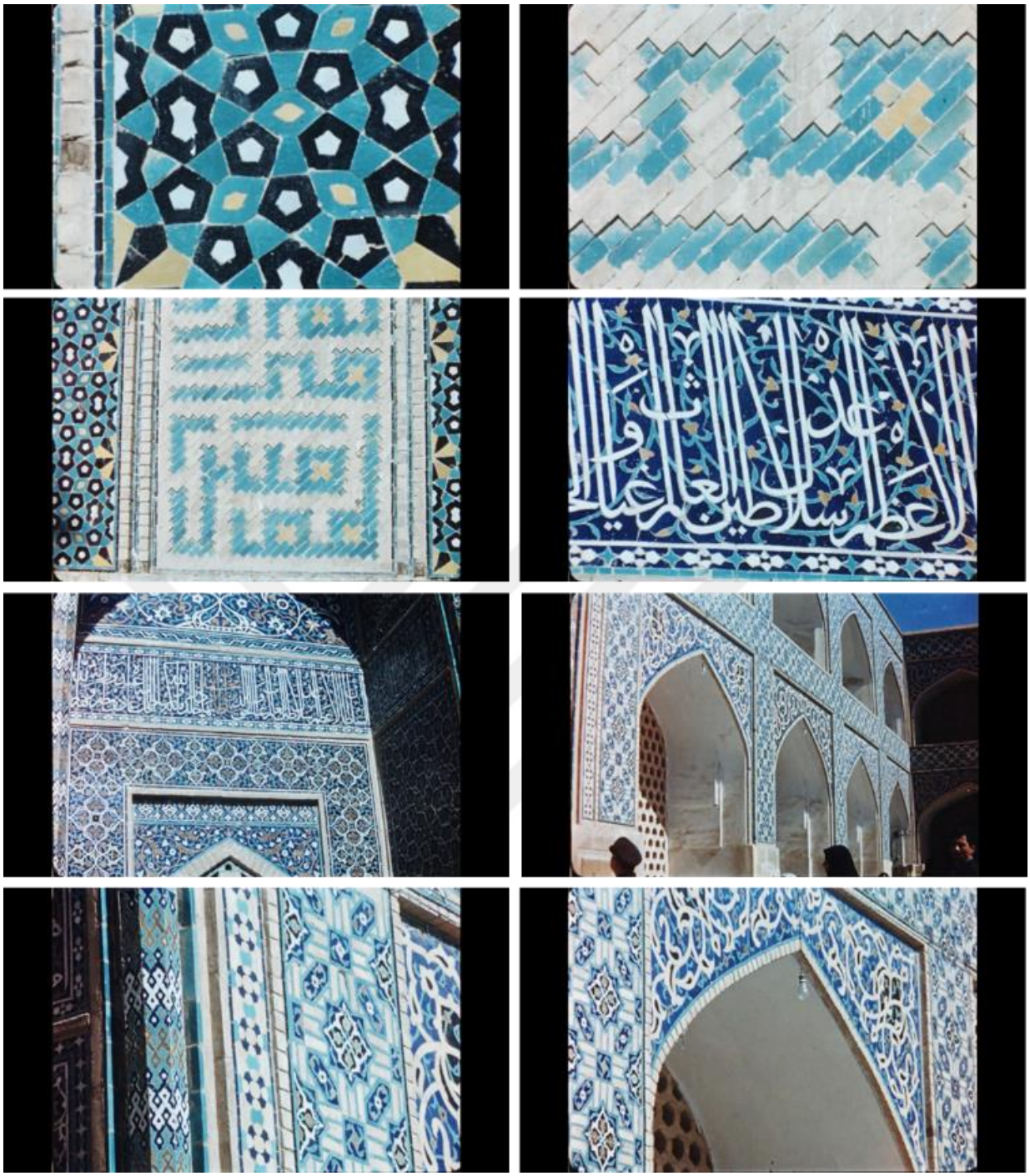


Figure 8: Picture sequence of Utzon's 8mm film at Masjid-i Jamii of Isfahan from his 1959 trip, recording of the color scheme and surface patterns made with glazed tiles. Source: © *Utzon Archives* / Aalborg University & Utzon Center

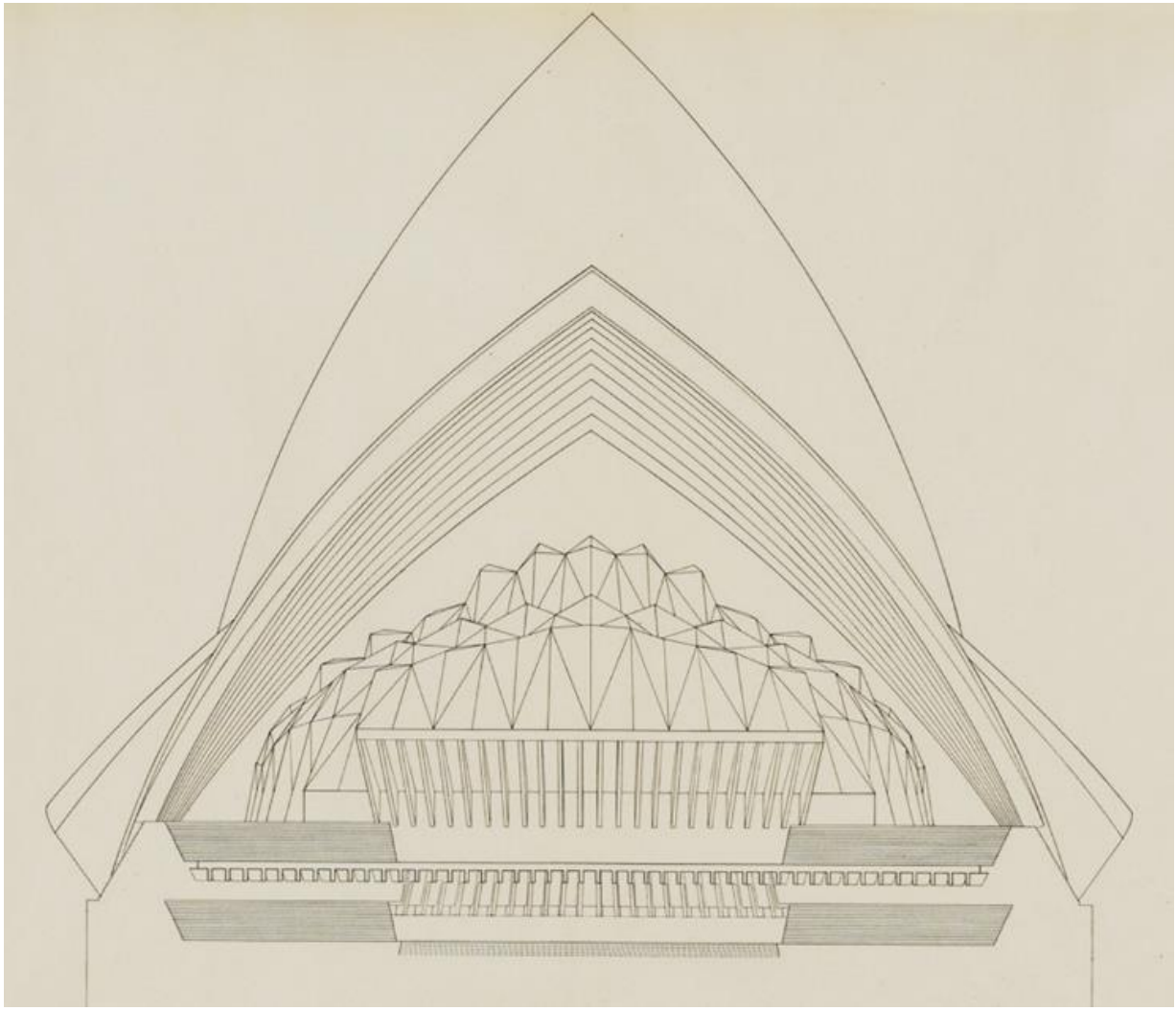


Figure 9: An earlier scheme of acoustic ceilings for the Sydney Opera House to create a continuous ceiling similar to *muqarnas* and bound to the earthwork. Source: © *Utzon Archives* / Aalborg University & Utzon Center

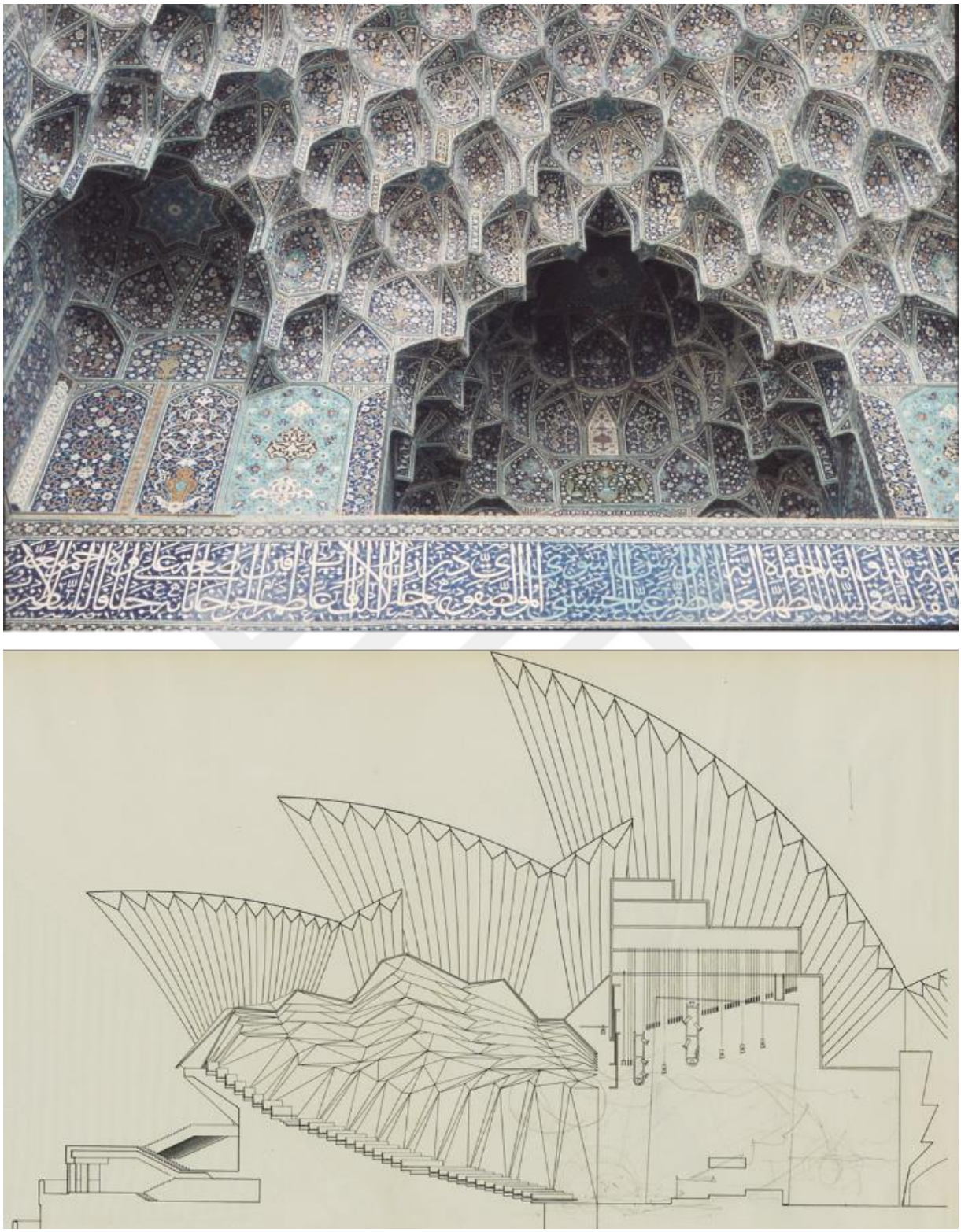


Figure 10: Above: The *muqarnas* ornamentation in Masjid-I Shah in Isfahan from Utzon's photograph showing *beyts* and its arrangement in *tabaqas.* Below: The early scheme of acoustic ceilings of the Sydney Opera House. The *tabaqas* of the *muqarnas* were gradually extended vertically, compared to Islamic *muqarnas.*
Source: © *Utzon Archives* / Aalborg University & Utzon Center

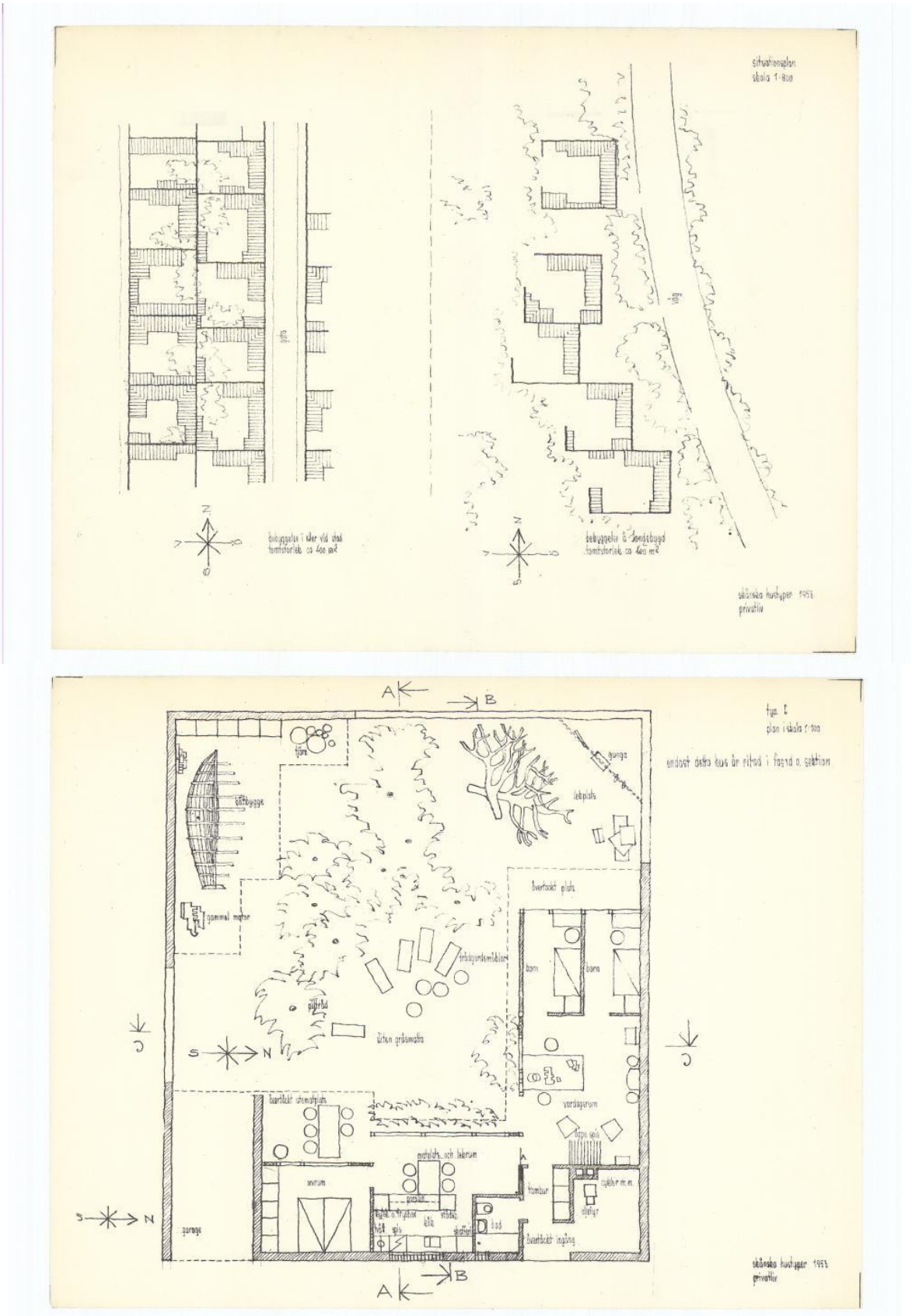


Figure 11: Urban planning (above) and plan (below) of Utzon's housing scheme for Skanska competition. Source: © *Utzon Archives* / Aalborg University & Utzon Center

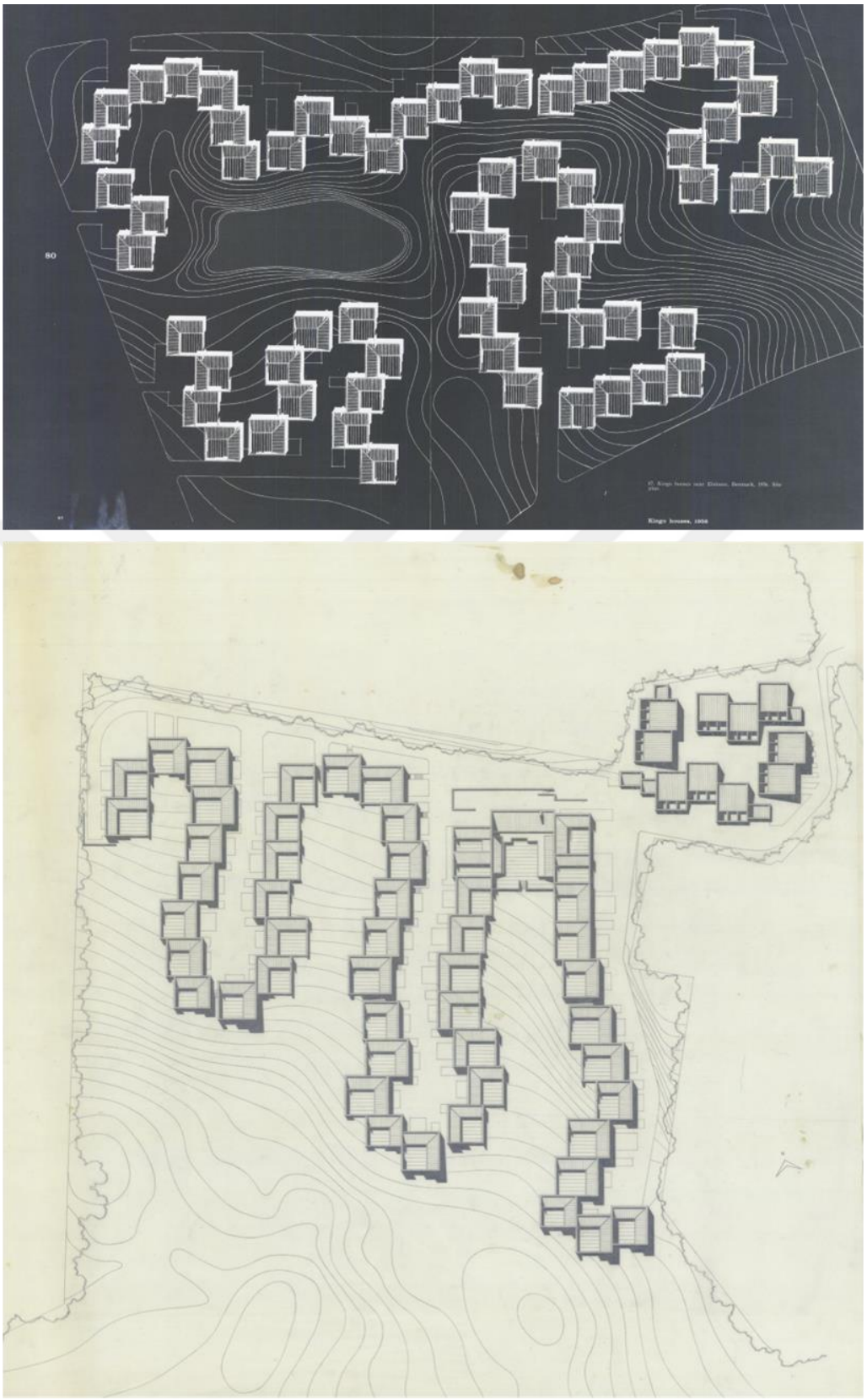


Figure 12: Above: Utzon's courtyard housing scheme for 1956 Kingo Houses. Below: Utzon's 1959 courtyard housing complex in Fredensborg.
Source: © *Utzon Archives* / Aalborg University & Utzon Center

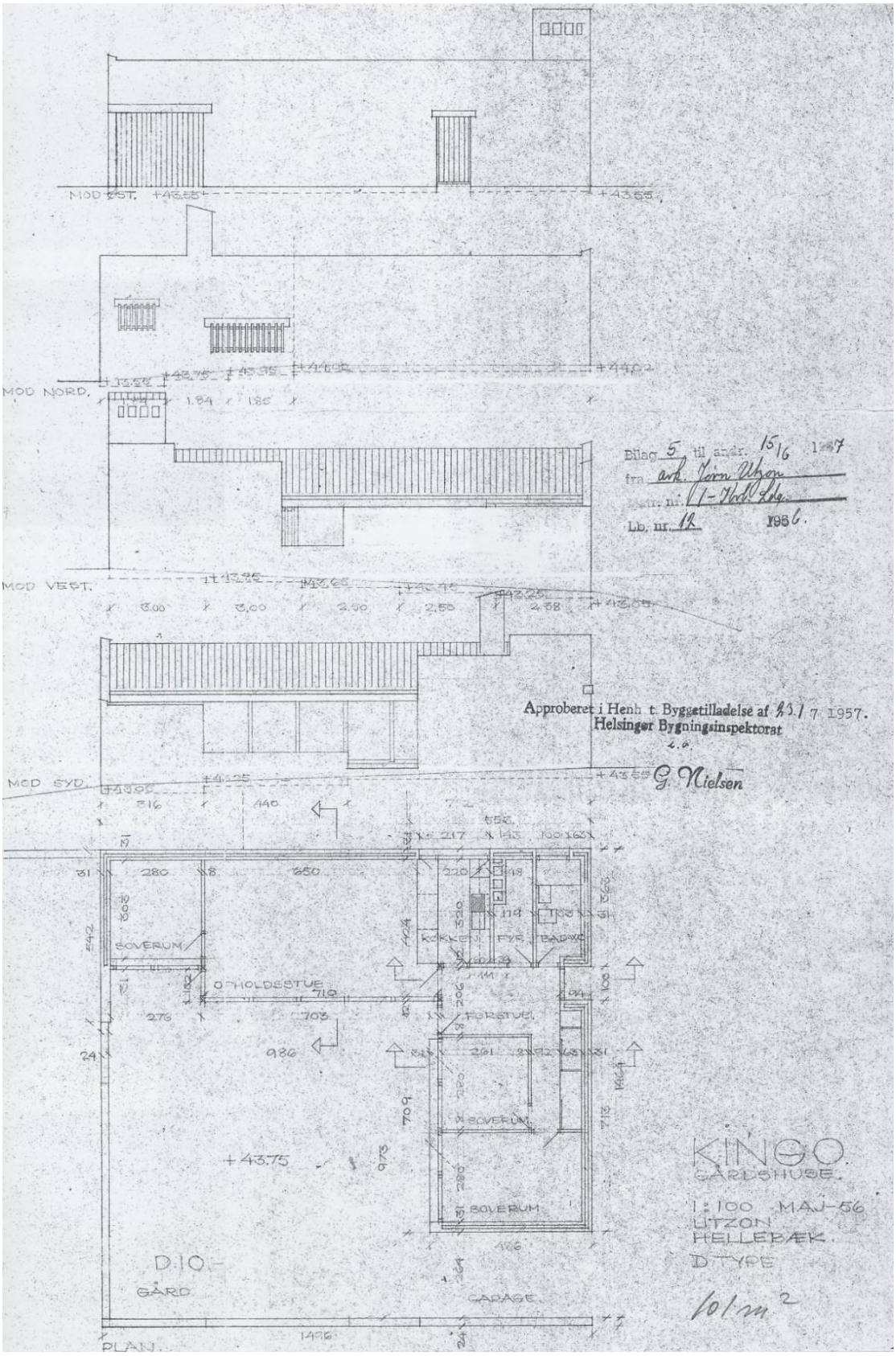


Figure 13: Drawings of Utzon's 1956 Kingo Houses.
Source: © *Utzon Archives* / Aalborg University & Utzon Center

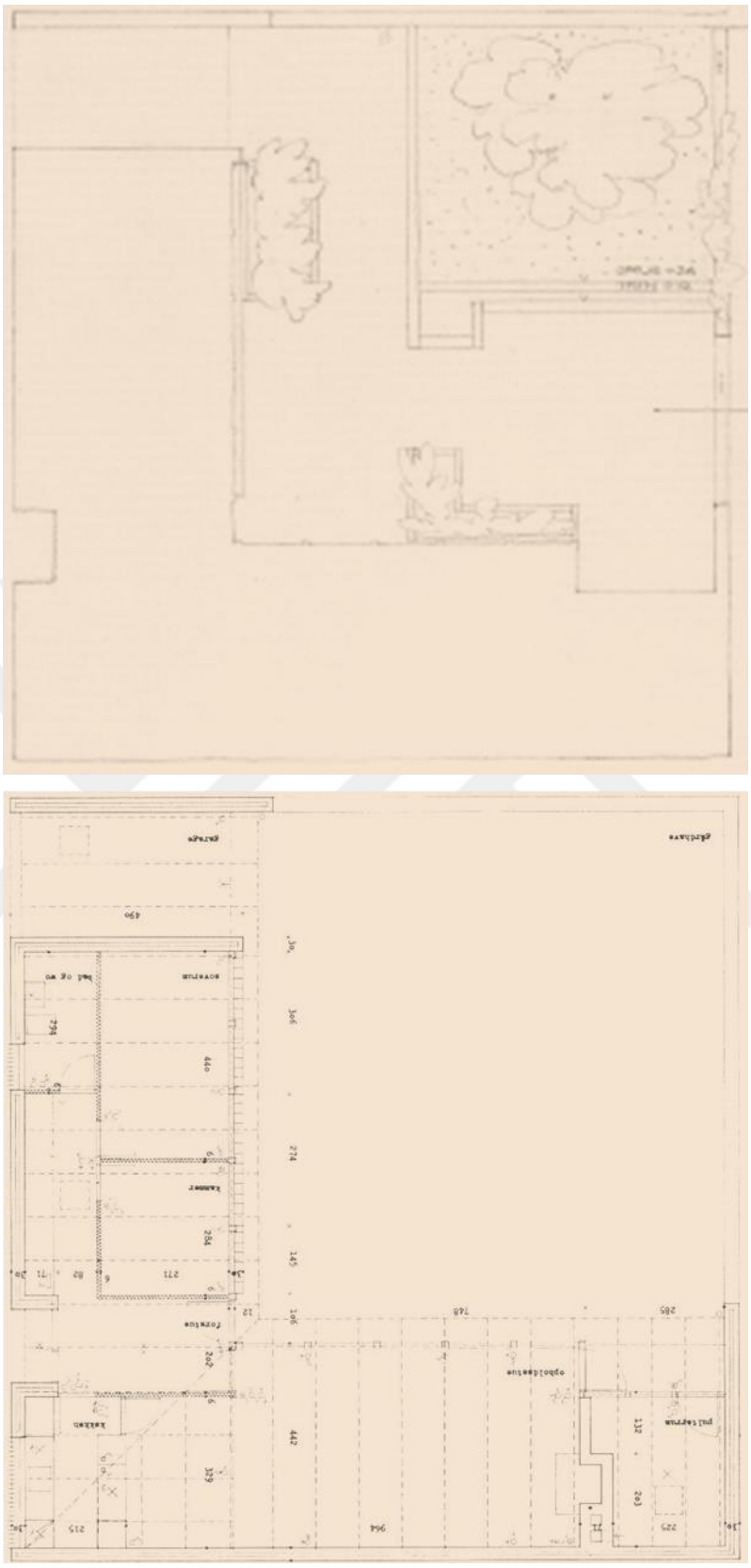


Figure 14: Roof plan and plan of Fredensborg patio house.
Source: © *Utzon Archives* / Aalborg University & Utzon Center

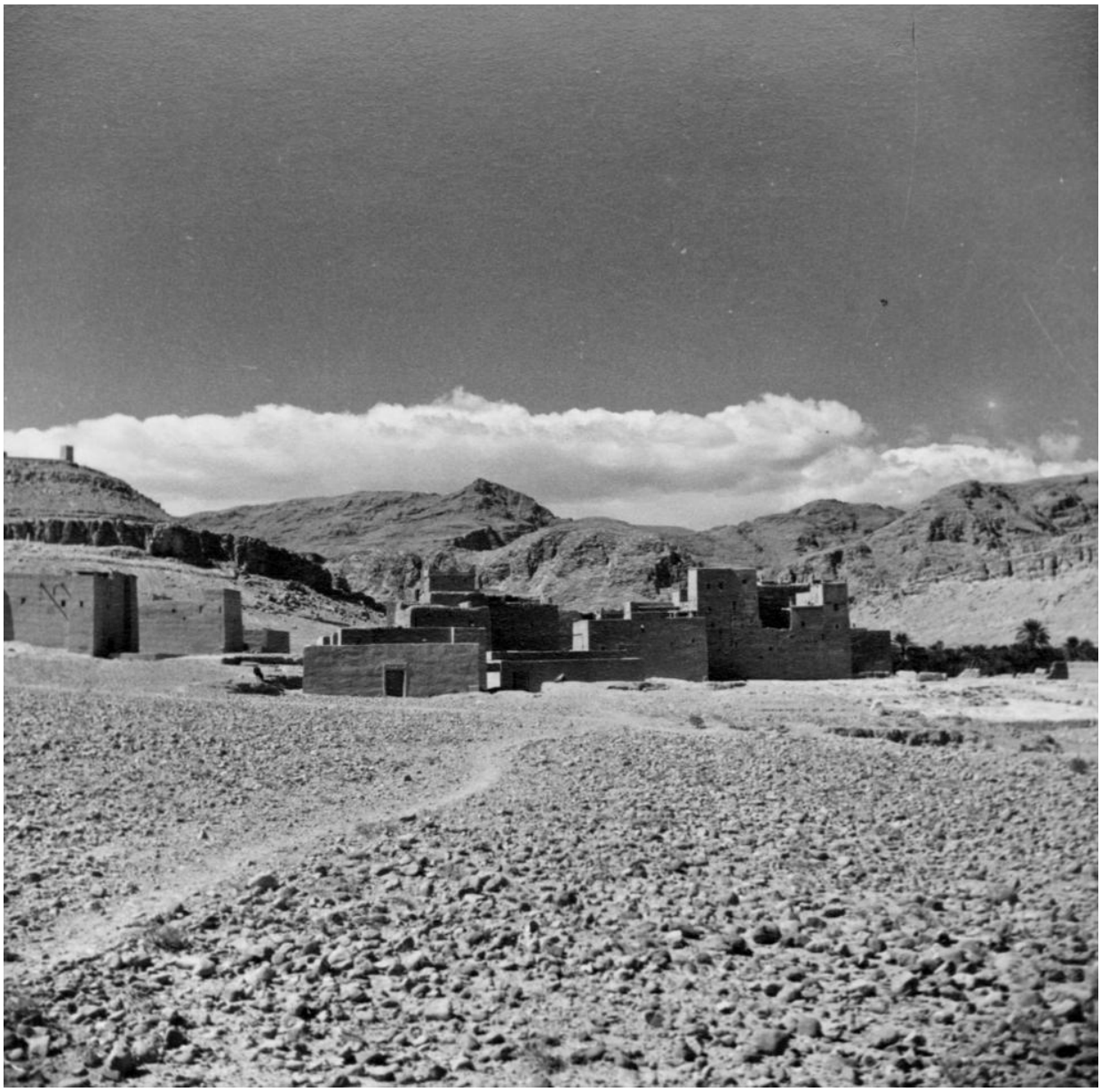


Figure 15: Utzon's own photograph of vernacular houses of Morocco which was sent to C.C. Höganäs. Source: © *Utzon Archives* / Aalborg University & Utzon Center

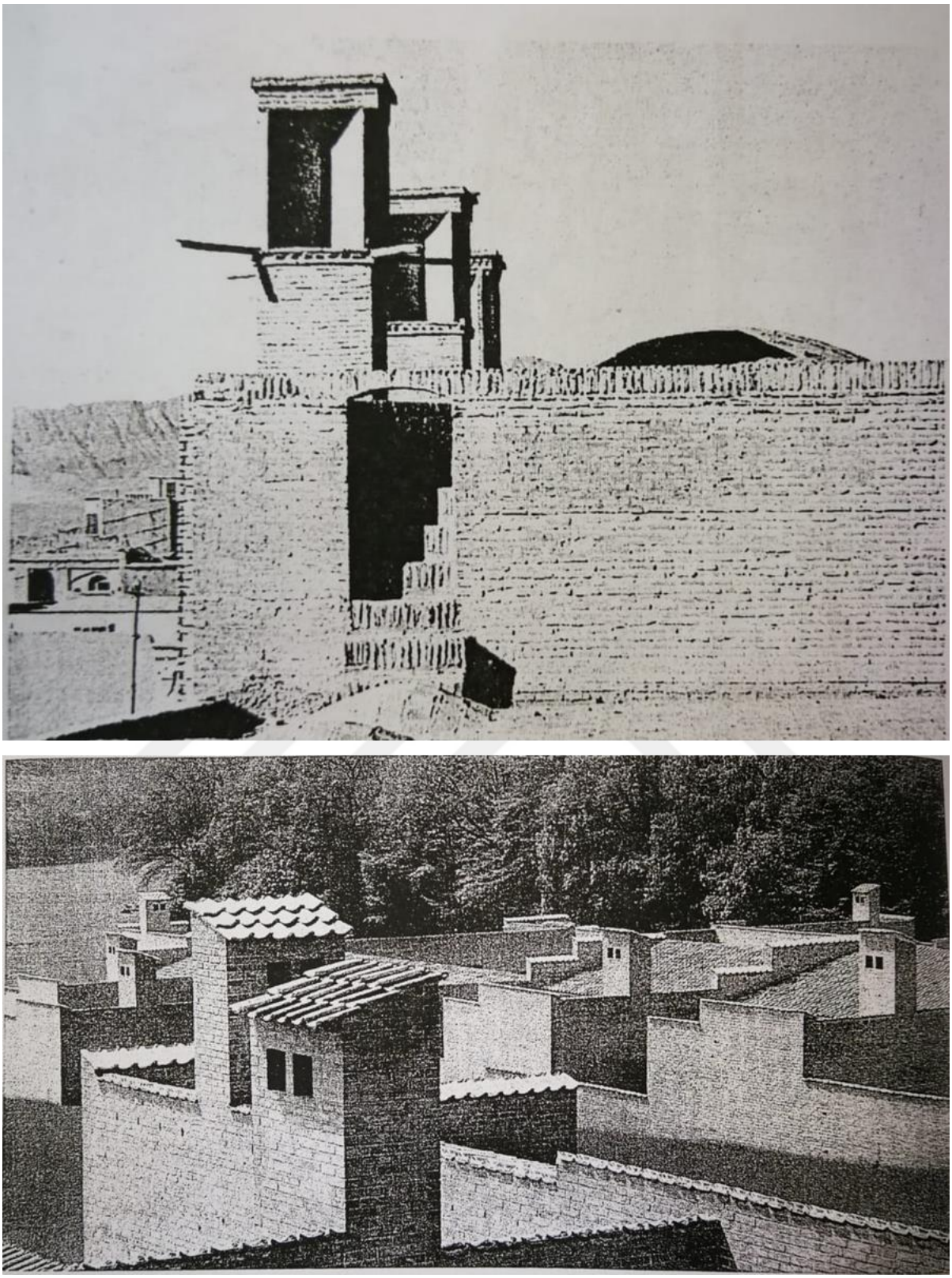


Figure 16: Above: Kashan, Madrasah-yi Sultani, wind towers and exterior walls. Below: Housing complex in Fredensborg, showing exterior walls and chimneys.
Source: Ardalan and Bakhtiar, 59.
Source Forés, 199.

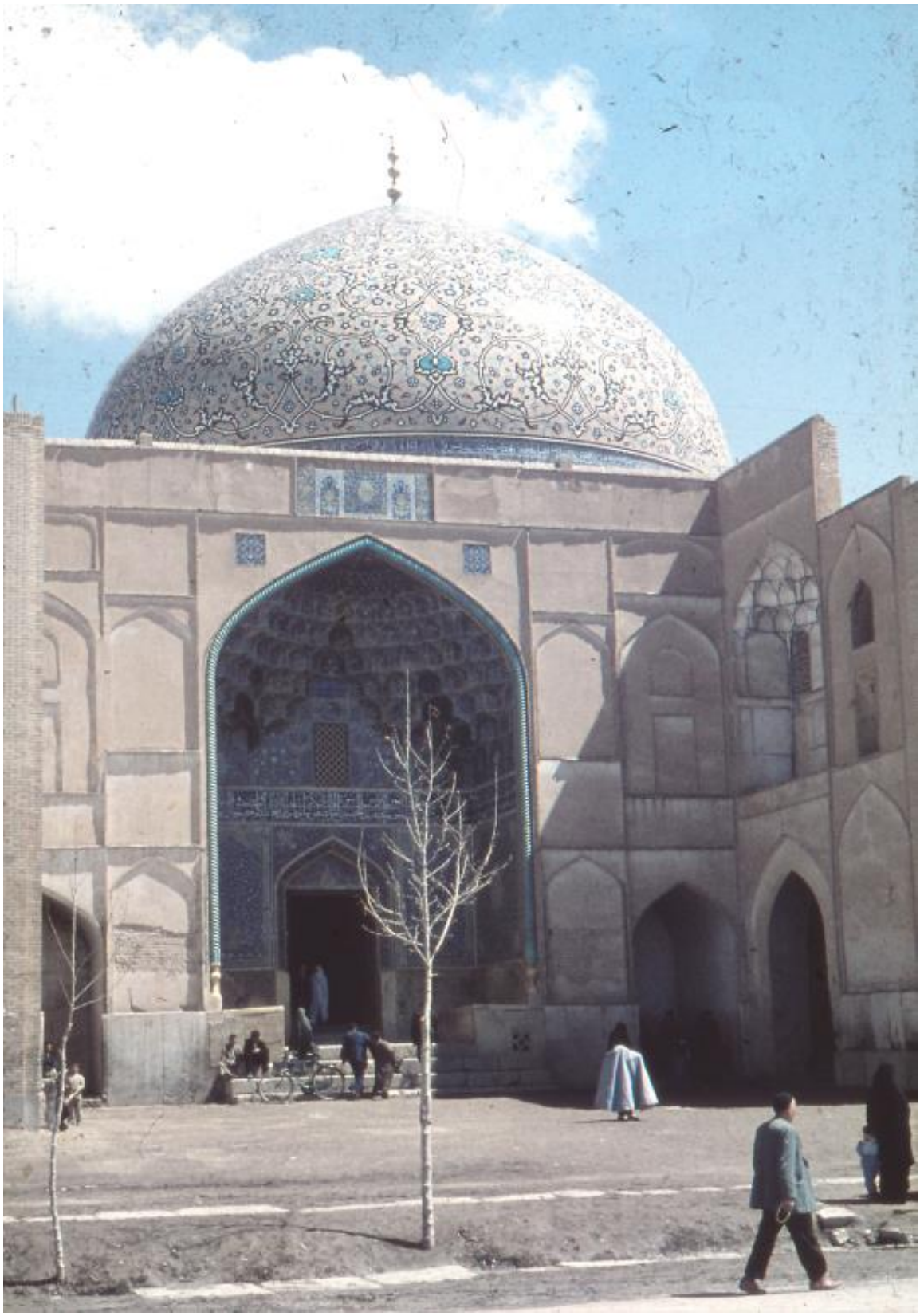


Figure 17: The Shaikh Lotfollah Mosque in Isfahan city scape and entrance space, photograph taken by Utzon. Source: © *Utzon Archives* / Aalborg University & Utzon Center

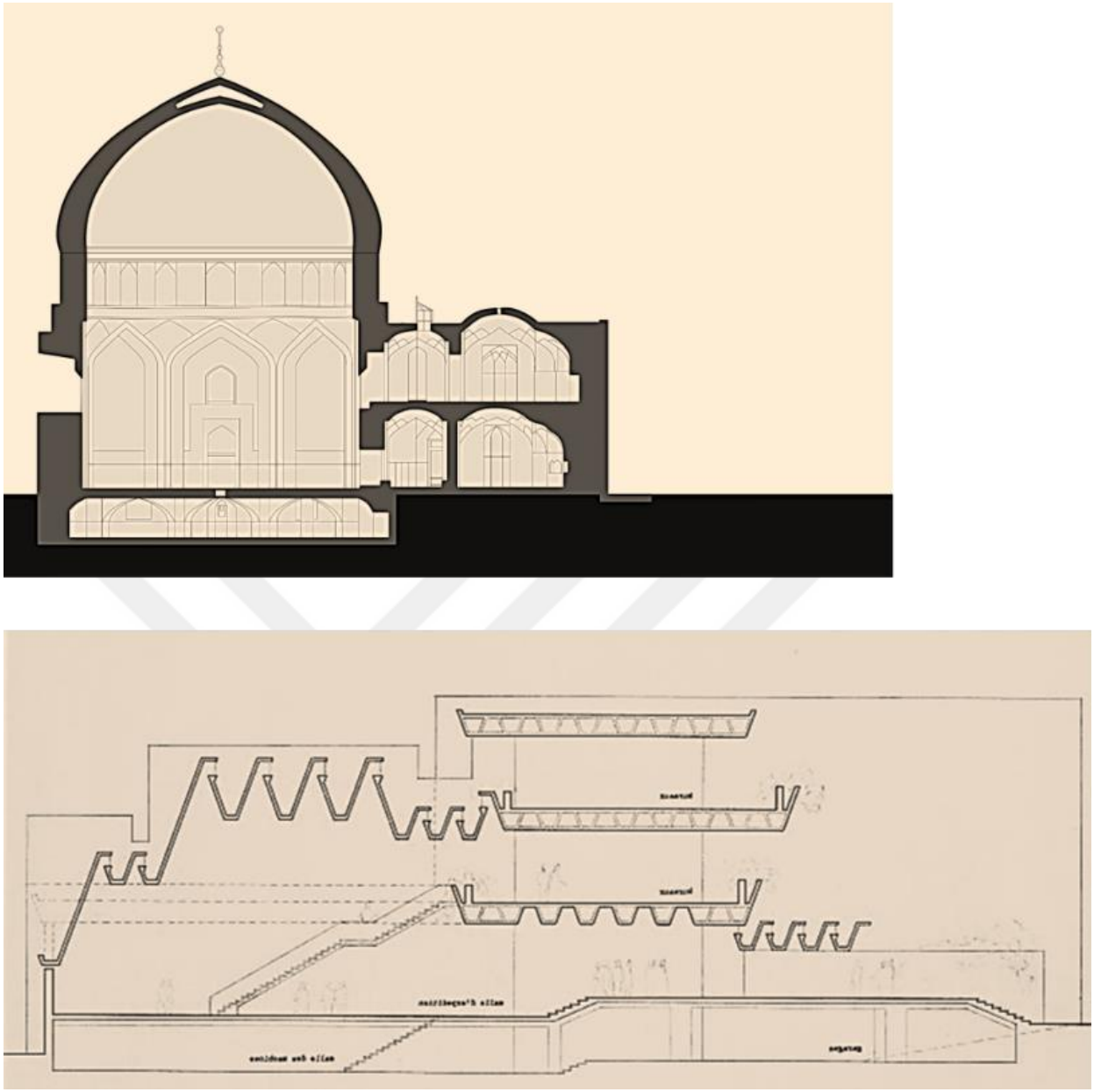


Figure 18: Above: Cross-section drawing of the Shaikh Lotfollah Mosque.
Source: Author's drawing. Below: Cross-section of the Melli Bank showing the sequence of spaces.
Source: © *Utzon Archives* / Aalborg University & Utzon Center

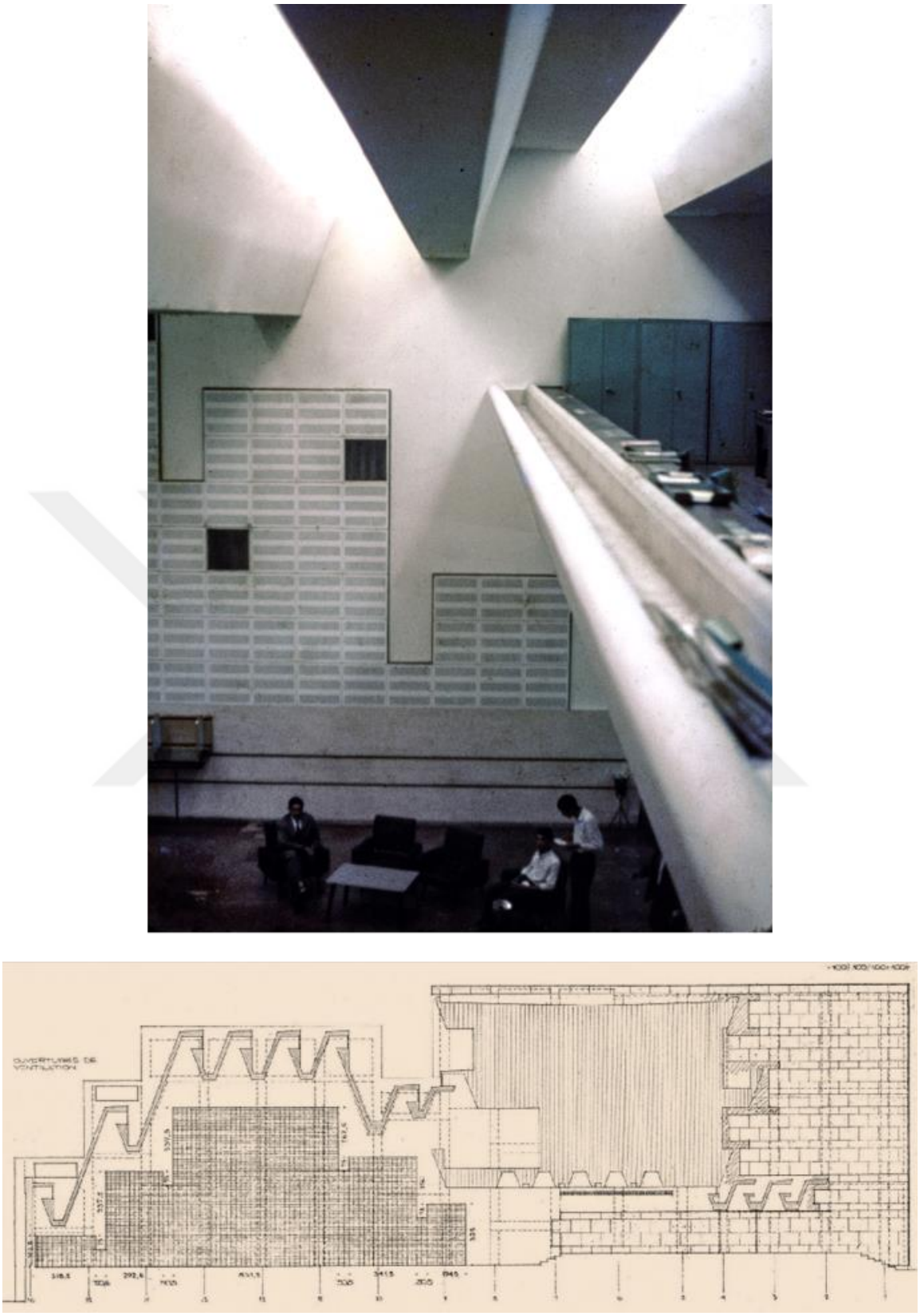


Figure 19: Above: Travertine cladding of the Melli Bank in the form of a mountain, reaching the "sky". Below: Section drawing of the Melli Bank displaying the wall texture arrangements. Source: © *Utzon Archives* / Aalborg University & Utzon Center

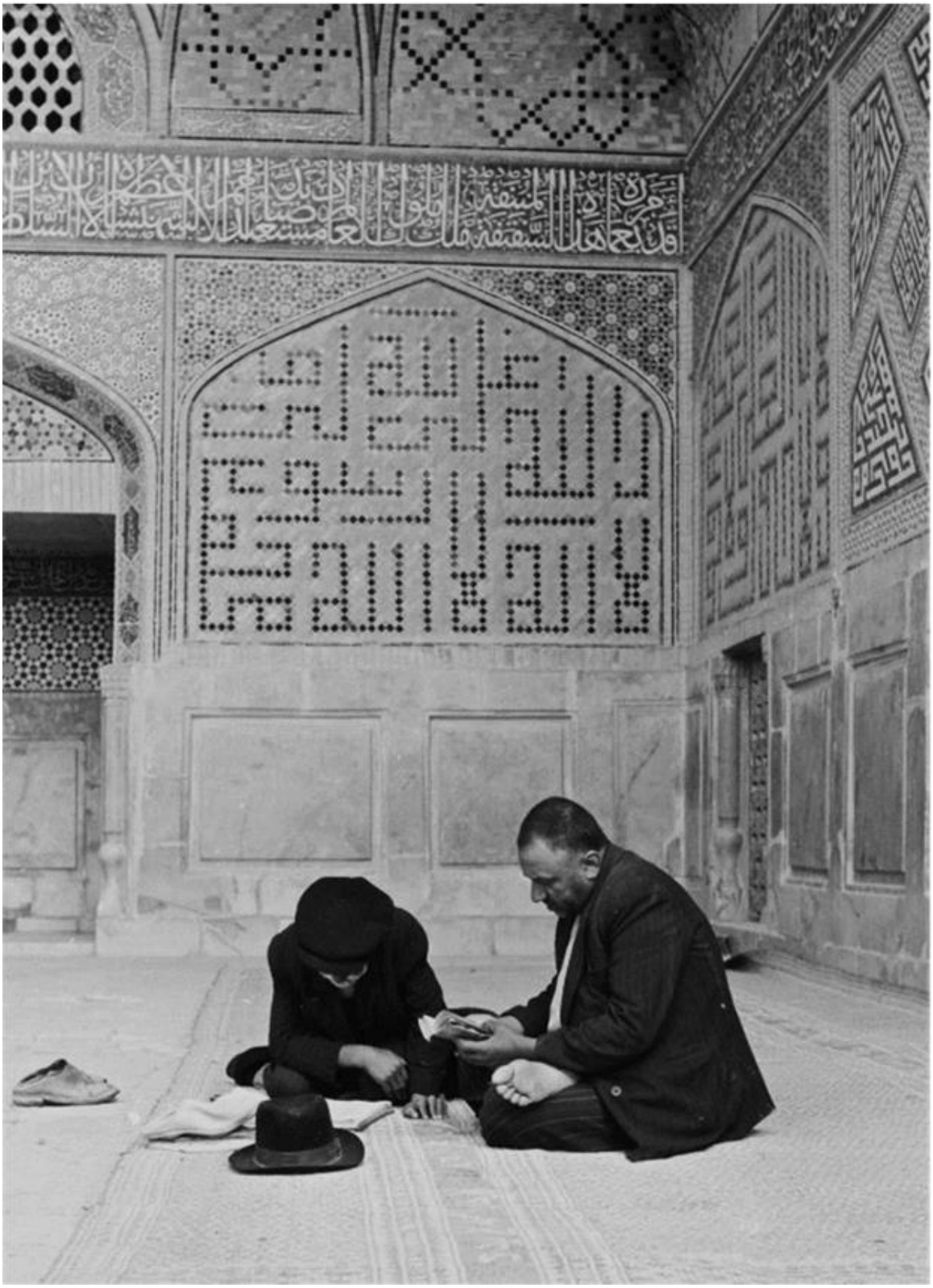


Figure 20: Utzon's photograph showing the tilework, *Kufic* calligraphy decoration and the stone wall protection of Masjid-i Jamii in Isfahan, while two people are sitting and reading the *Quran*.
Source: © *Utzon Archives* / Aalborg University & Utzon Center

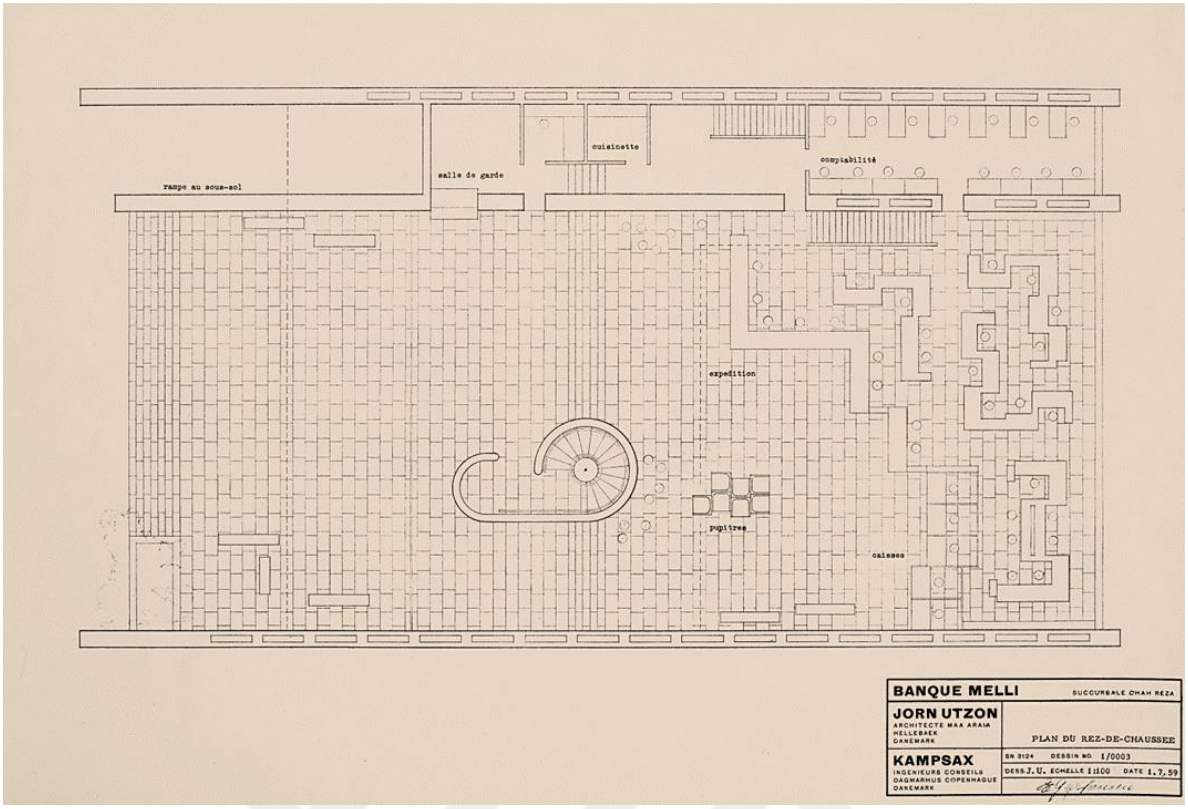


Figure 21: Plan of the Melli Bank, the arrangement of furnitures resembling *Kufic* calligraphy that Utzon studied at Masjid-i Jamii of Isfahan. Source: © *Utzon Archives* / Aalborg University & Utzon Center

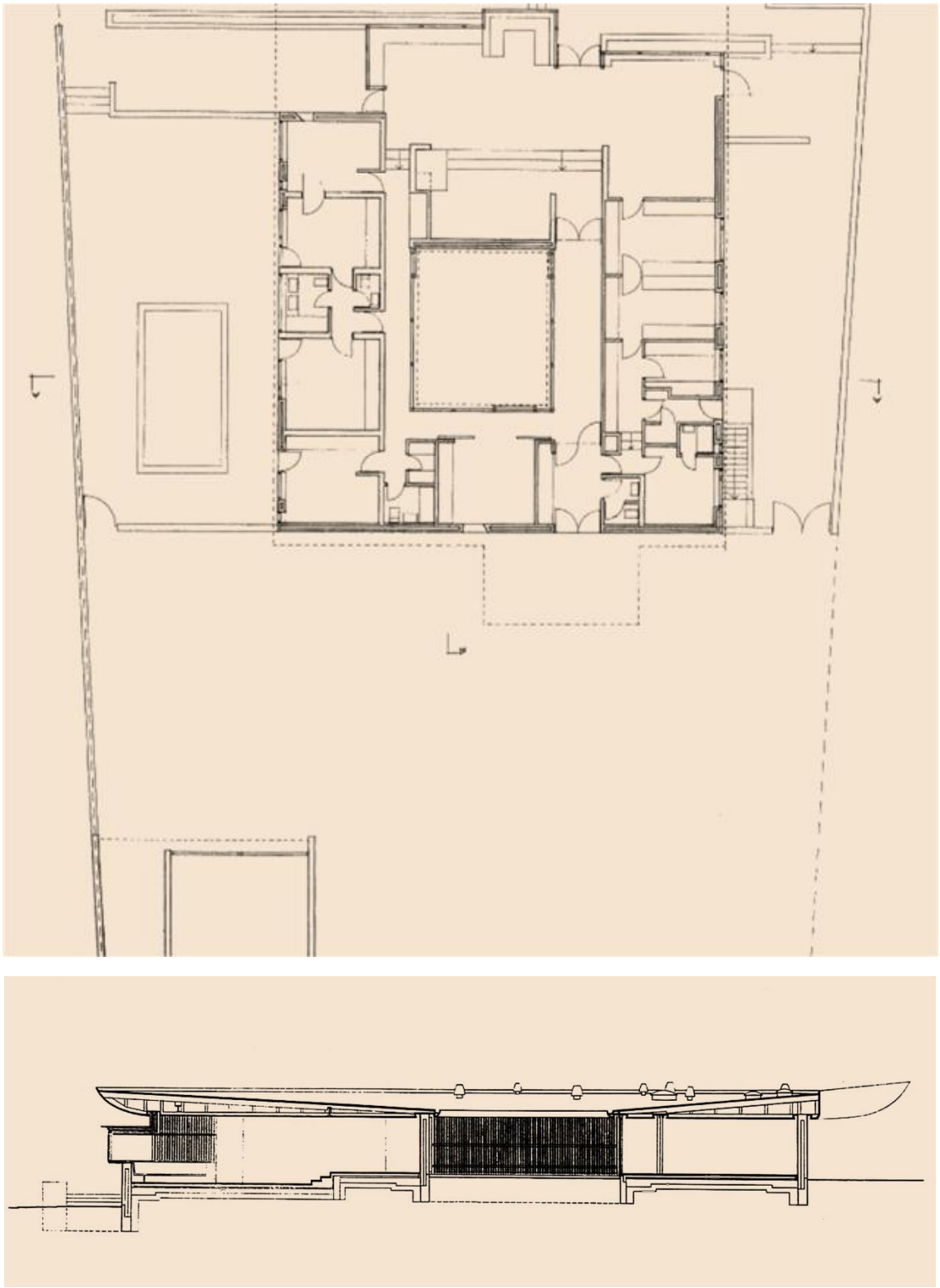


Figure 22: Plan and section of the Herneryd house, showing the square layout and use of courtyard in plan and extended eaves in section.
Source: © *Utzon Archives* / Aalborg University & Utzon Center

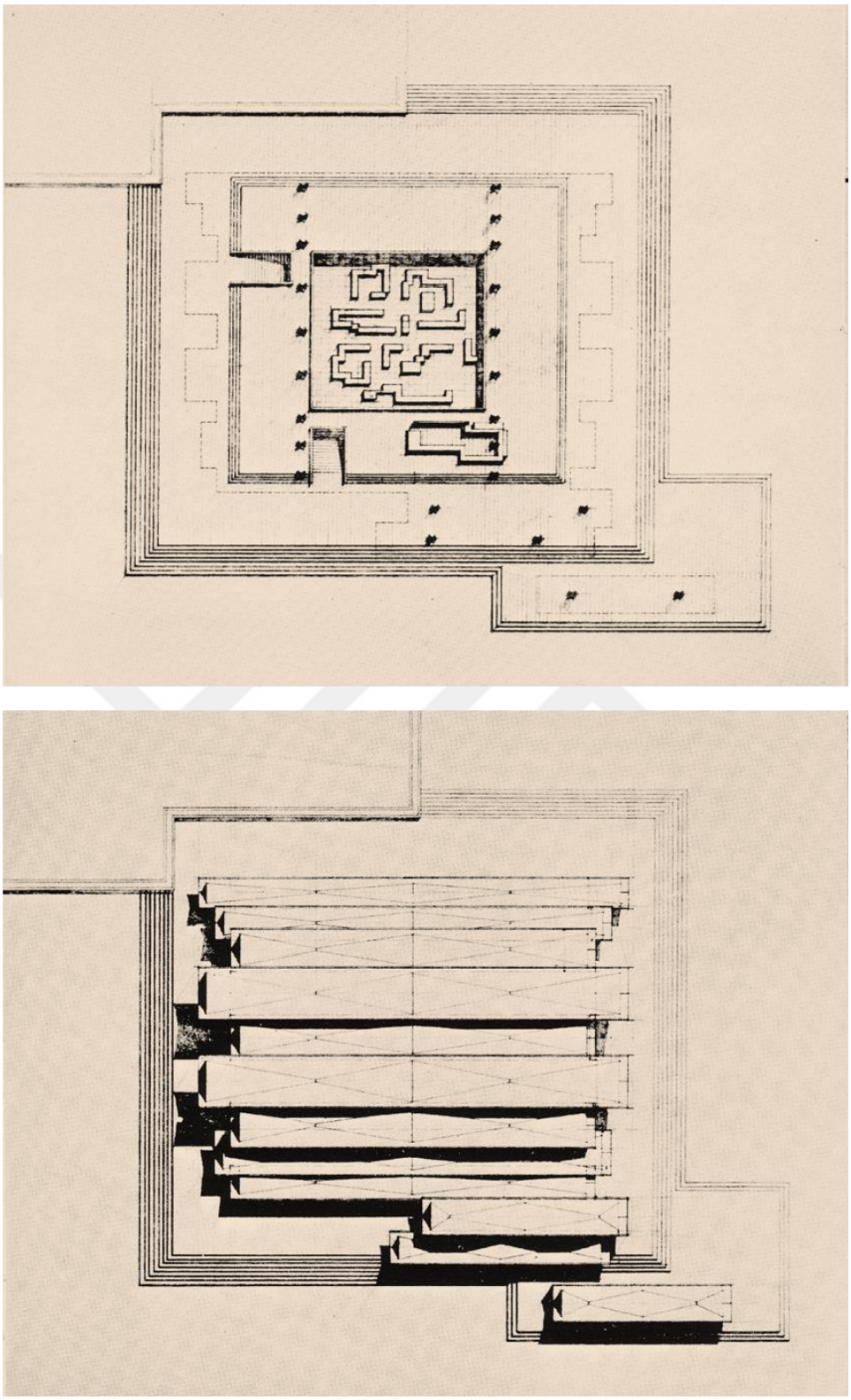


Figure 23: Plan (above) and roof plan (below) of the Market in Elineborg, the arrangement of shops resembling *Kufic* calligraphy similar to the Melli Bank furniture covered with mass-produced roof elements. Source: © *Utzon Archives* / Aalborg University & Utzon Center

Figure 24: Plan of the Bayview House, plan arrangement and wall configuration similar to the *Kufic* calligraphic lines, analogous to the Melli Bank furniture and Market in Elineborg shops. Source: © *Utzon Archives* / Aalborg University & Utzon Center

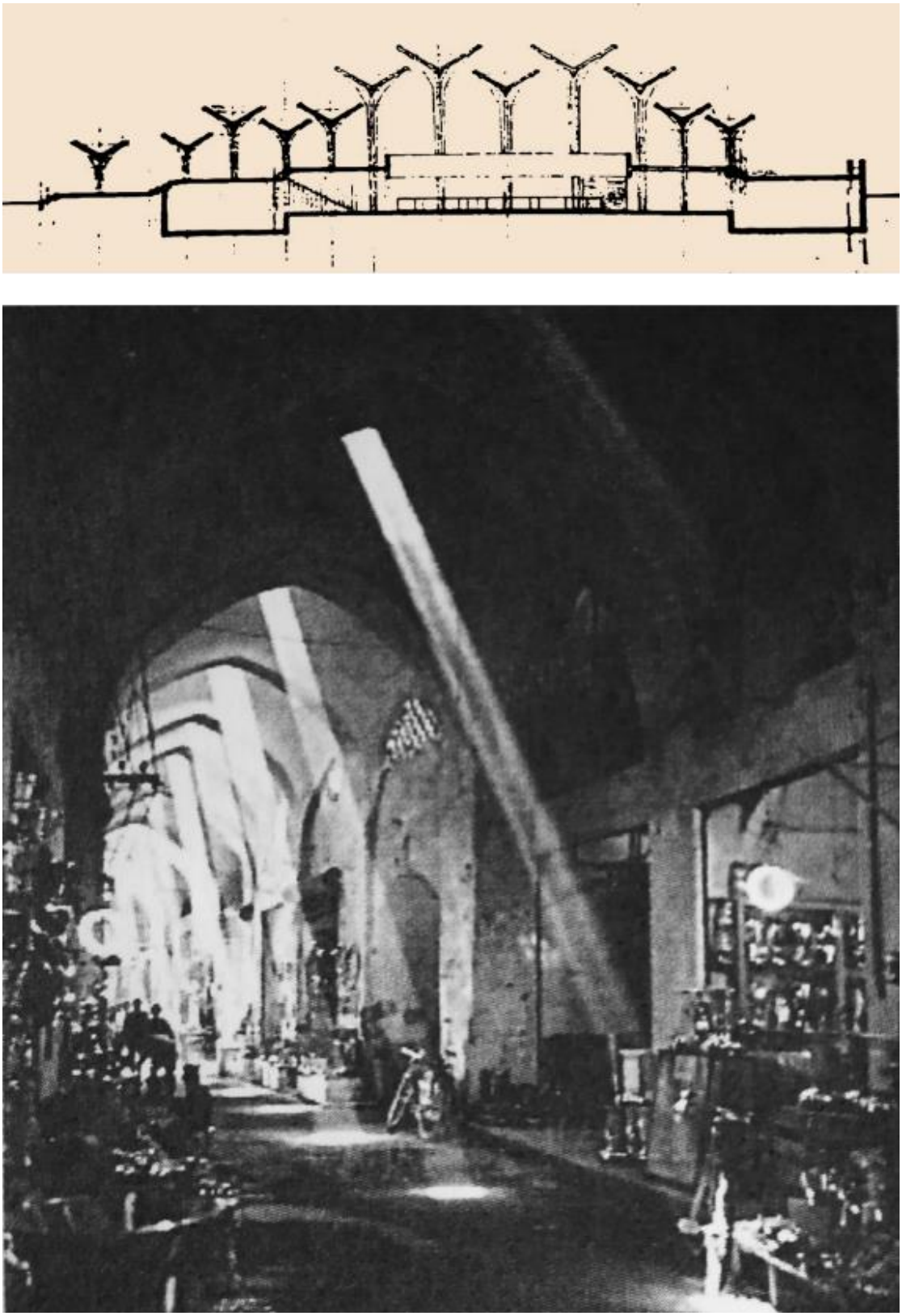


Figure 25: Above: Cross-section of the Market in Elineborg, showing the roof elements as Islamic vaults gradually ascending and descending at the center, with illumination from skylights. Source: Redrawn by author, from J. Ferrer Fores, *Jorn Utzon. Works and Projects.* Below: Grand Bazaar of Isfahan, Photograph showing the vaults and light beams, taken by Jørn Utzon and architect Hans Munk Hansen. Source: Jørn Utzon's *Logbook vol. 5: Additive architecture.*

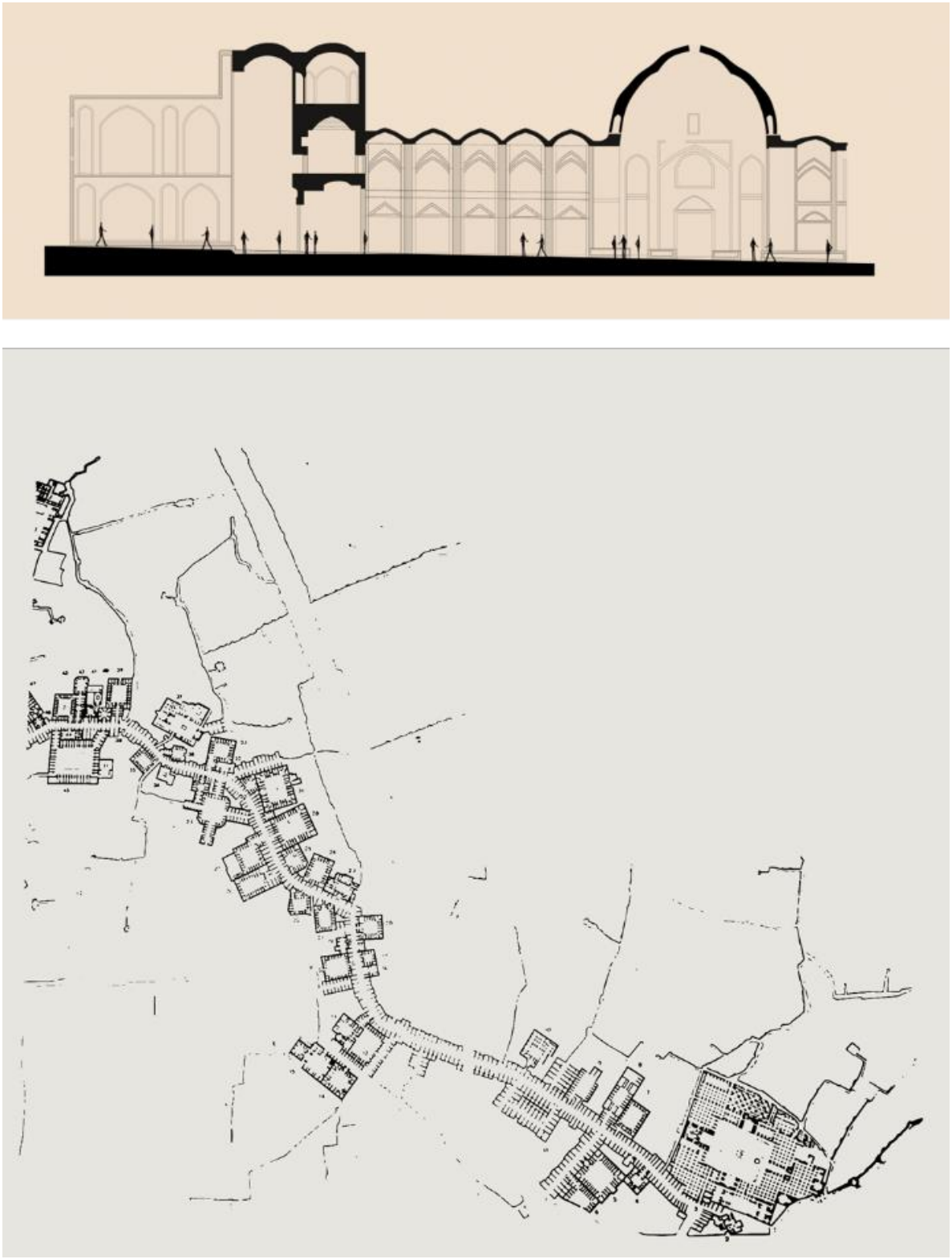
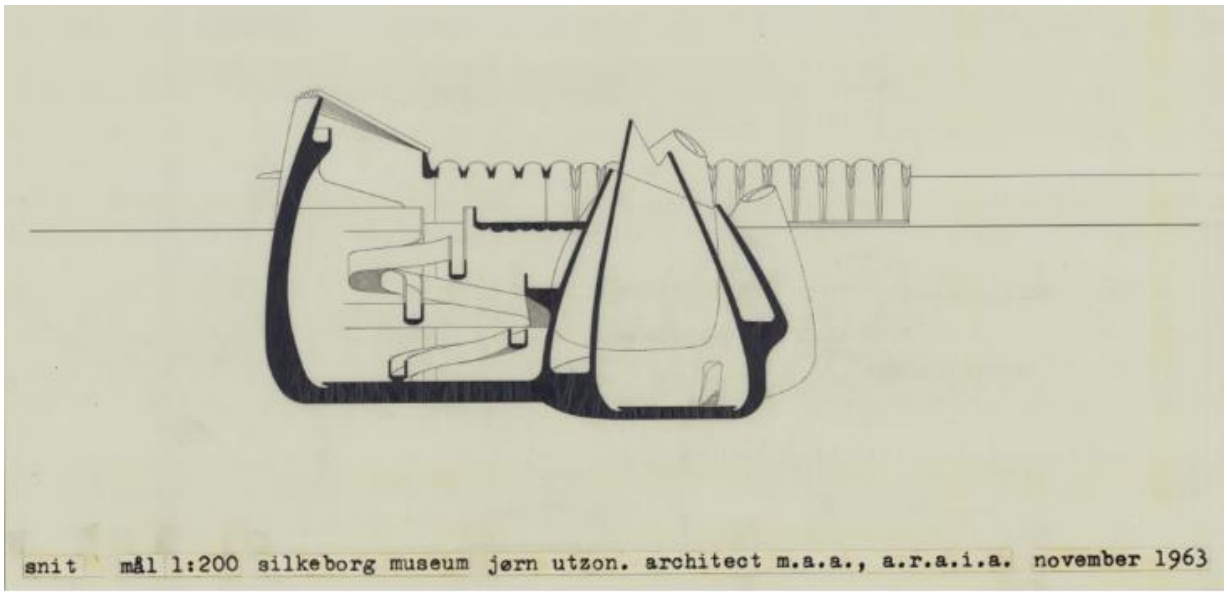


Figure 26: Above: Section of the Grand Bazaar of Isfahan. Below: Plan of the Grand Bazaar of Isfahan connected to the Naqsh-e Jehan square by Shah Abbas I of the Safavids.
Source: Redrawn by author from: Browne, Kenneth. (1976). Life Line 1: Bazaar Route from Friday Mosque to the Maidan. Isfahan, Special Issue. Ed. Cantacuzino, Sherban and Kenneth Browner. London: Architectural Review. vol. 159, no.951, 260-281.
Source: Redrawn by author from Nader Ardalan&Laleh Bakhtiar's *The Sense of Unity*



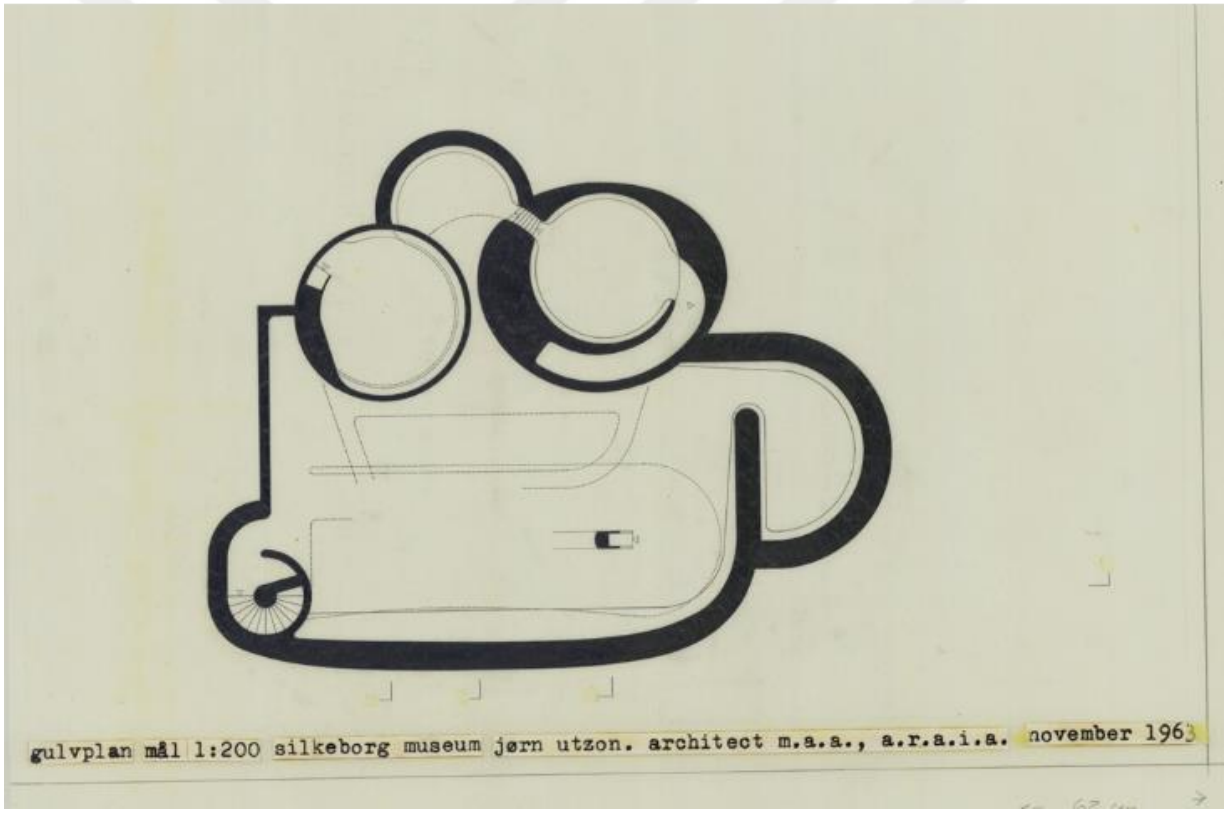


Figure 27: The interconnected domical spaces of the Silkeborg Museum of Art, should be inspired from the Aminoddole Plaza of the Bazaar of Kashan and south dome of the Masjid-i Jamii of Isfahan.
Source: © *Utzon Archives* / Aalborg University & Utzon Center

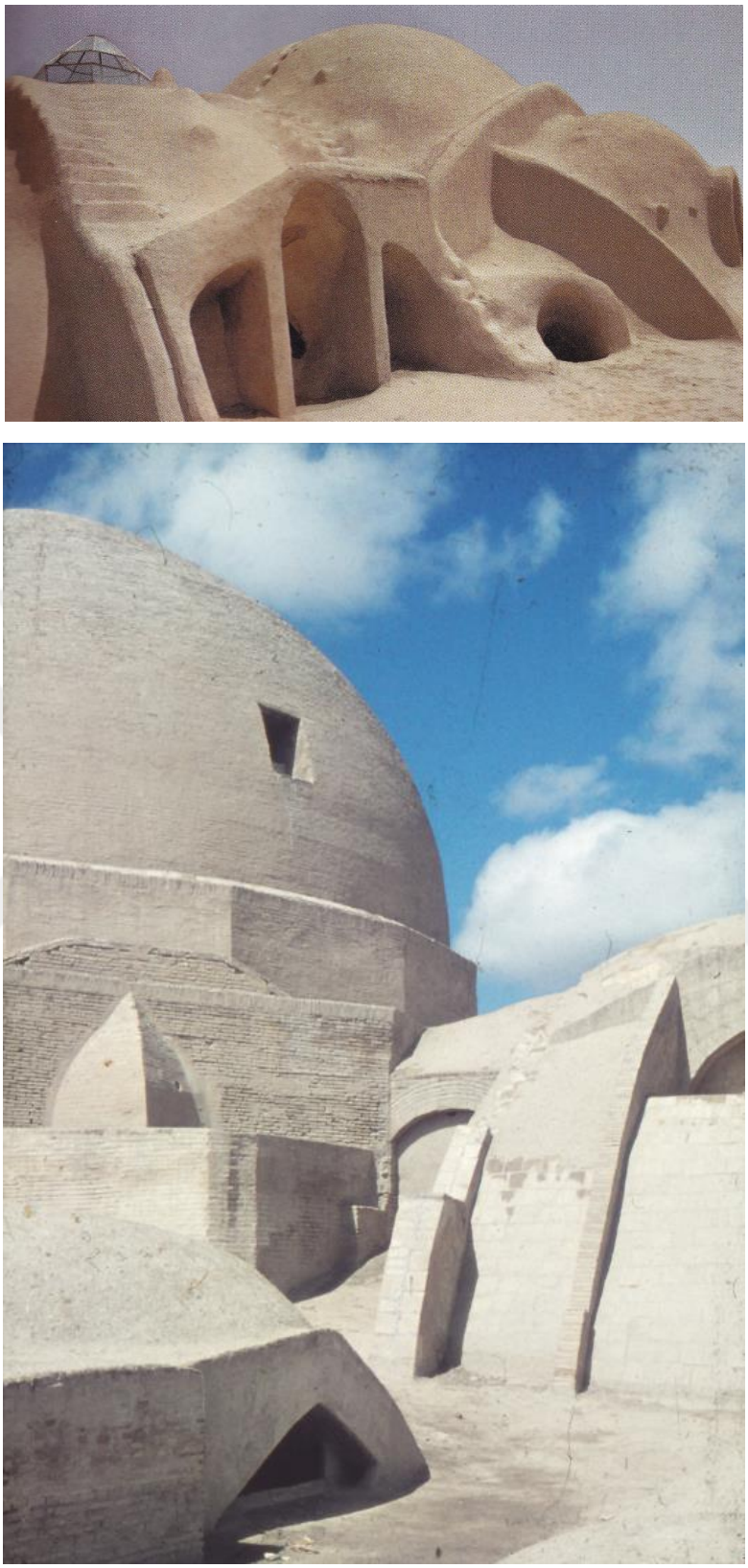


Figure 28: Above: Scanned image from Utzon's reading, showing below the Bazaar of Kashan, roofscape of Aminoddole Plaza made of earth architecture. Source: Jean Dethier, *Down to Earth, Adobe Architecture: and old idea, a new future* (New York: Facts on File Inc, 1983), 107.
Below: Utzon's photograph of the south dome of Masjid-i Jamii of Isfahan, constructed by Nizam-al Mulk in 1086. Source: © *Utzon Archives* / Aalborg University & Utzon Center

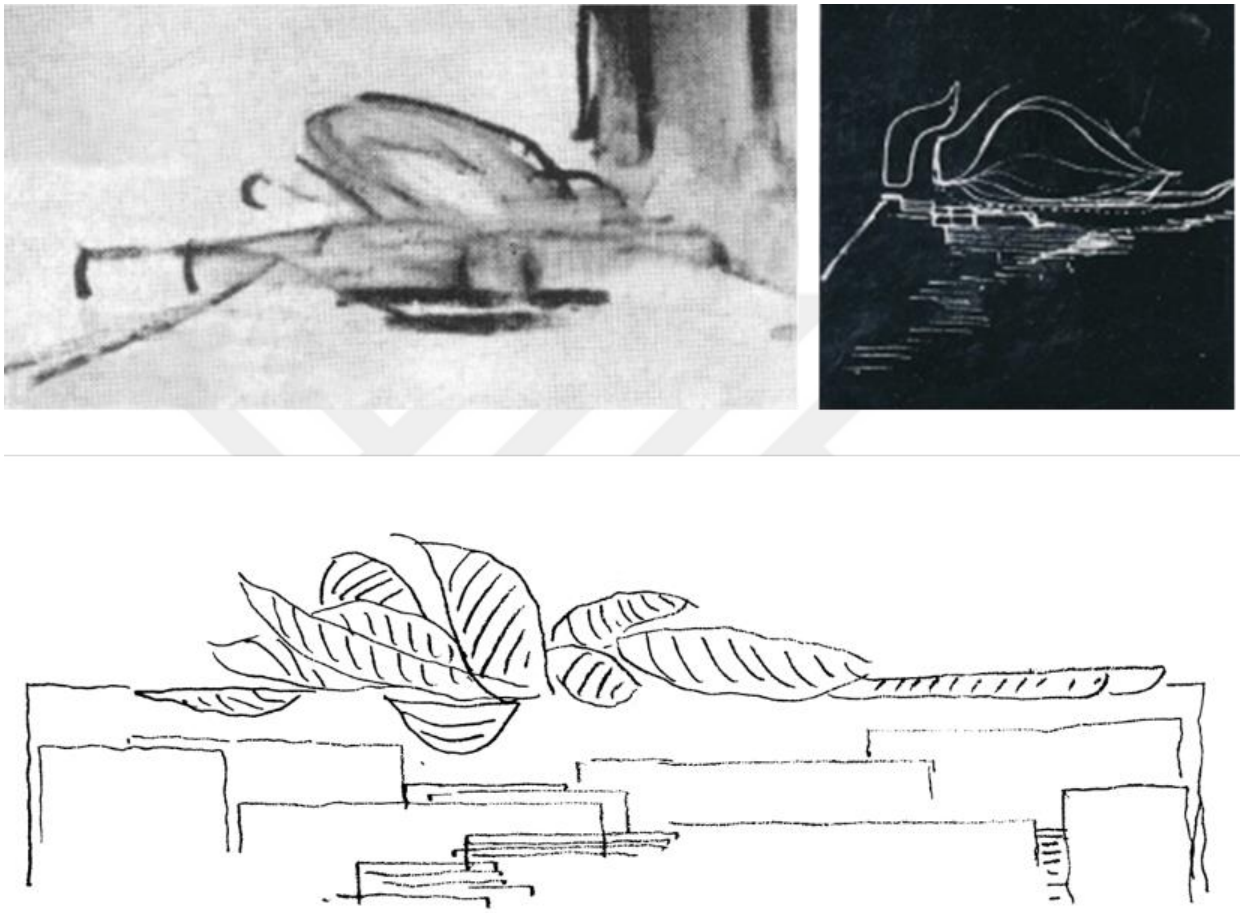


Figure 29: Above Left: Utzon's experimental domical forms of 1958 Hojstrup School. Above Right: 1960 Civic and Leisure Center plan for Elviria project. Below: Bayview house early roof sketch (below) inspired from historical domes of Persia. Source: © Utzon Archives / Aalborg University & Utzon Center

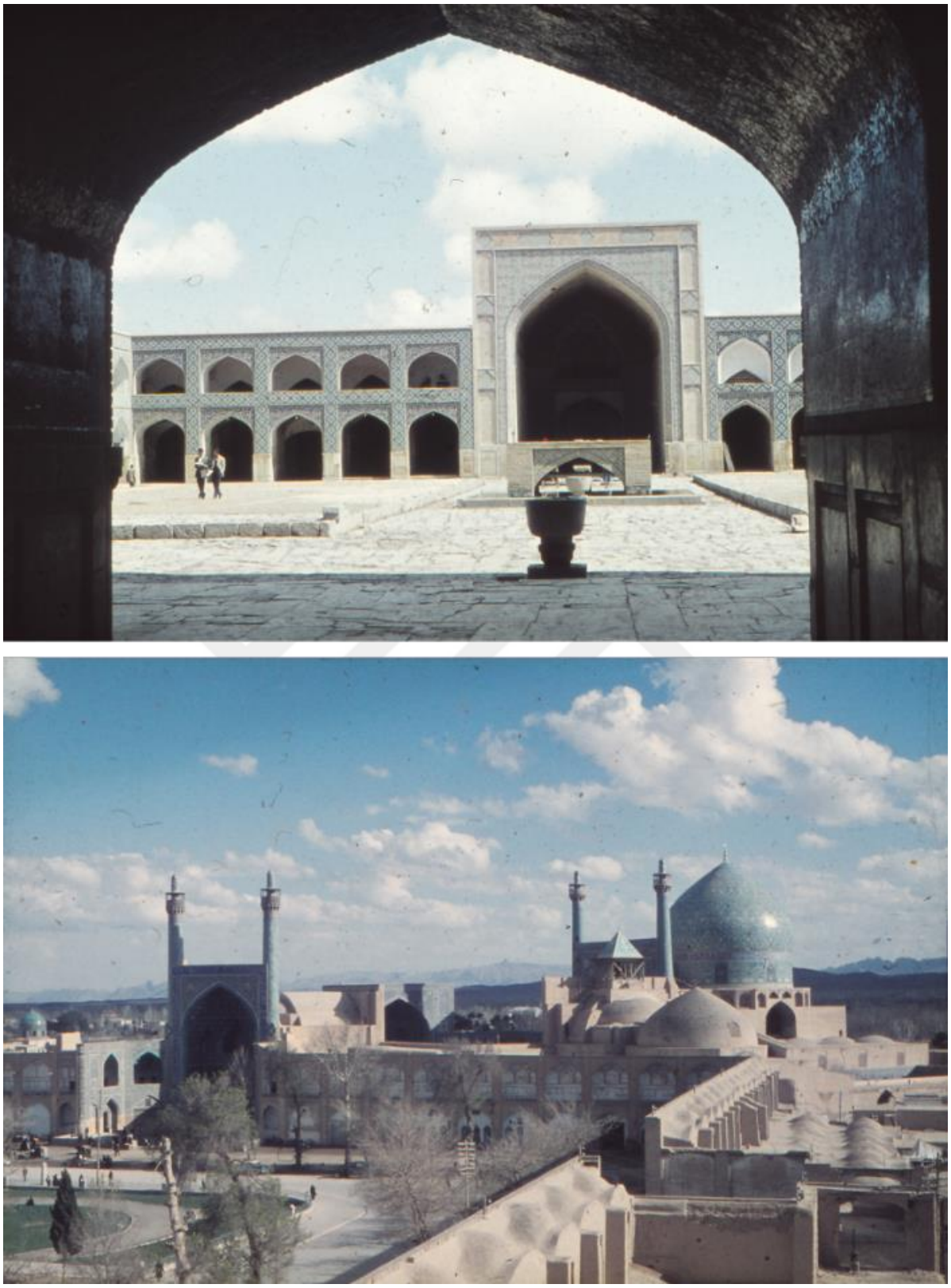


Figure 30: Above: The central court of the Masjid-I Shah from Utzon's slides. Below: The Masjid-I Shah and its relation to the urban court, the Maidan-I Shah. Source: © Utzon Archives / Aalborg University & Utzon Center

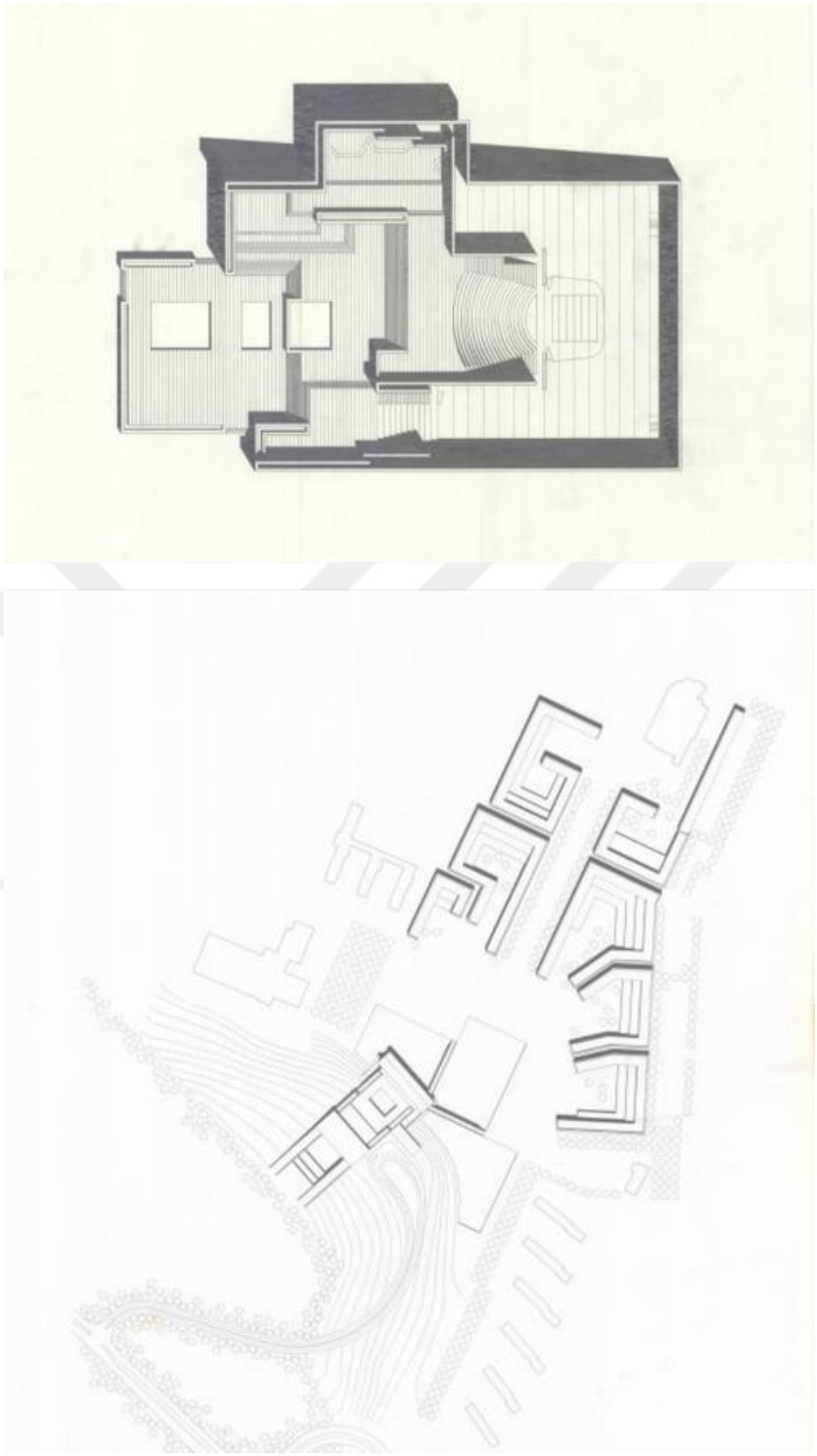


Figure 31: Above: Zurich Theatre plan scheme showing central axis and three pools at front court. Below: Wolfsburg theatre plan scheme housed an urban pool, and the plan arrangement resembled lines of *Kufic* calligraphy Utzon perceived in Masjid-i Jamii of Isfahan.
Source: © Utzon Archives / Aalborg University & Utzon Center

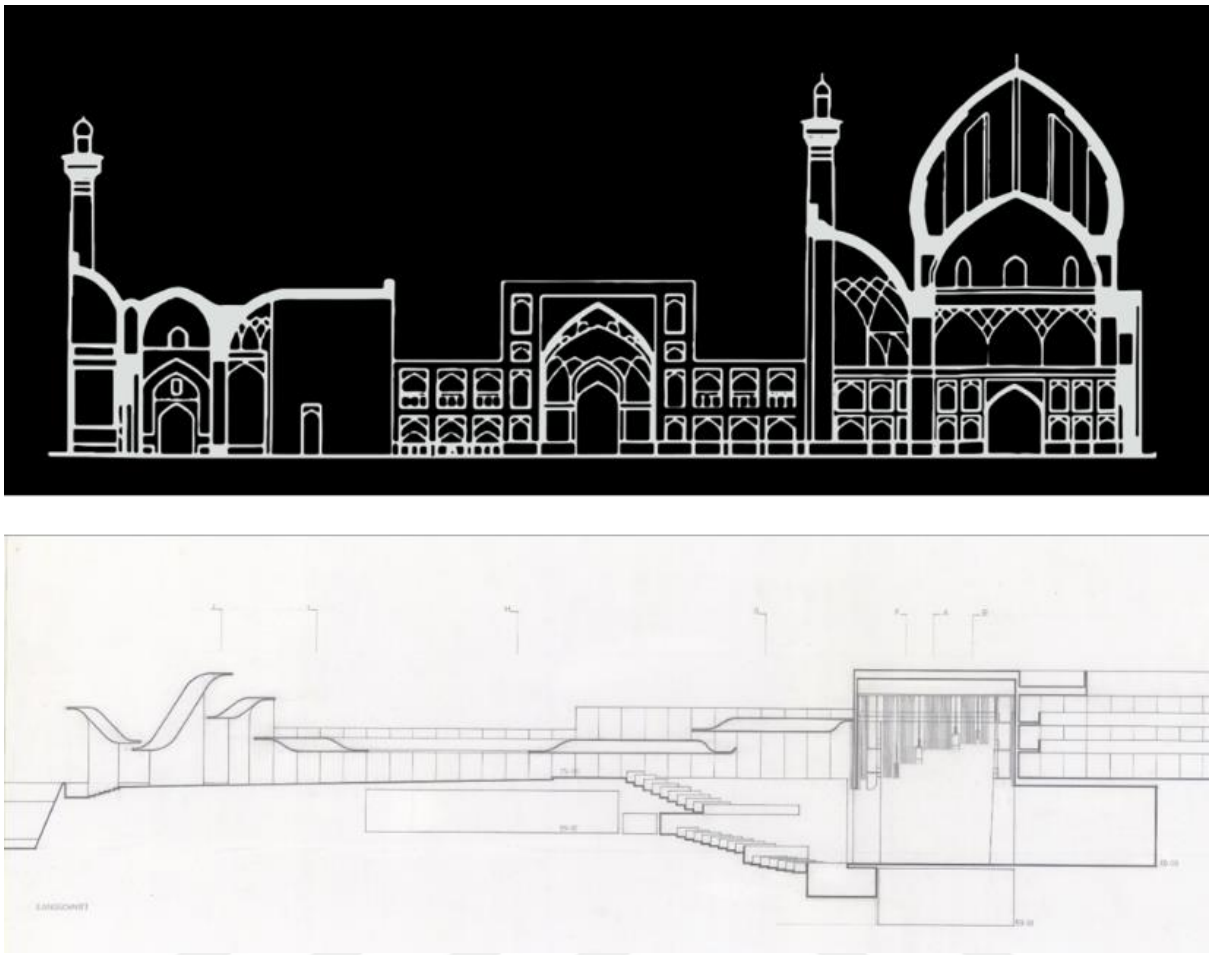


Figure 32: Above: Longitudinal section of Masjid-Shah showing the roof form and spatial progressions. Source: Author's drawing. Below: Longitudinal section of the Wolfsburg Theater.
Source: © Utzon Archives / Aalborg University & Utzon Center

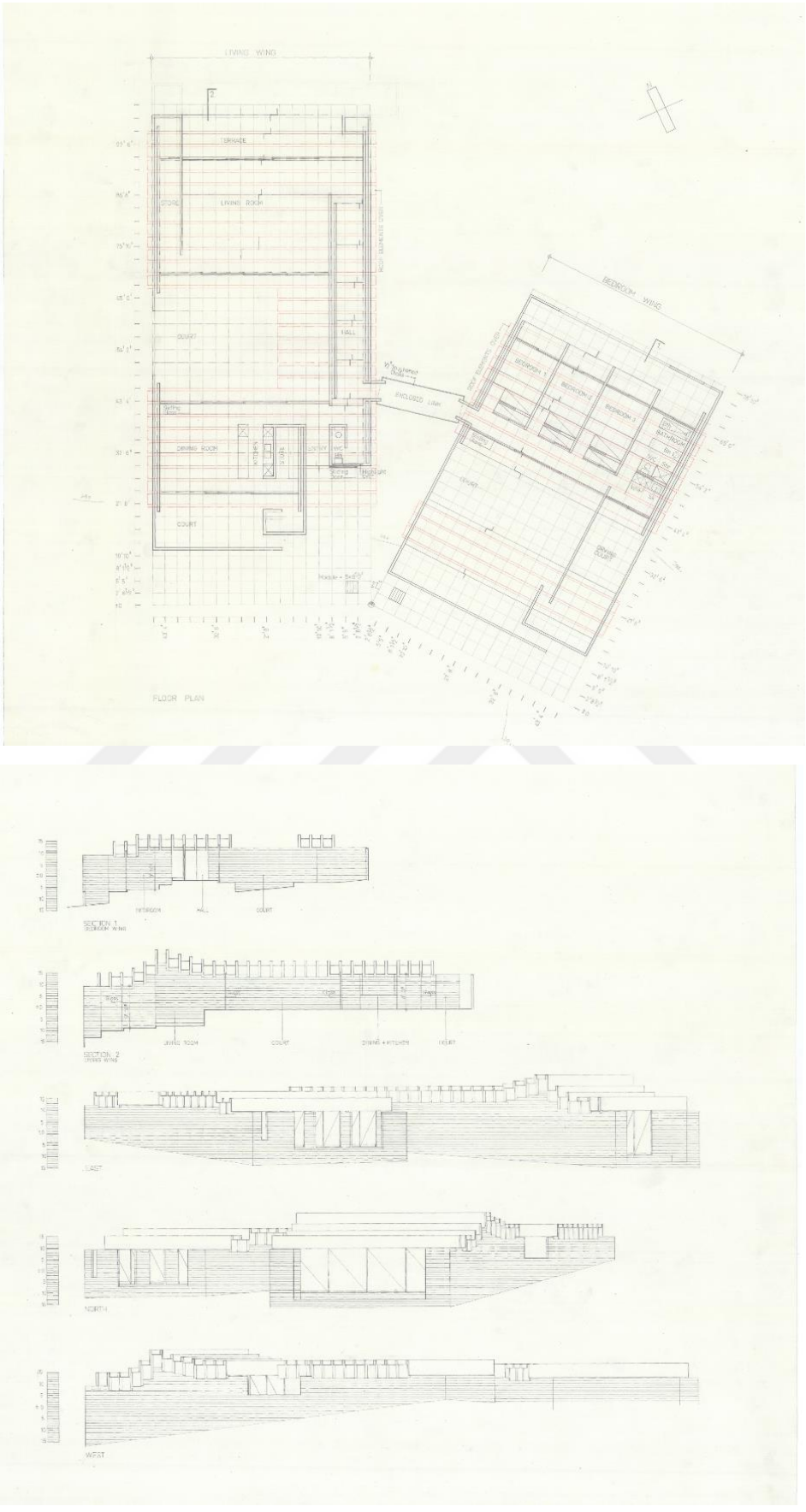


Figure 33: Utzon's 1963 Bayview house scheme with plan and section drawings.
Source: © Utzon Archives / Aalborg University & Utzon Center

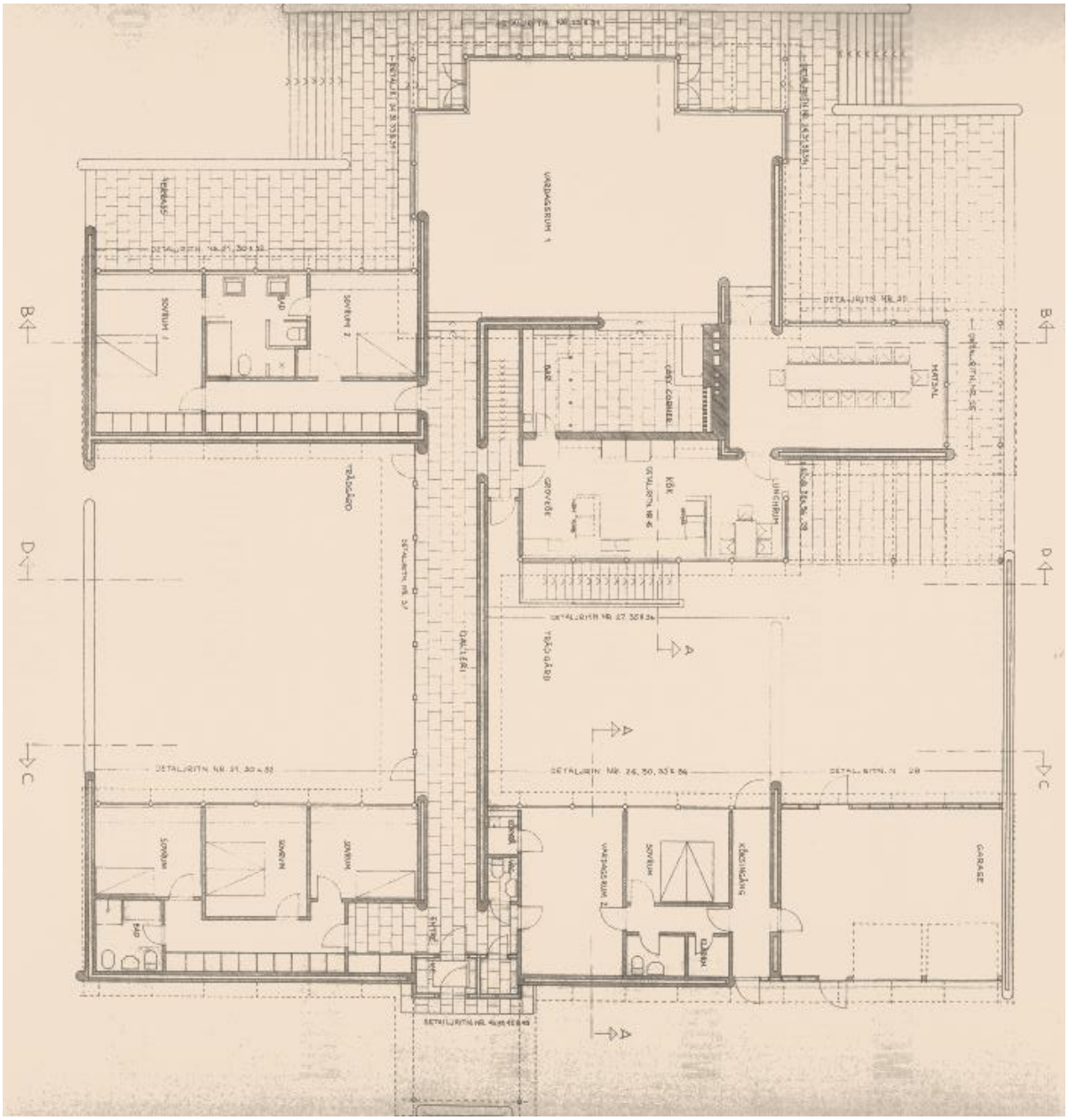


Figure 34: Plan drawing of the 1958 Banck House designed by Utzon.
Source: © Utzon Archives / Aalborg University & Utzon Center

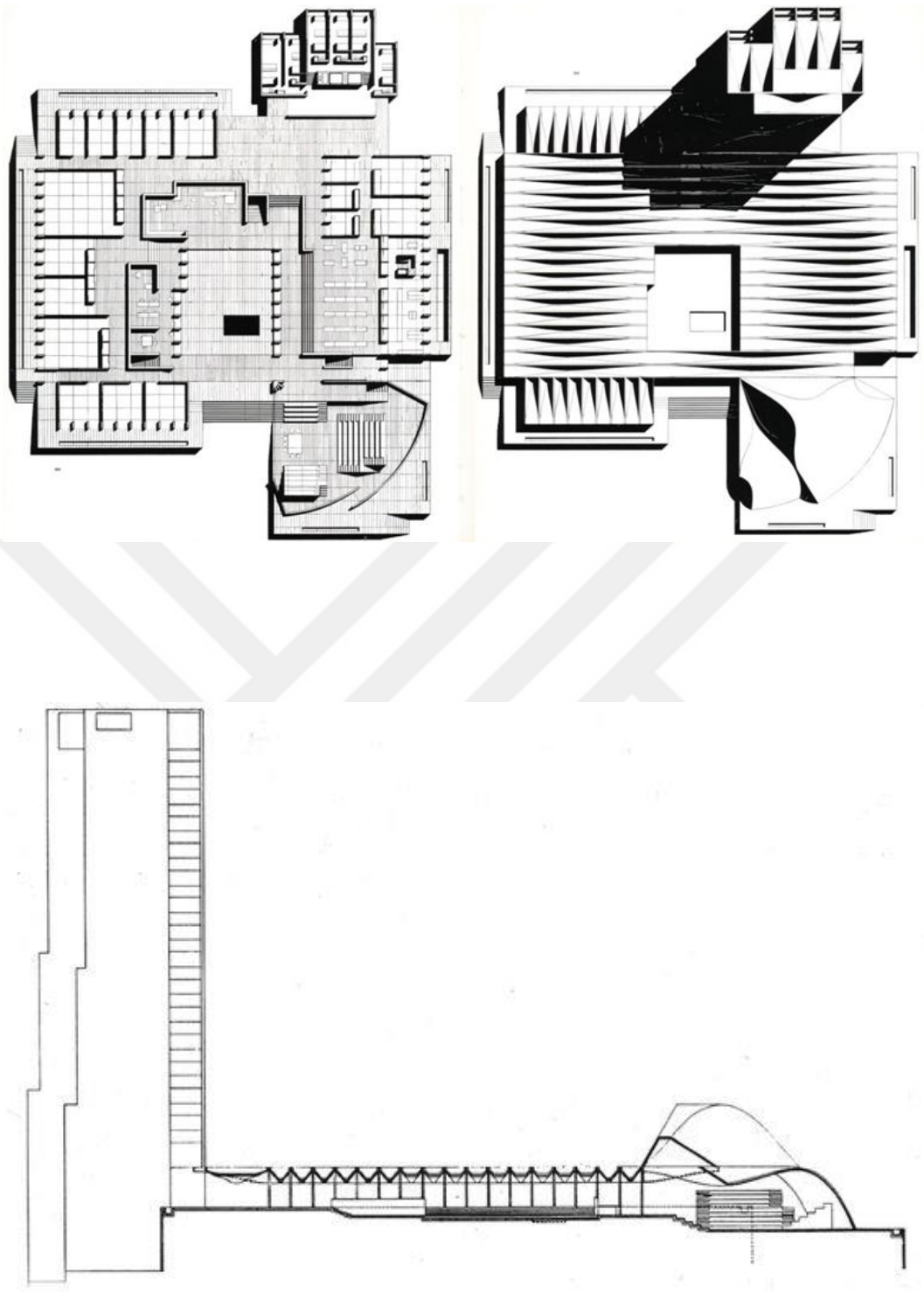


Figure 35: Plan, roof plan and section of the 1958 Hojstrup High-school competition entry of Utzon. Source: © Utzon Archives / Aalborg University & Utzon Center

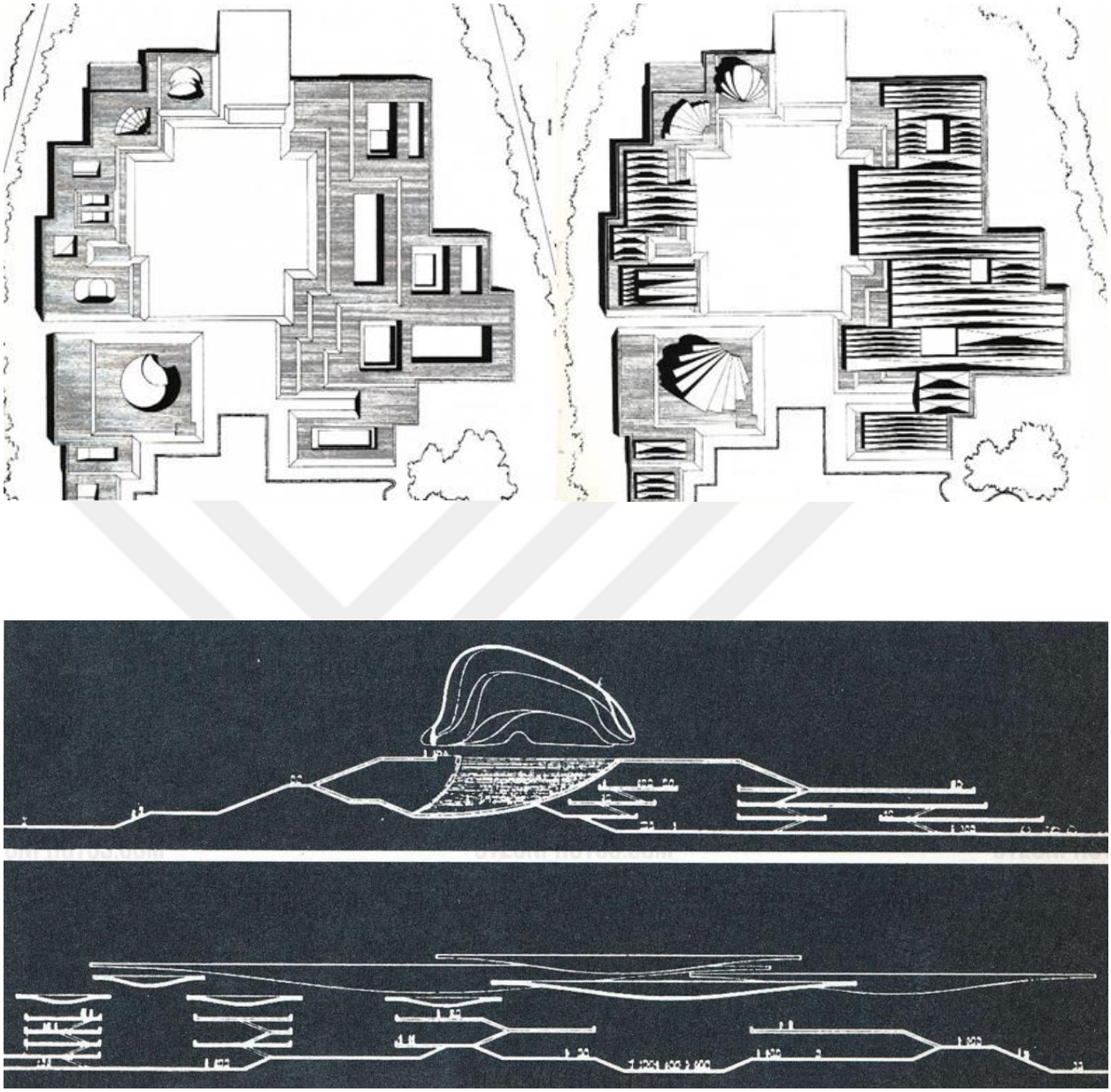


Figure 36: Plan, roof plan and section drawings of the 1959 Amager World Exhibition Project of Utzon..
Source: © Utzon Archives / Aalborg University & Utzon Center

Figure 37: Urban plan, elevation, plan and roof plan of the 1966 competition for University in Odense project of Utzon.
Source: © Utzon Archives / Aalborg University & Utzon Center

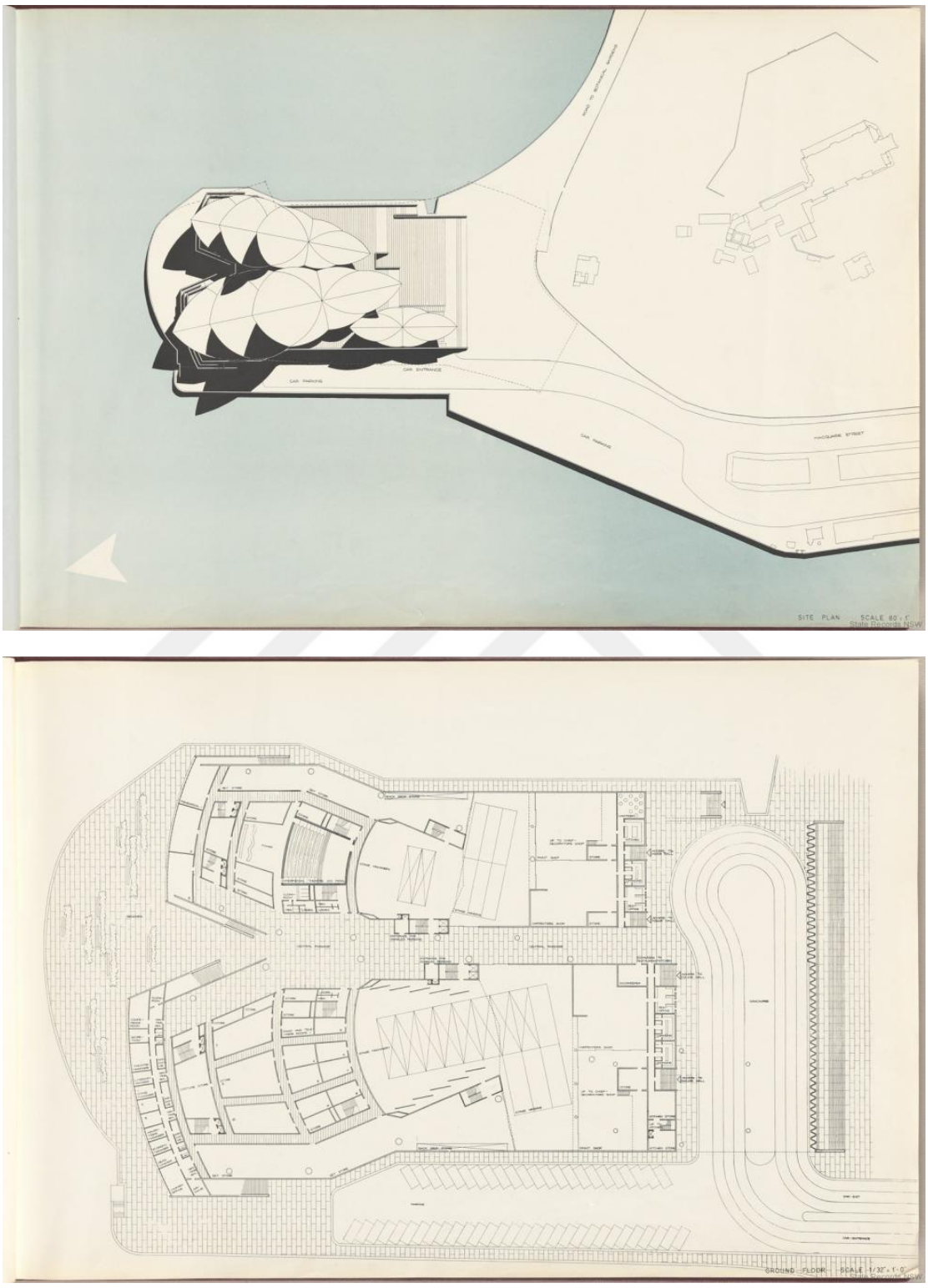


Figure 38: Urban plan and first floor plan of the Sydney Opera House as published from the Red Book. Source: © Utzon Archives / Aalborg University & Utzon Center

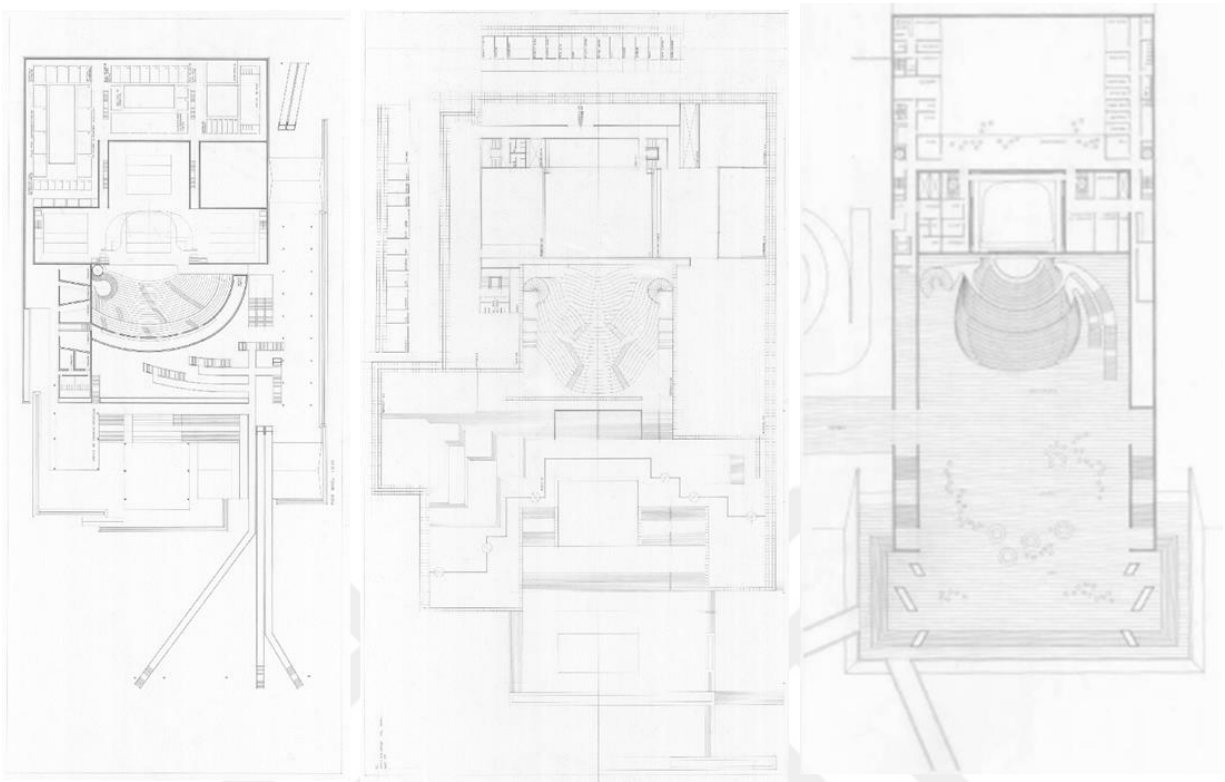


Figure 39: Plans of the 1962 Madrid Opera House (left), 1964-70 Zurich Theatre, (middle) and 1965 Wolfsburg Theatre (right).
Source: © Utzon Archives / Aalborg University & Utzon Center

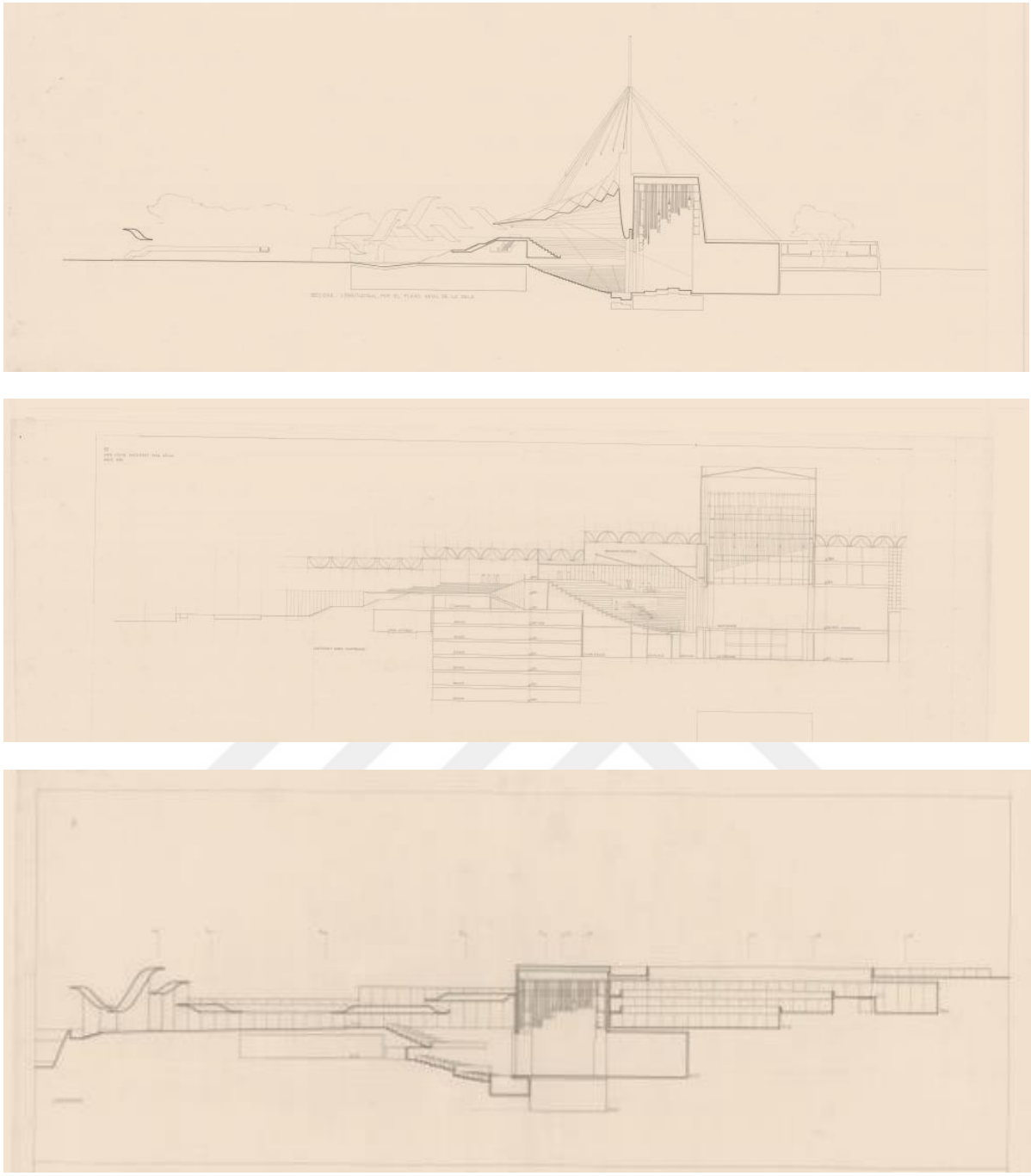


Figure 40: Section drawings of the 1962 Madrid Opera House (above), 1964-70 Zurich Theatre, (middle) and 1965 Wolfsburg Theatre (below).
Source: © Utzon Archives / Aalborg University & Utzon Center

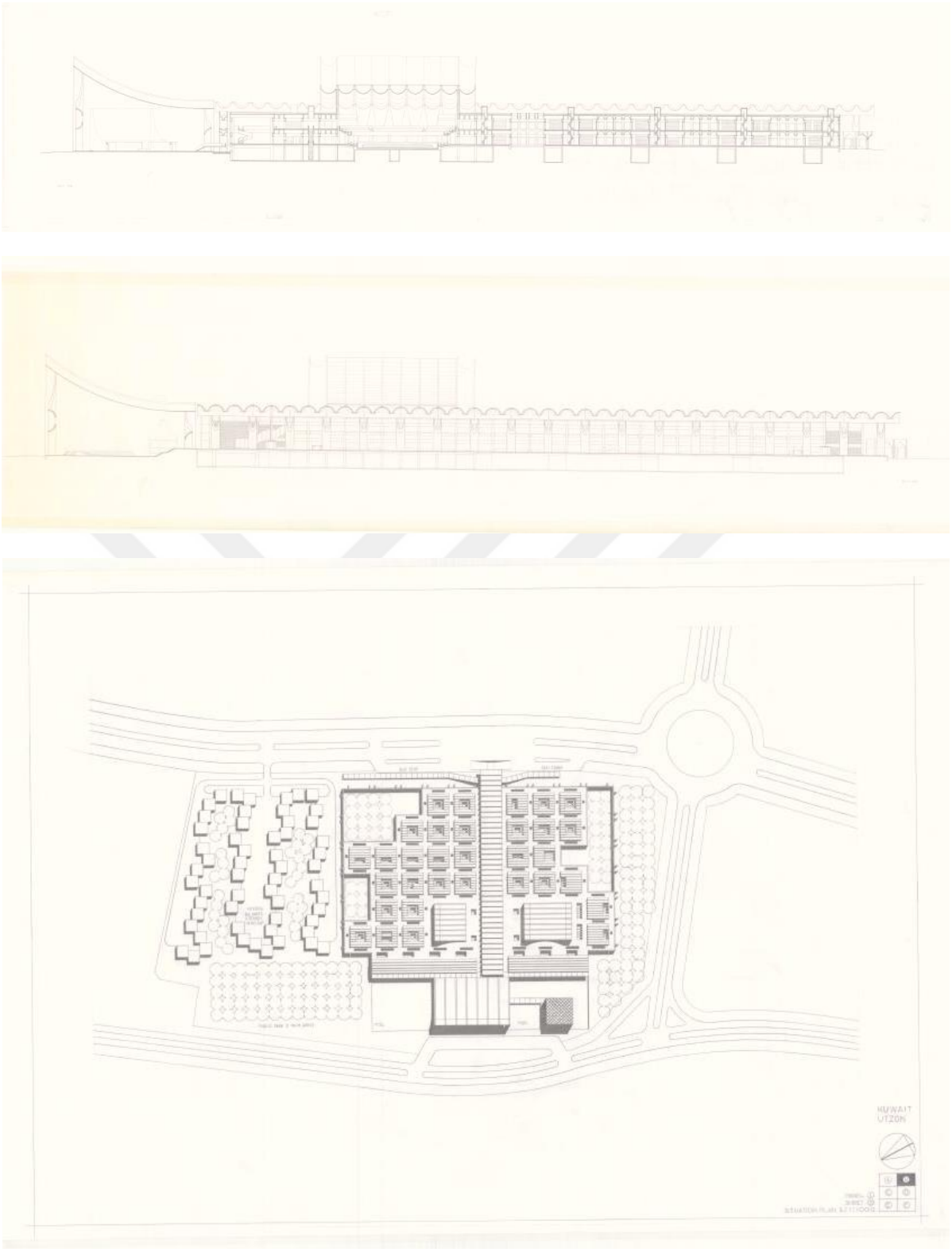


Figure 41: Section drawings and plan of the 1972-82 National Assembly of Kuwait building.
Source: © Utzon Archives / Aalborg University & Utzon Center

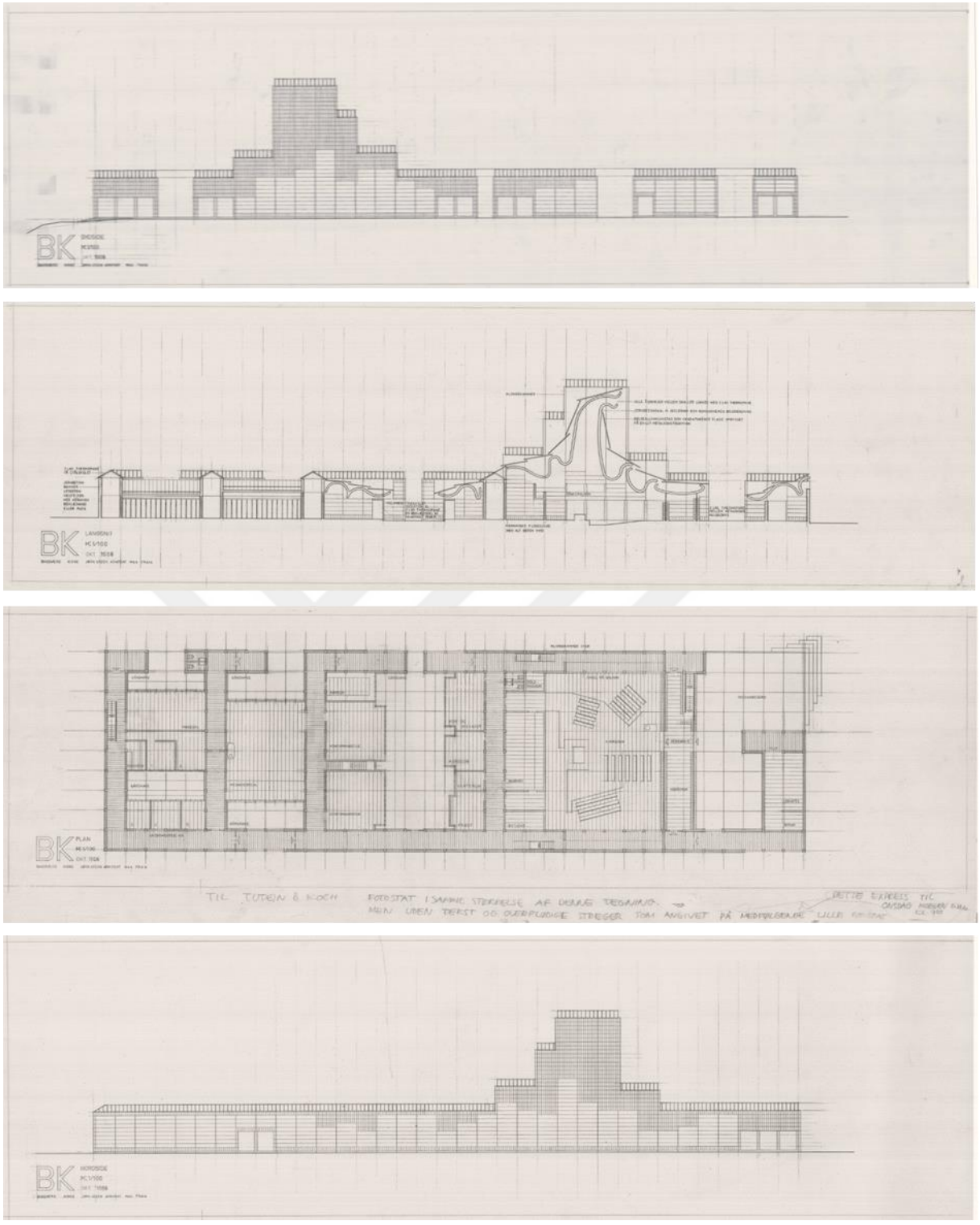


Figure 42: Utzon's design scheme for the 1968-76 Bagsværd Church.
Source: © Utzon Archives / Aalborg University & Utzon Center

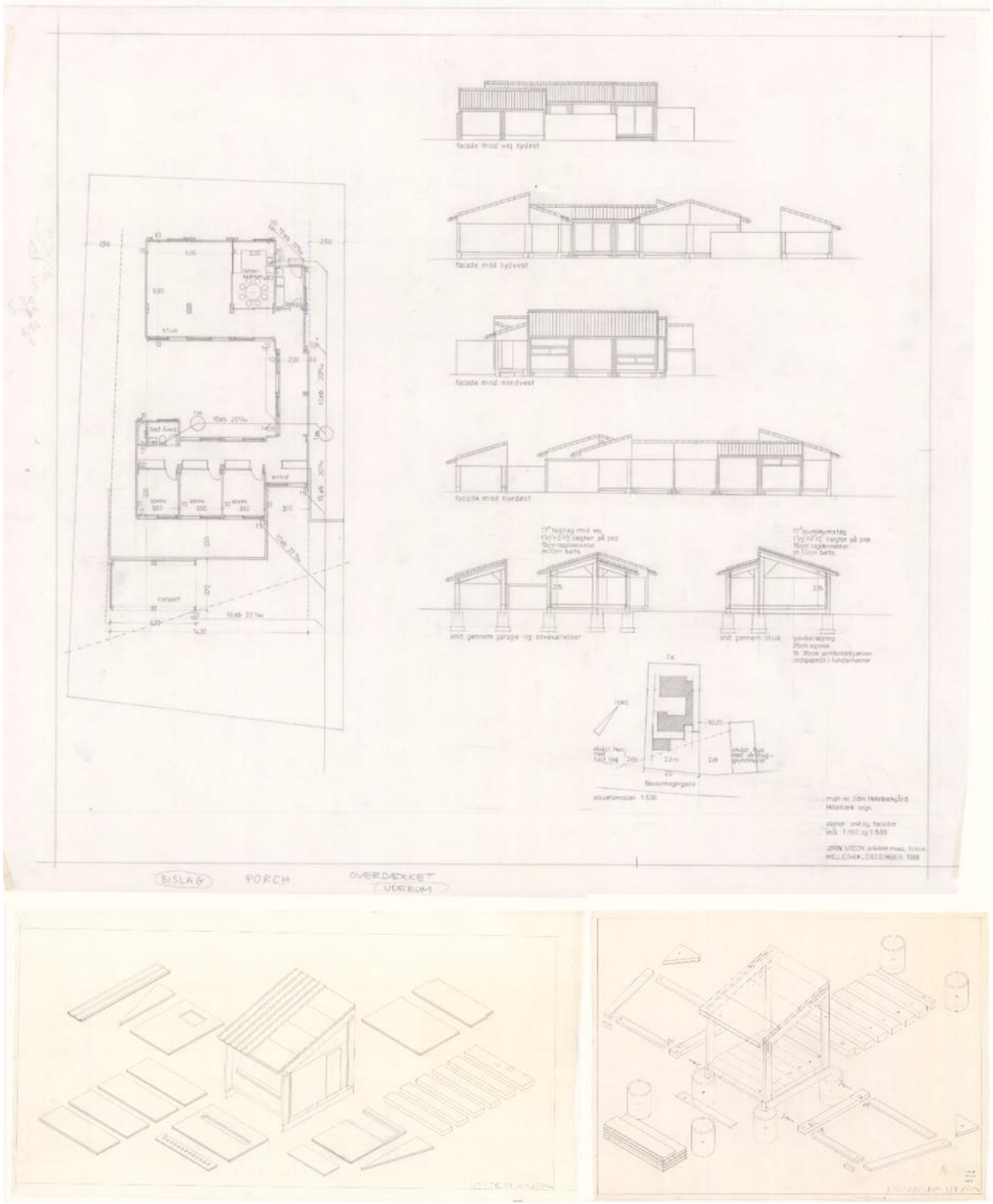


Figure 43: Utzon's drawings for 1969 Espansiva housing system for the prototype in Hellebæk.
Source: © Utzon Archives / Aalborg University & Utzon Center

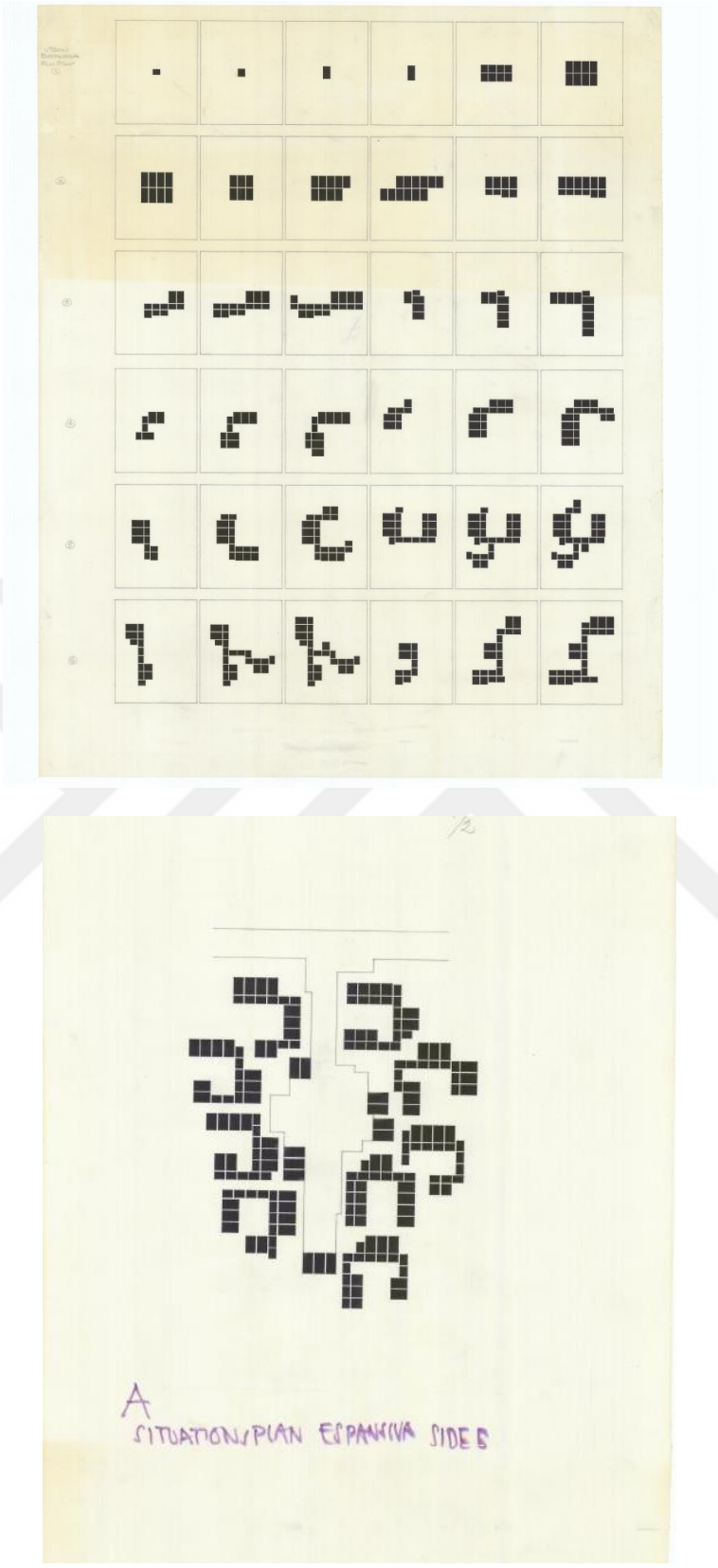


Figure 44: Utzon's drawings for 1969 Espansiva housing system showing the combination types and urban plan. Source: © Utzon Archives / Aalborg University & Utzon Center

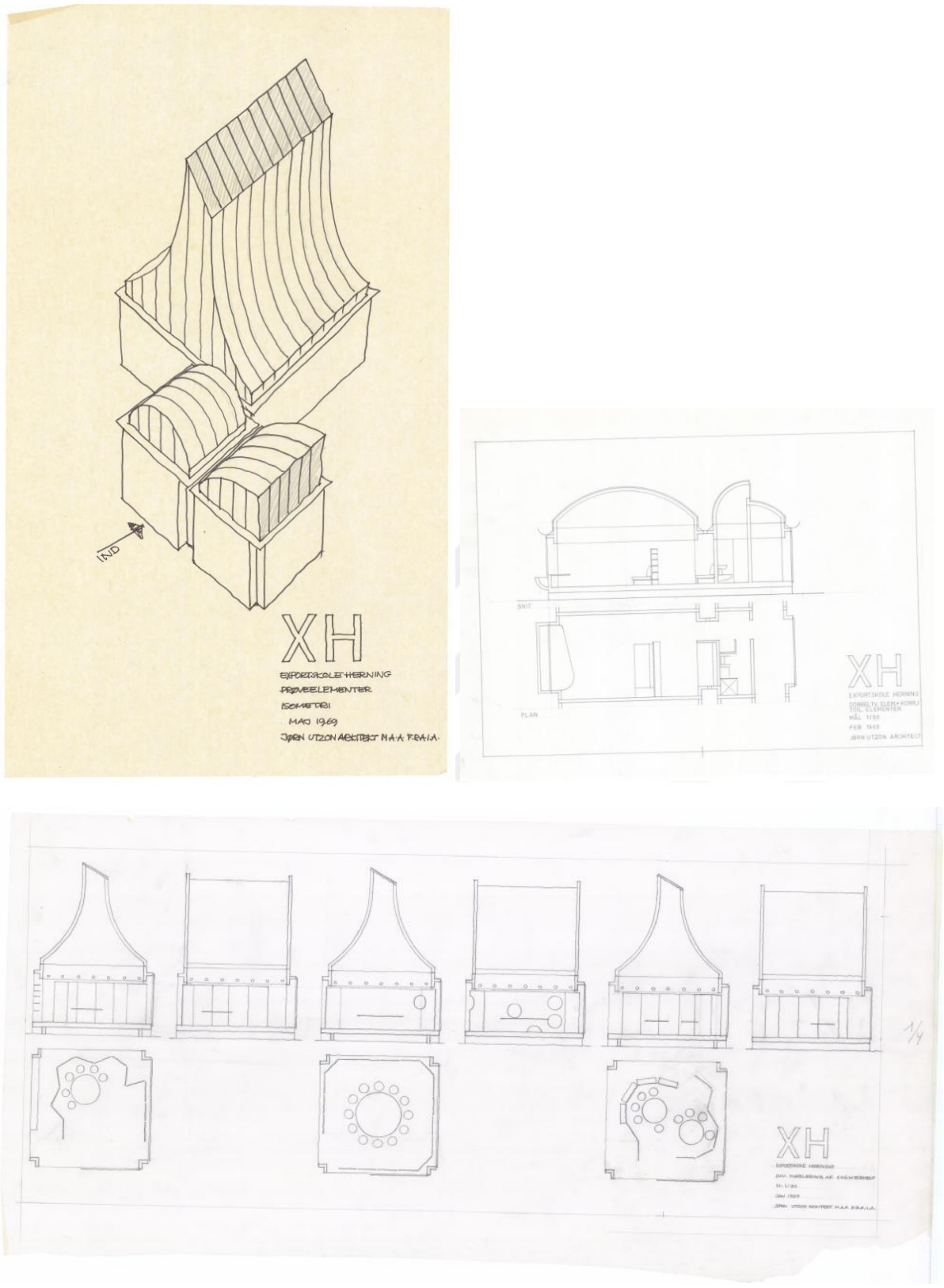


Figure 45: Utzon's drawings for Uno-X system, the prototype was built 1969-77.
Source: © Utzon Archives / Aalborg University & Utzon Center

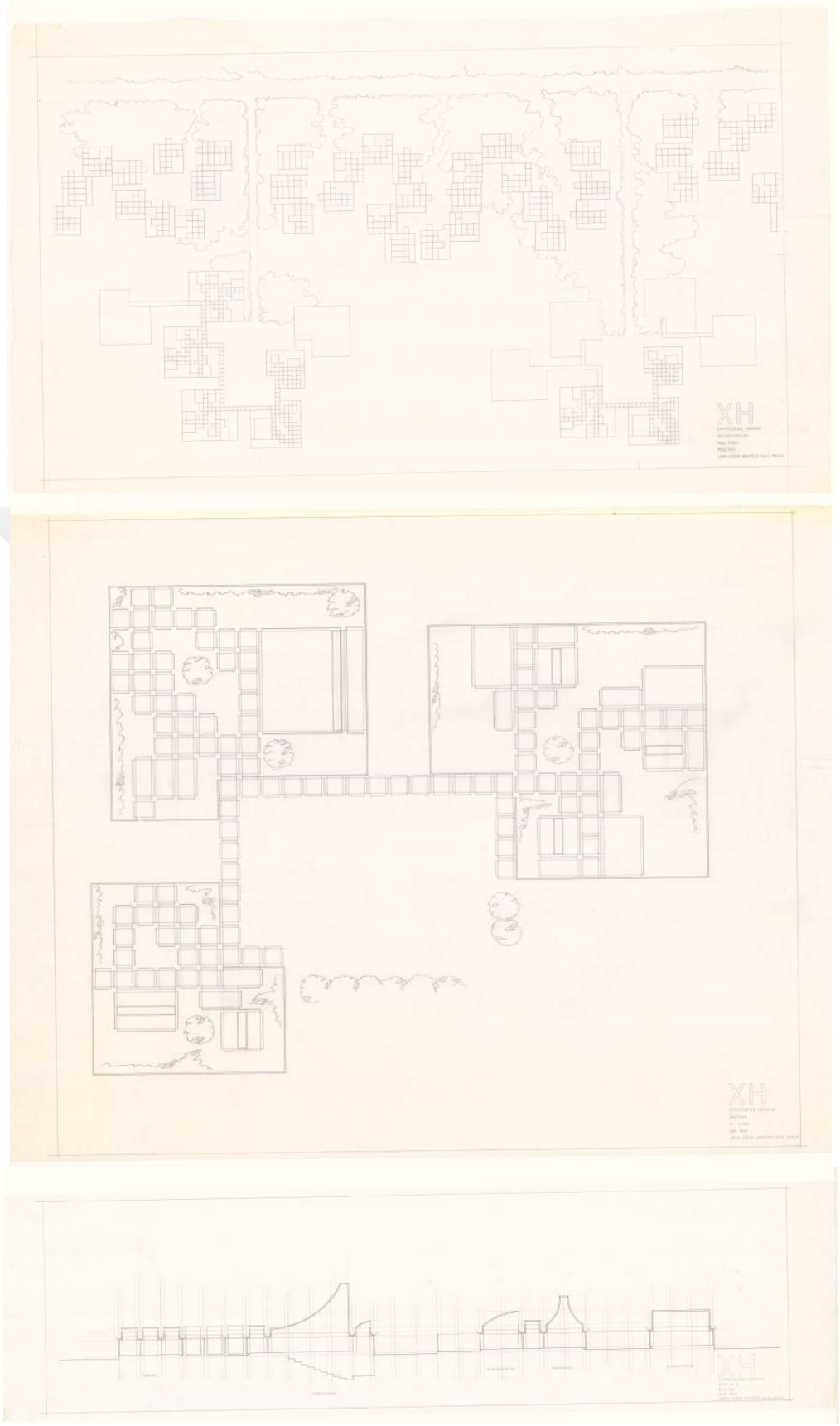


Figure 46: Urban plan, unit plan and section drawings of the 1969 Export College in Herning project. Source: © Utzon Archives / Aalborg University & Utzon Center

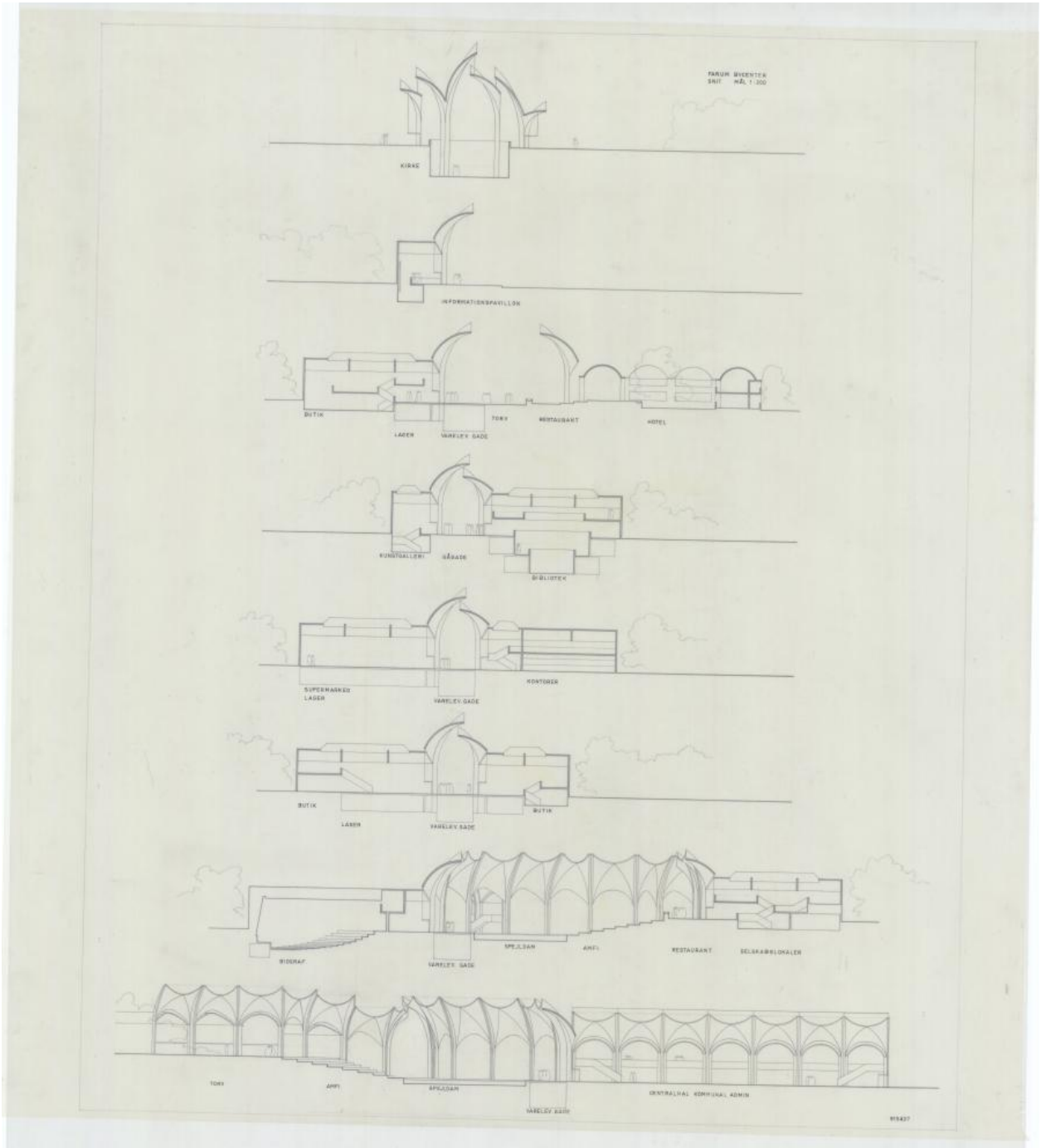


Figure 47: Section and elevation drawings of Utzon for the 1966 Farum Town Center, showing the typologies for private buildings such as church, shops, hotel, art gallery, library, market, offices and their integration to the relative public unit.Source: © Utzon Archives / Aalborg University & Utzon Center

Figure 48: Perspective drawings for the 1966 Farum Town Center, showing the urban plaza and bazaar streets. Source: © Utzon Archives / Aalborg University & Utzon Center

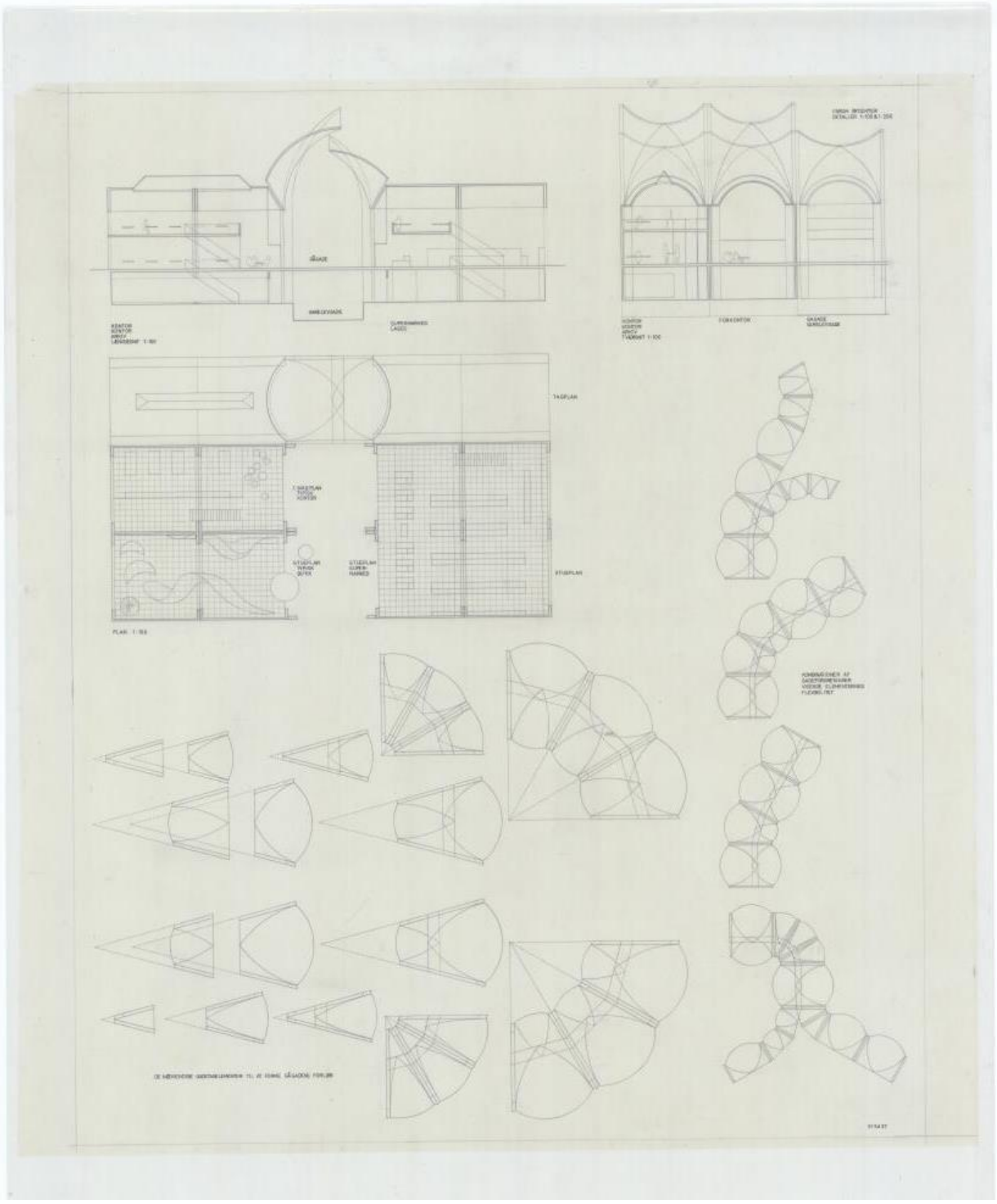


Figure 49: Unit type drawings of Utzon for the 1966 Farum Town Center, showing the section through bazaar street, plan of linear and central (integrated) private units, and types of public units and fan-shaped units to compose the curvilinear street.
Source: © Utzon Archives / Aalborg University & Utzon Center

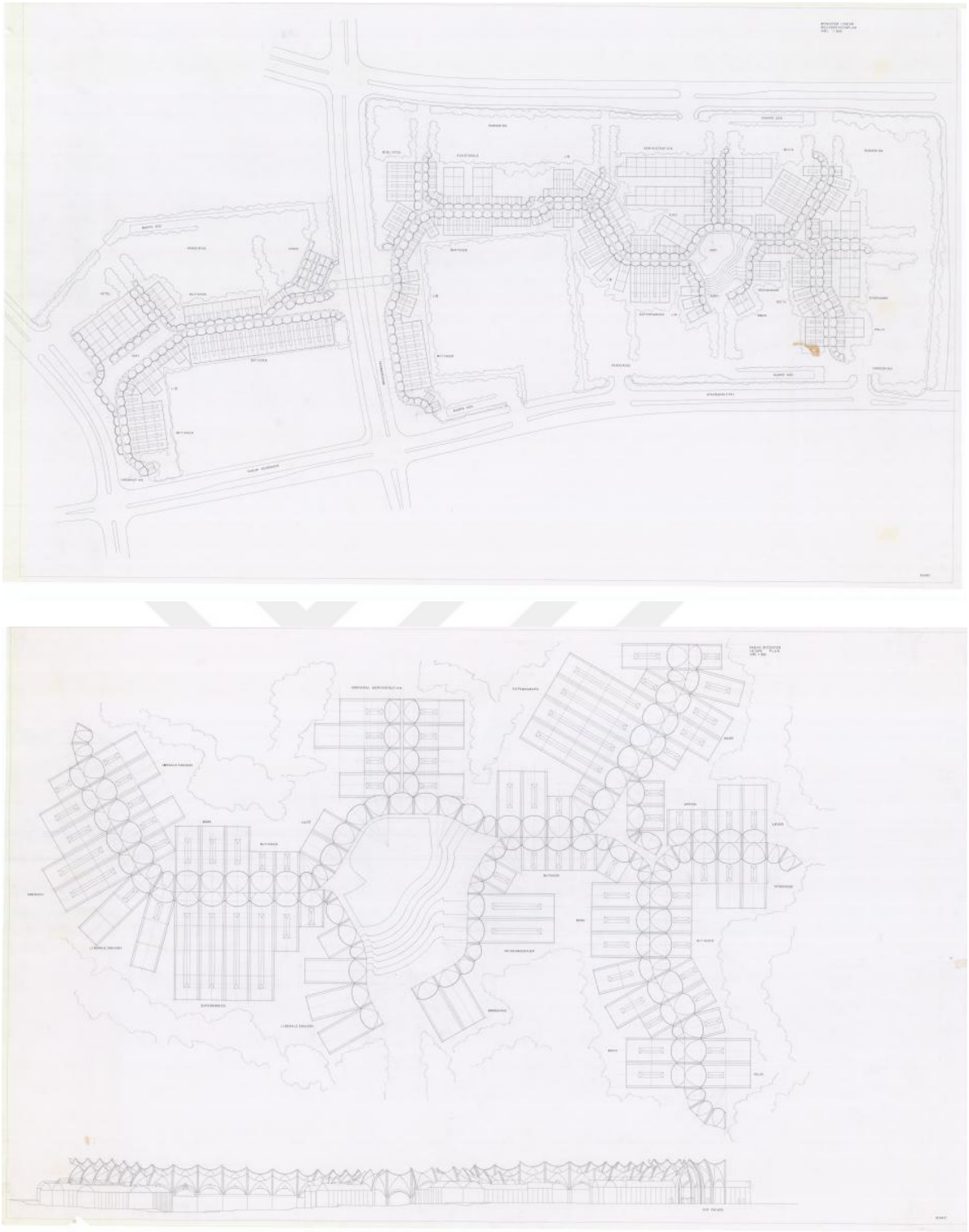


Figure 50: Urban plan drawings of Utzon for the 1966 Farum Town Center, showing the third (last) stage of the development of the town center (above) and first stage that developed around the urban plaza (below).
Source: © Utzon Archives / Aalborg University & Utzon Center

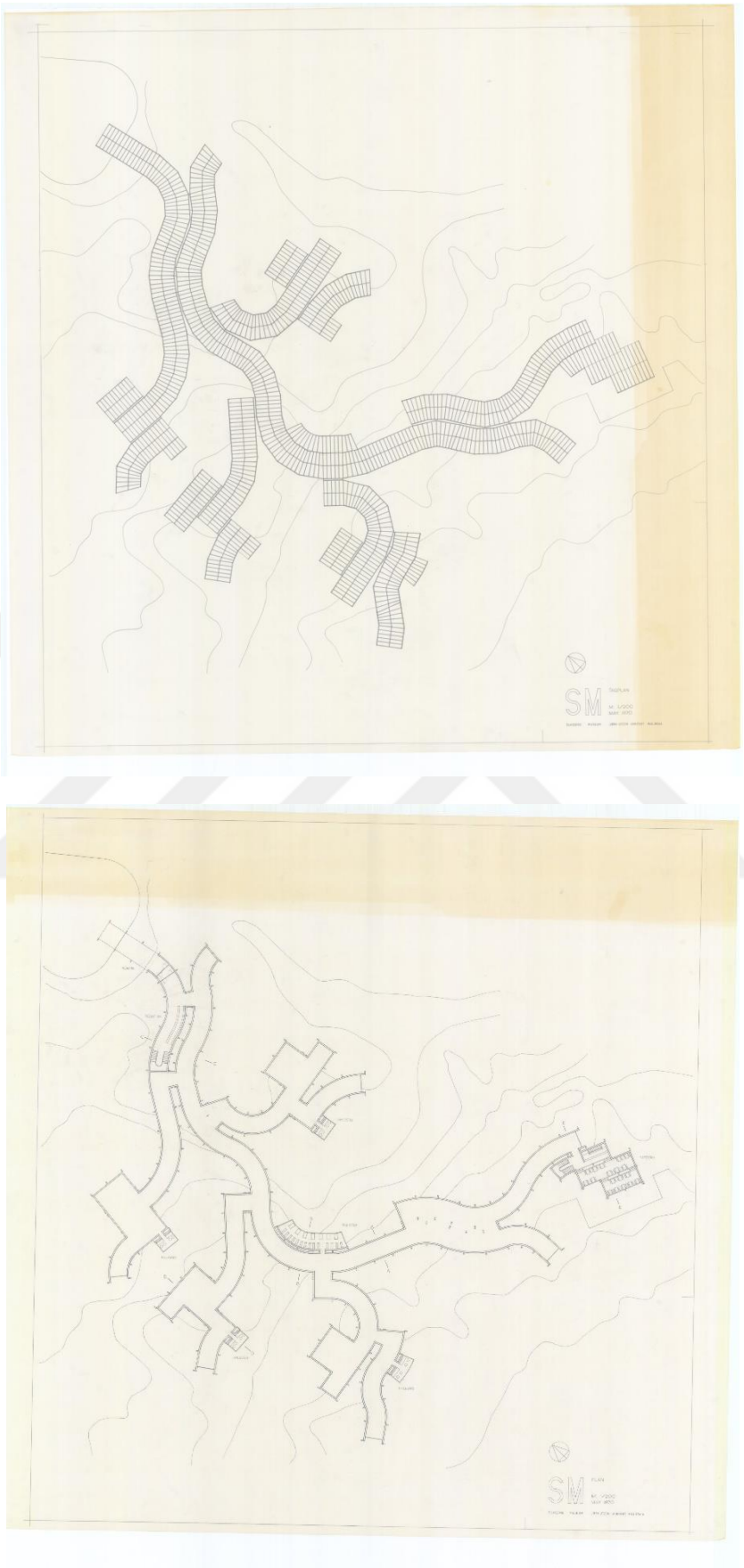


Figure 51: Urban plan drawings of Utzon for the 1969 Silkeborg Museum of Art II.
Source: © Utzon Archives / Aalborg University & Utzon Center

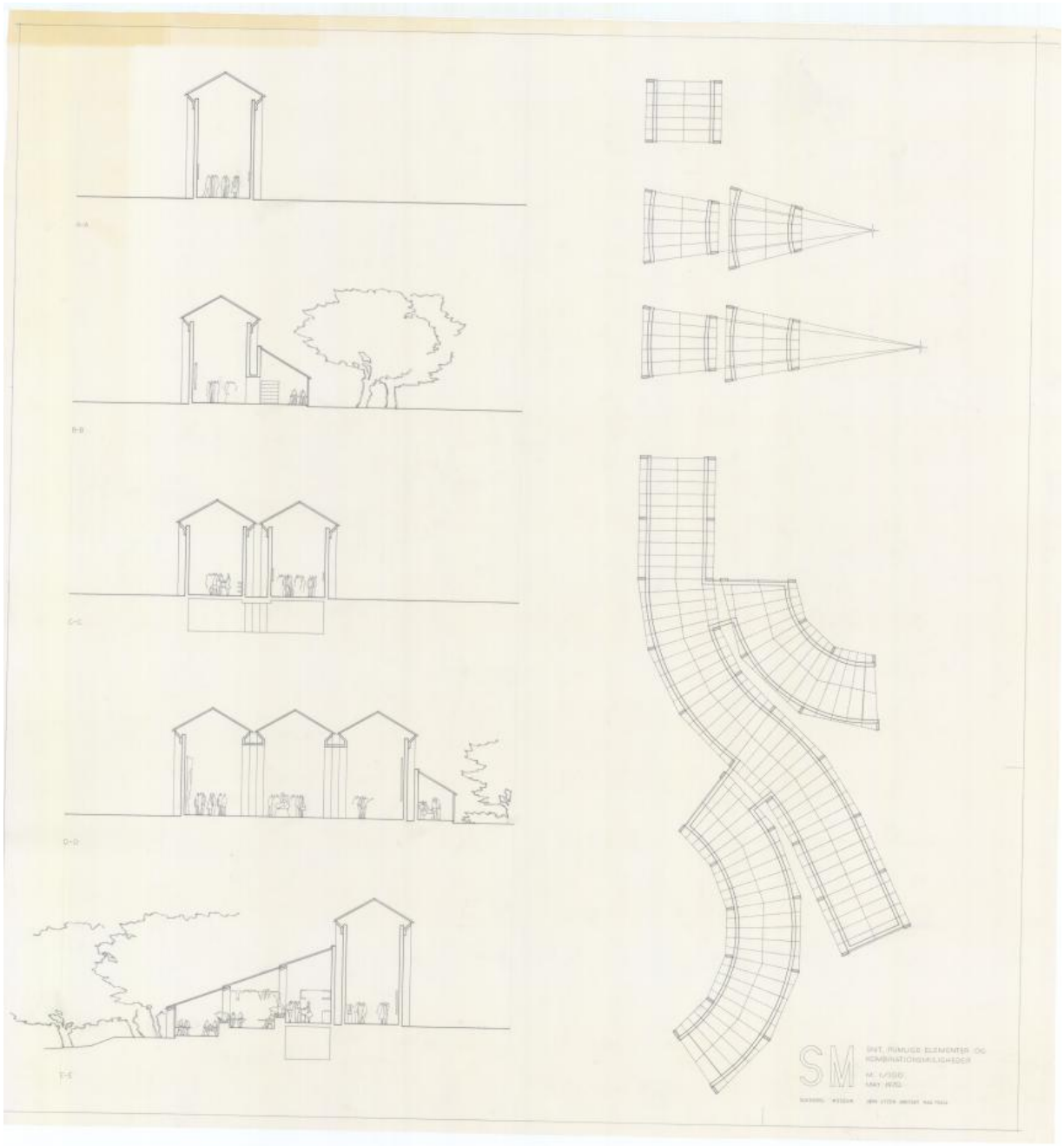


Figure 52: Section and detail drawings of Utzon for the 1969 Silkeborg Museum of Art II.
Source: © Utzon Archives / Aalborg University & Utzon Center

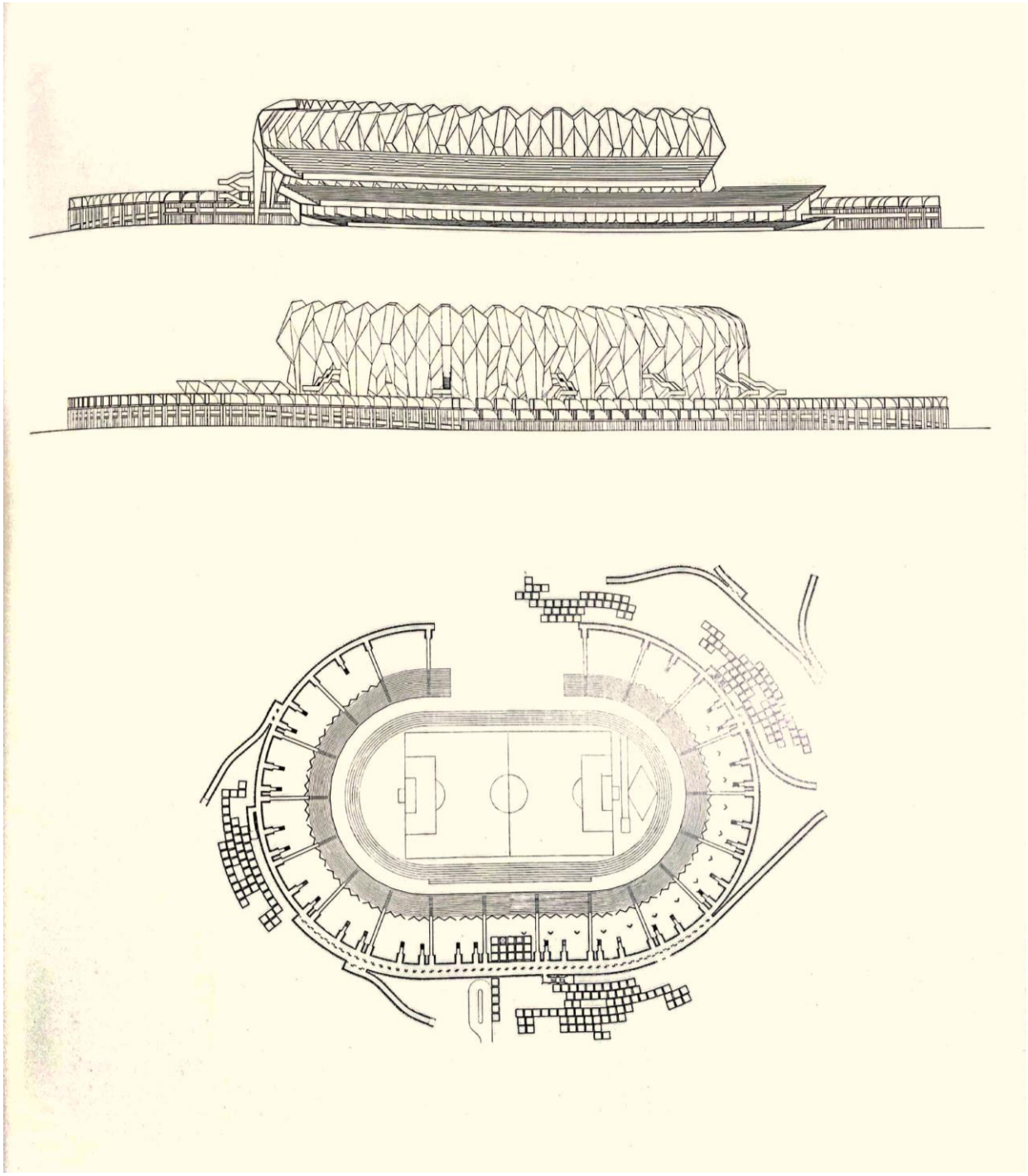


Figure 53: Elevation and plan drawings for the 1969 Stadium in Jeddah project.
Source: Weston, 273.

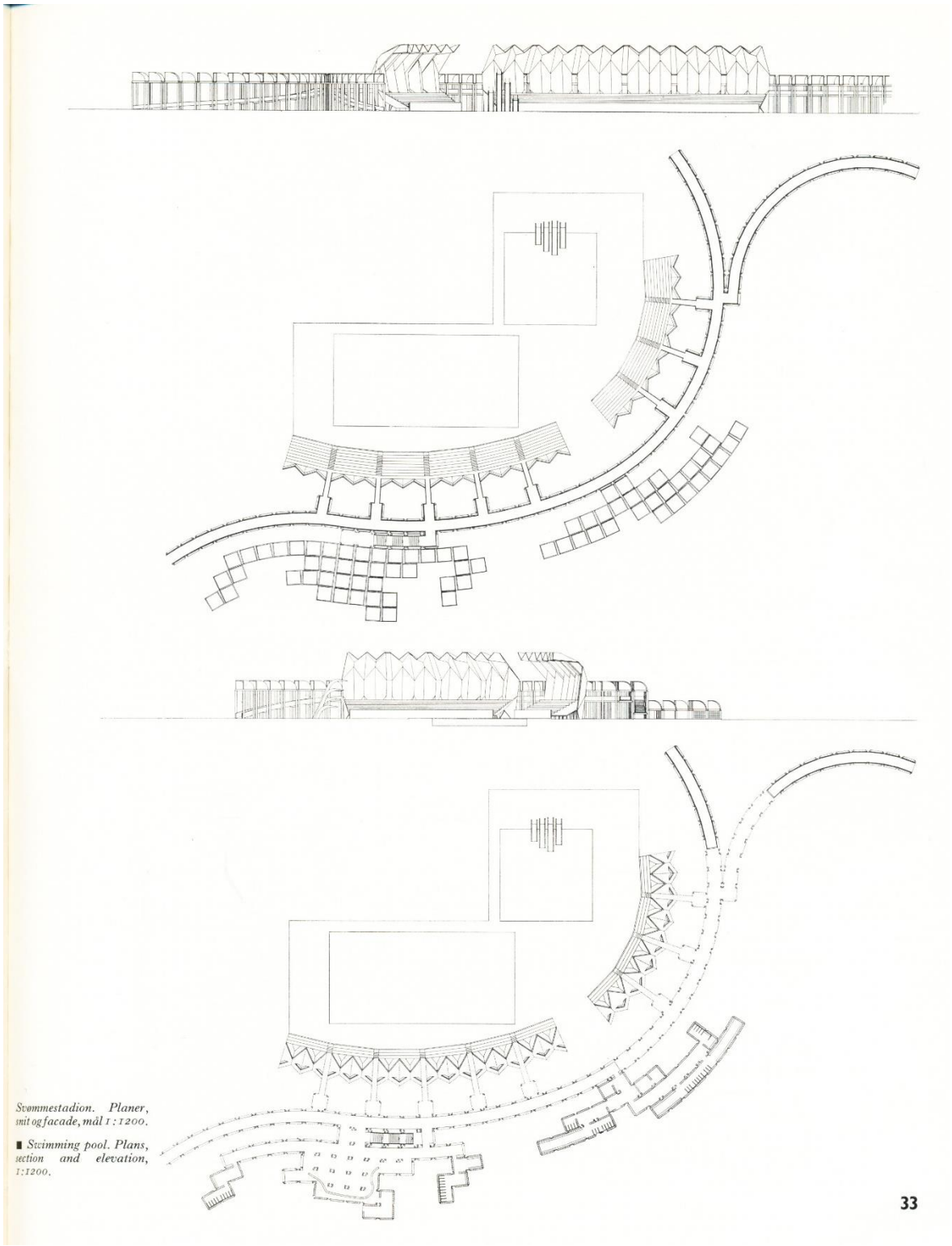


Figure 54: Detail plan and unit drawings for the 1969 Stadium in Jeddah project.
Source: Utzon, "Additive Architecture", 33.

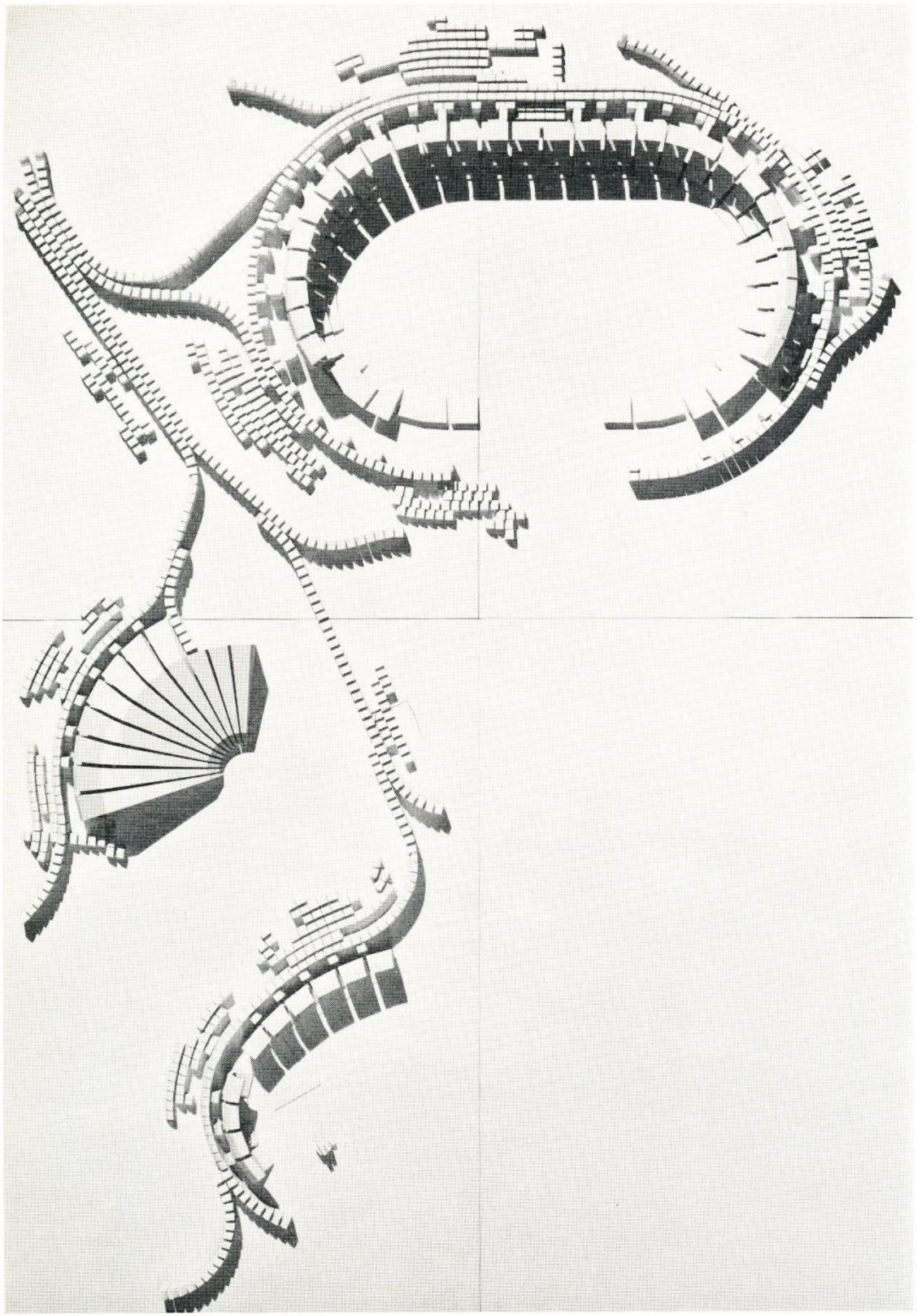


Figure 55: Urban plan model for the 1969 Stadium in Jeddah project.
Source: Utzon, “Additive Architecture”, 24.

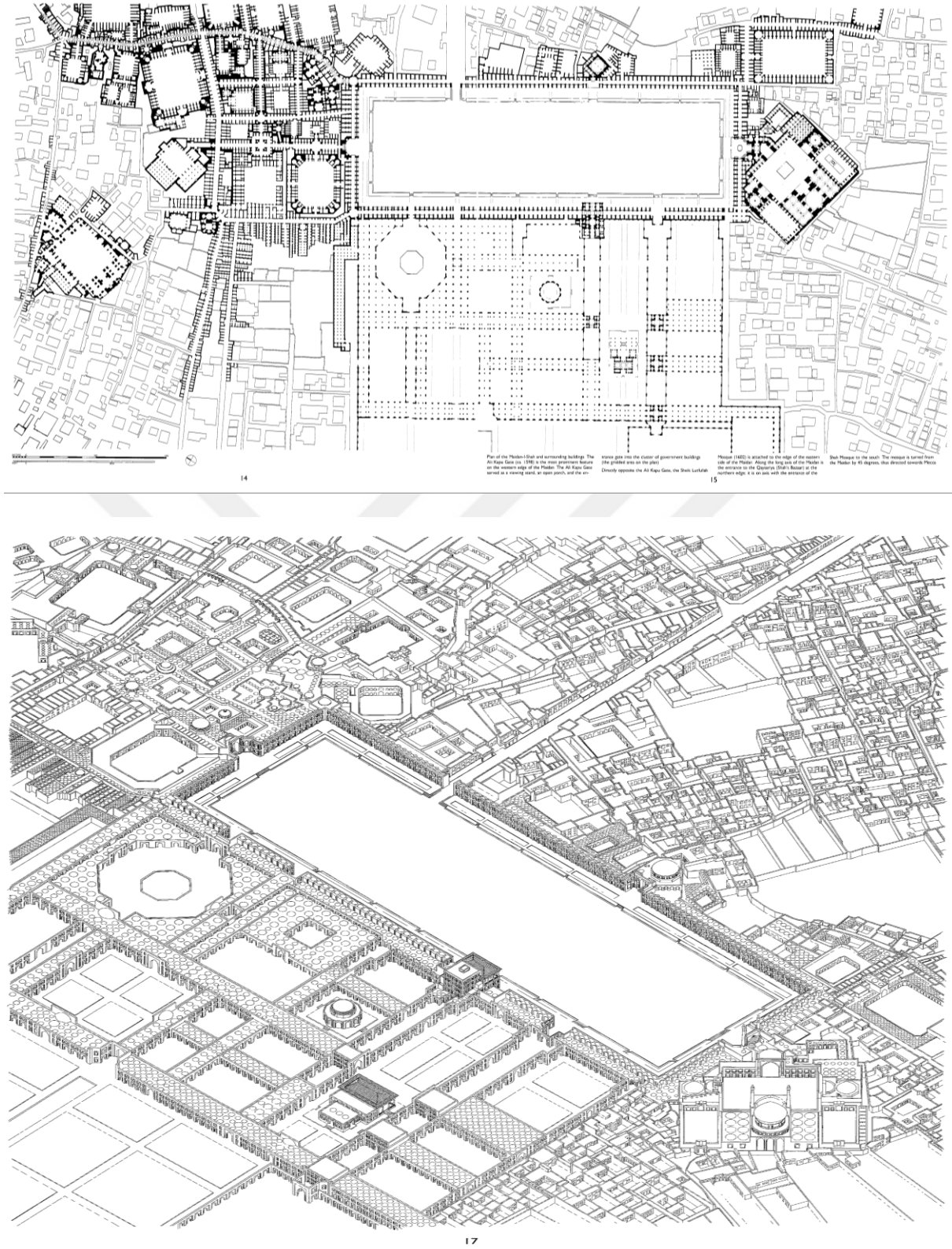


Figure 56: Plan (above) and axonometric drawing (below) of the Naqshe Jahan Square and Grand Bazaar of Isfahan.
Source: Herdeg, 14-17.

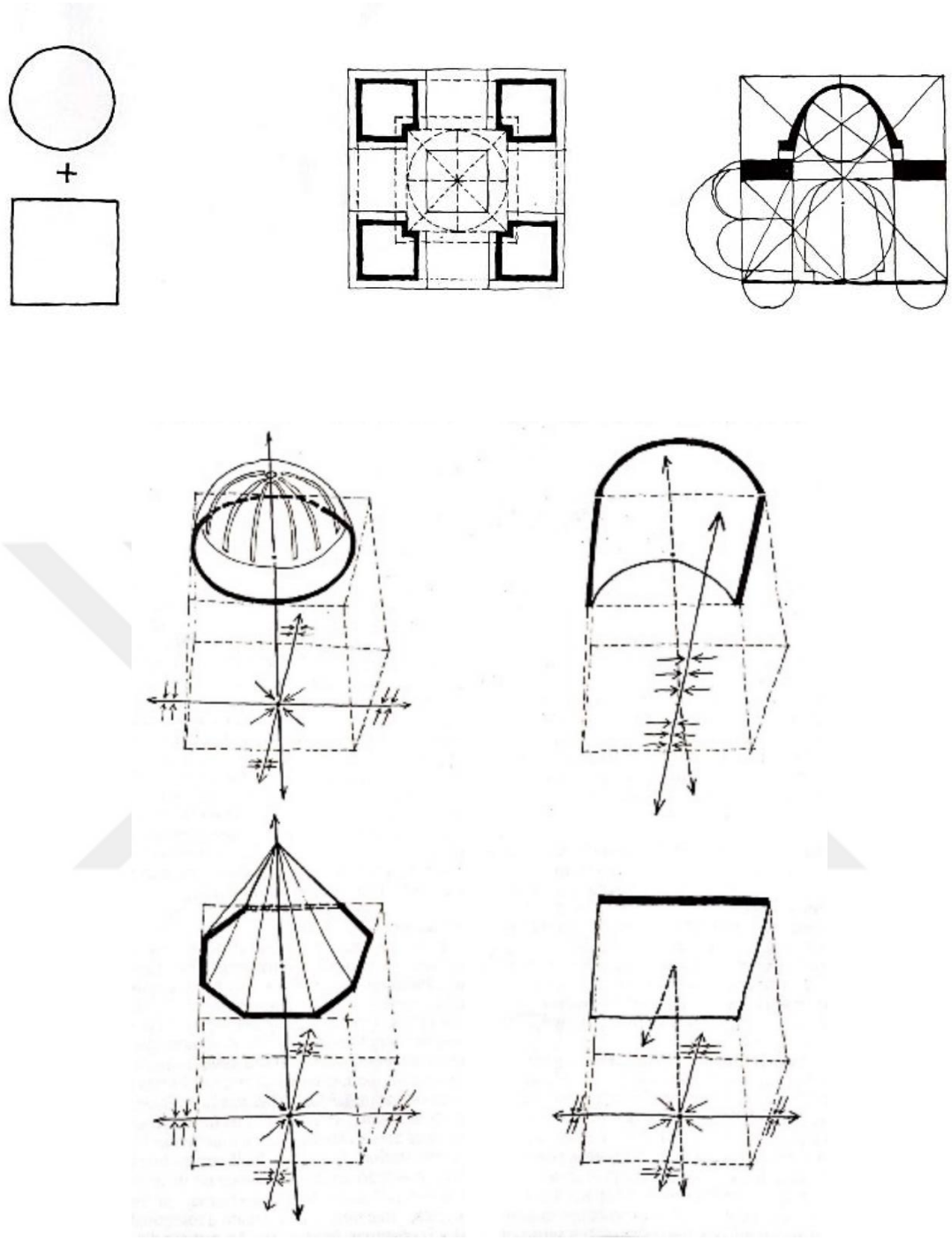


Figure 57: Diagrammatic drawings of the *Chahar Taq* concept, and the cube-like volume with dome or vault, scanned from Utzon's reading.
Source: Ardalan and Bakhtiar, 74, 75.

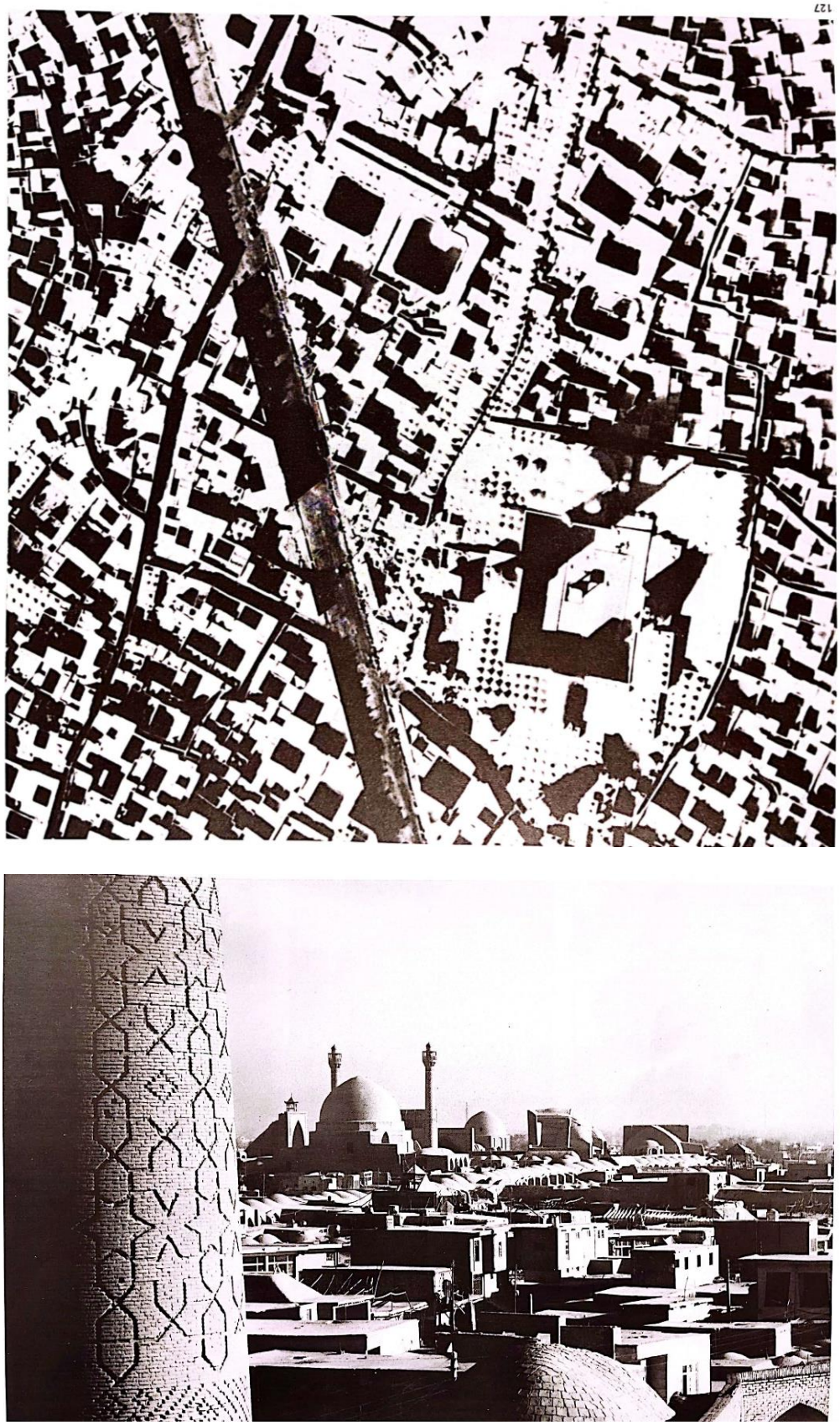


Figure 58: Photographs showing the roofscape of the Grand Bazaar of Isfahan with the repetitive domes emerged from integrated units of *Chahar Taq*, scanned from Utzon's reading.
Source: Ardalan and Bakhtiar, 104, 111.

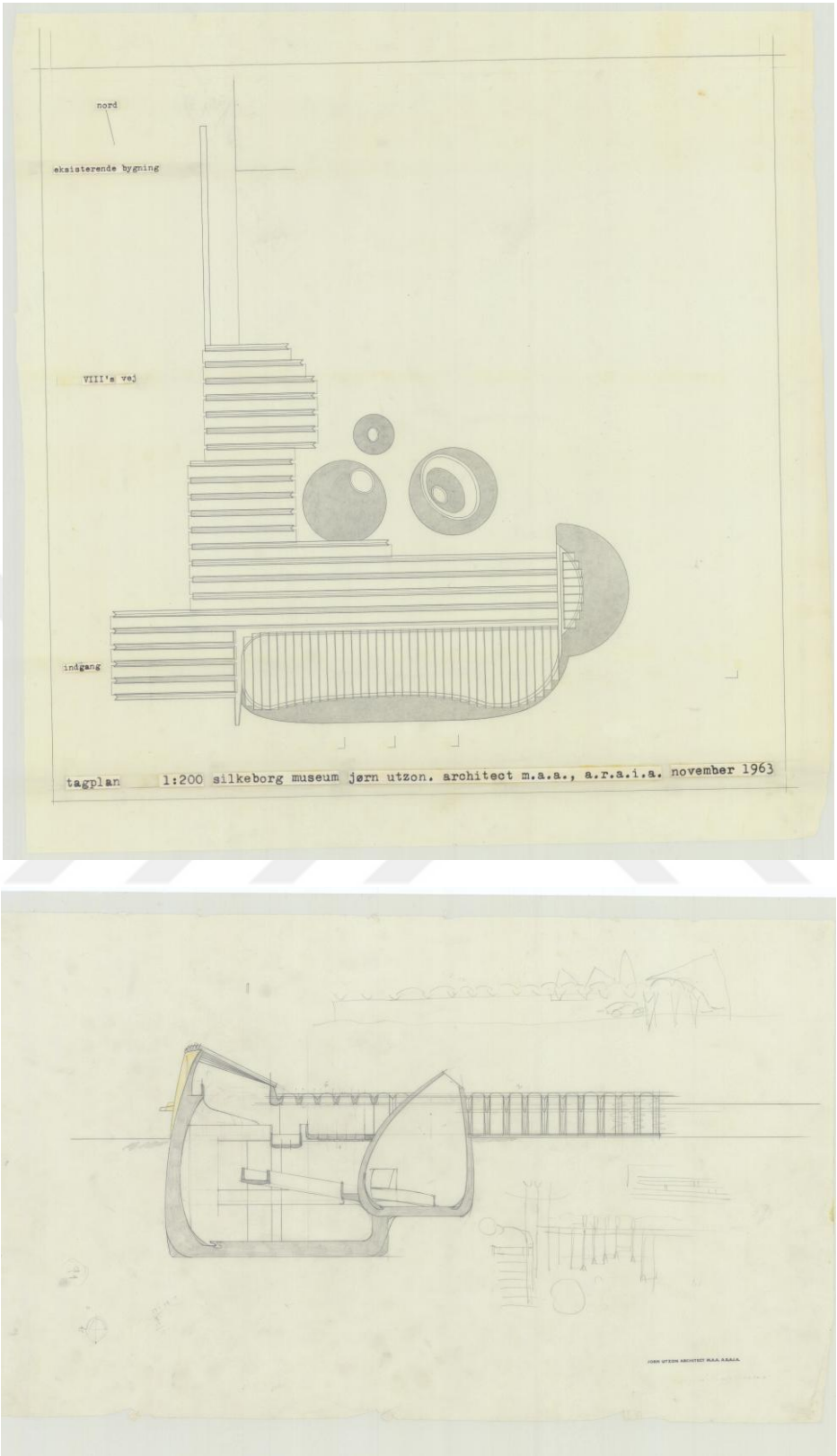


Figure 59: Roof plan and section of the 1963 Silkeborg Museum of Art.
Source: © Utzon Archives / Aalborg University & Utzon Center

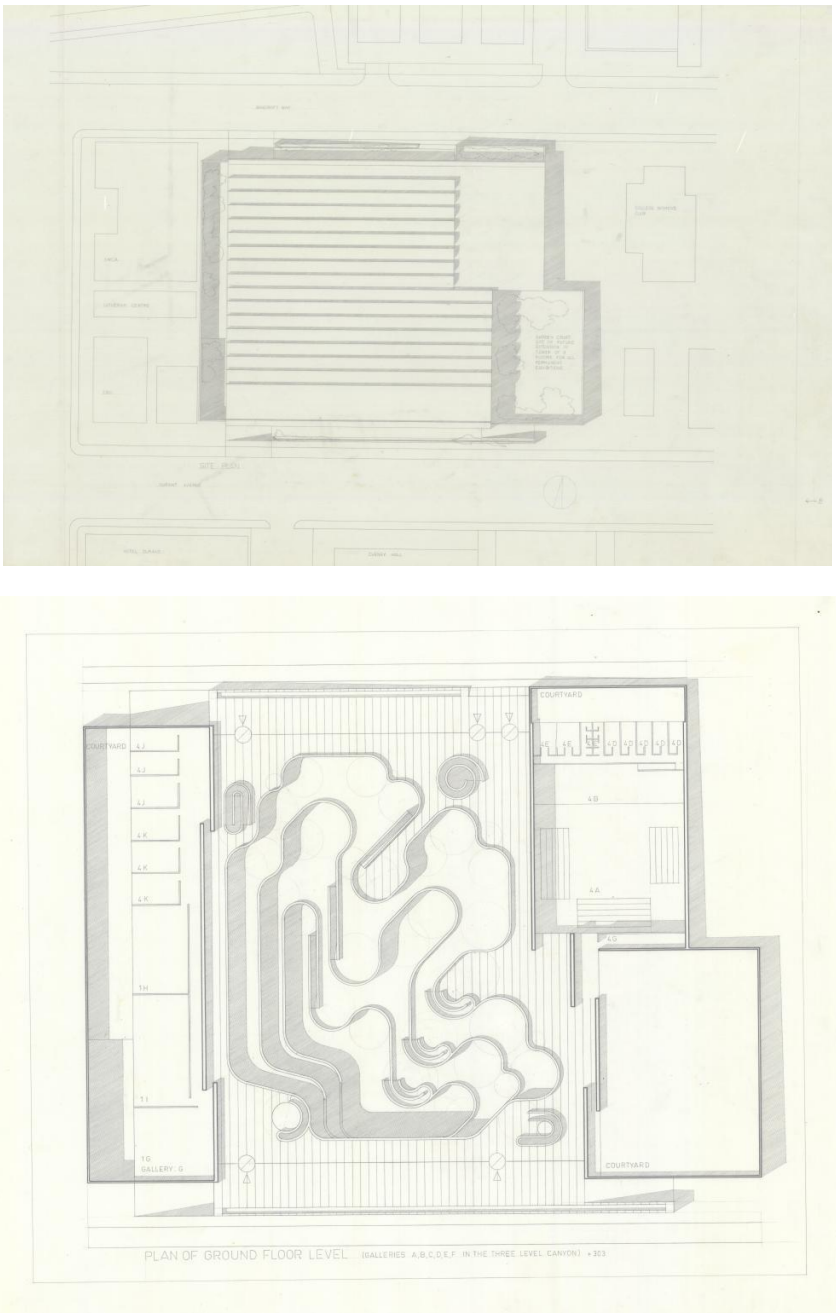


Figure 60: Roof plan, plan and section drawings of Utzon for the 1965 Berkeley Museum of Art.
Source: © Utzon Archives / Aalborg University & Utzon Center

Figure 61: Utzon's sketch of the clouds and horizon, representing the theme of the Plateaus and Platforms. Source: © Utzon Archives / Aalborg University & Utzon Center

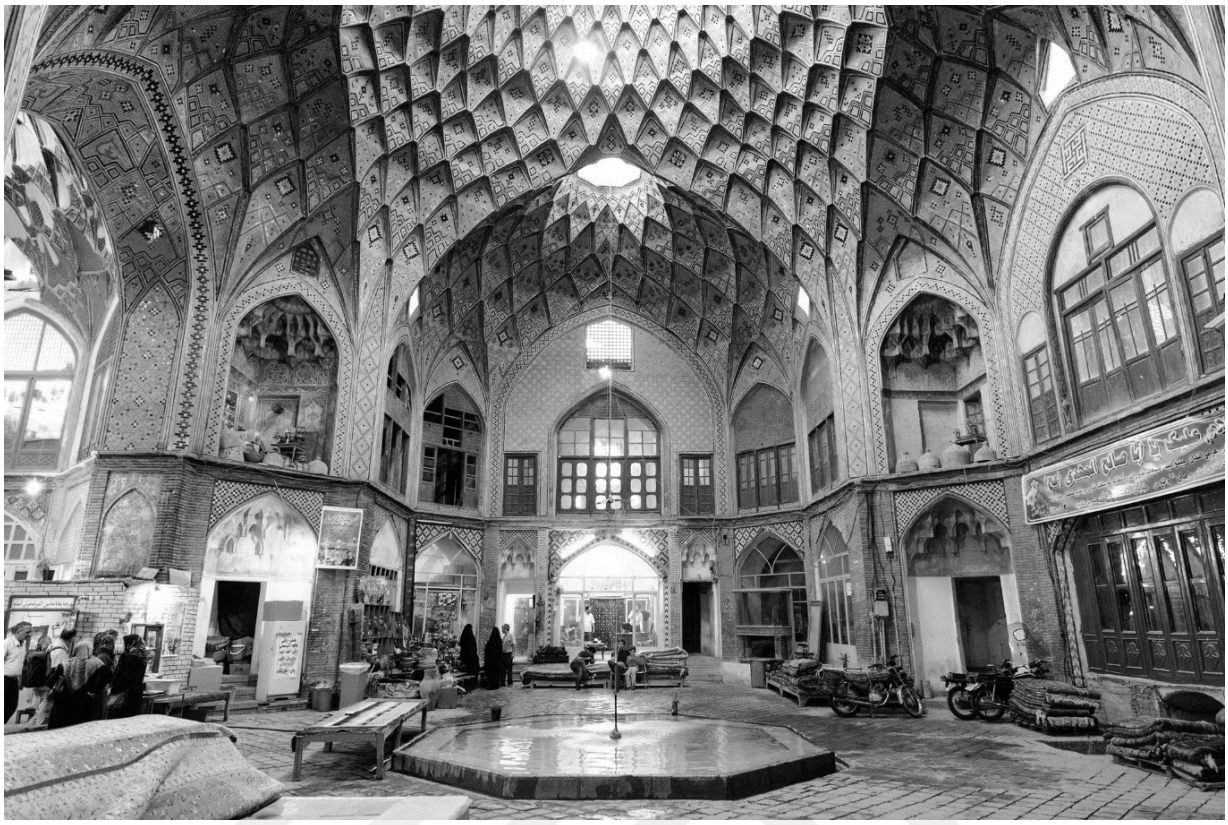


Figure 62: Interior view of the Aminoddole Plaza of the Grand Bazaar of Isfahan that Utzon studied onsite. Source: https://www.wikiwand.com/en/Aminoddole_Carvansarai

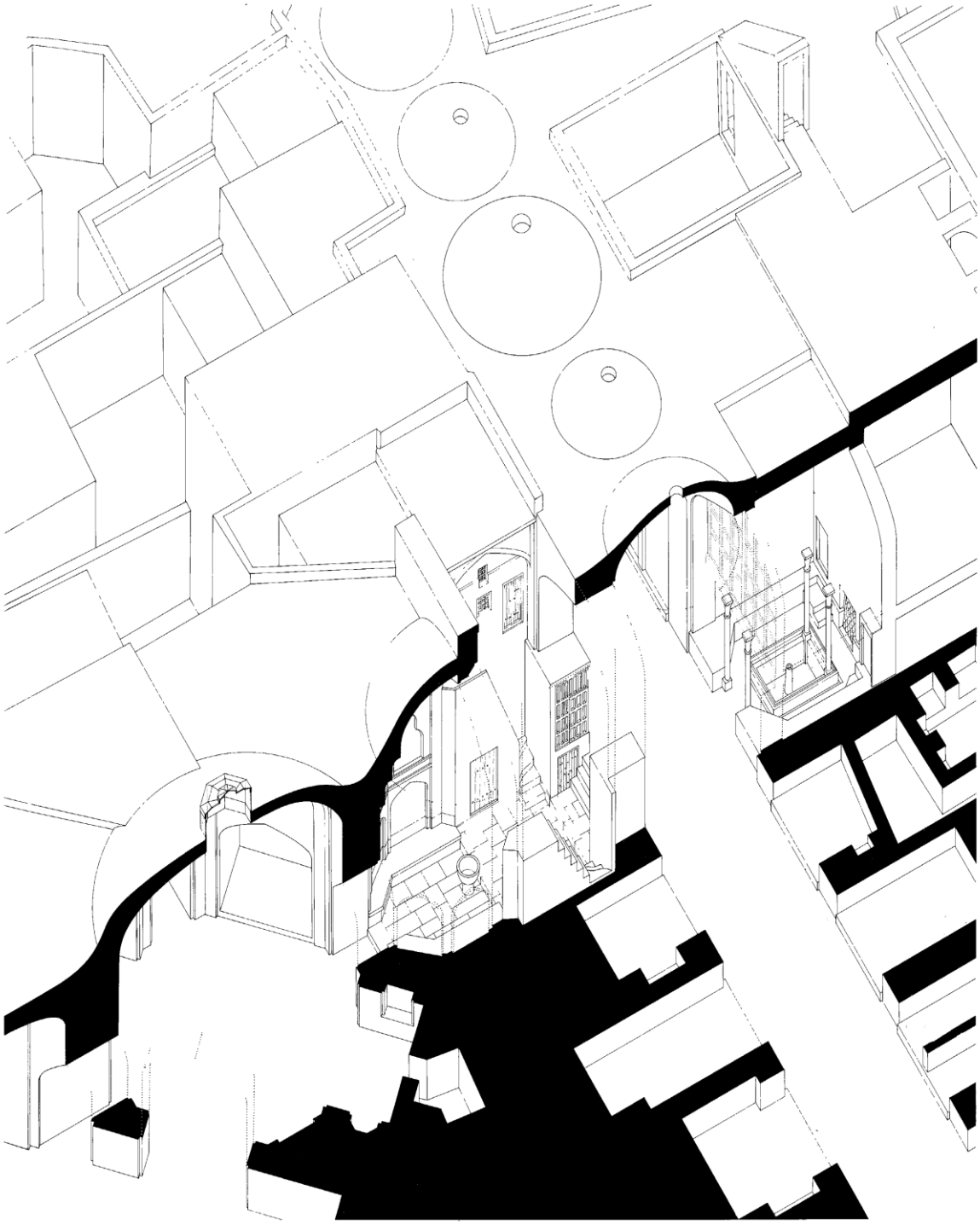


Figure 63: Axonometric section of one of the bazaar streets from Grand Bazaar of Isfahan.
Source: Herdeg, 33.

Figure 64: Entrance *Timchah* to Haji Karim Khan Caravansarai in Grand Bazaar of Isfahan, vaulted space created as a Persian Karabandi.
Source: Herdeg, 31.

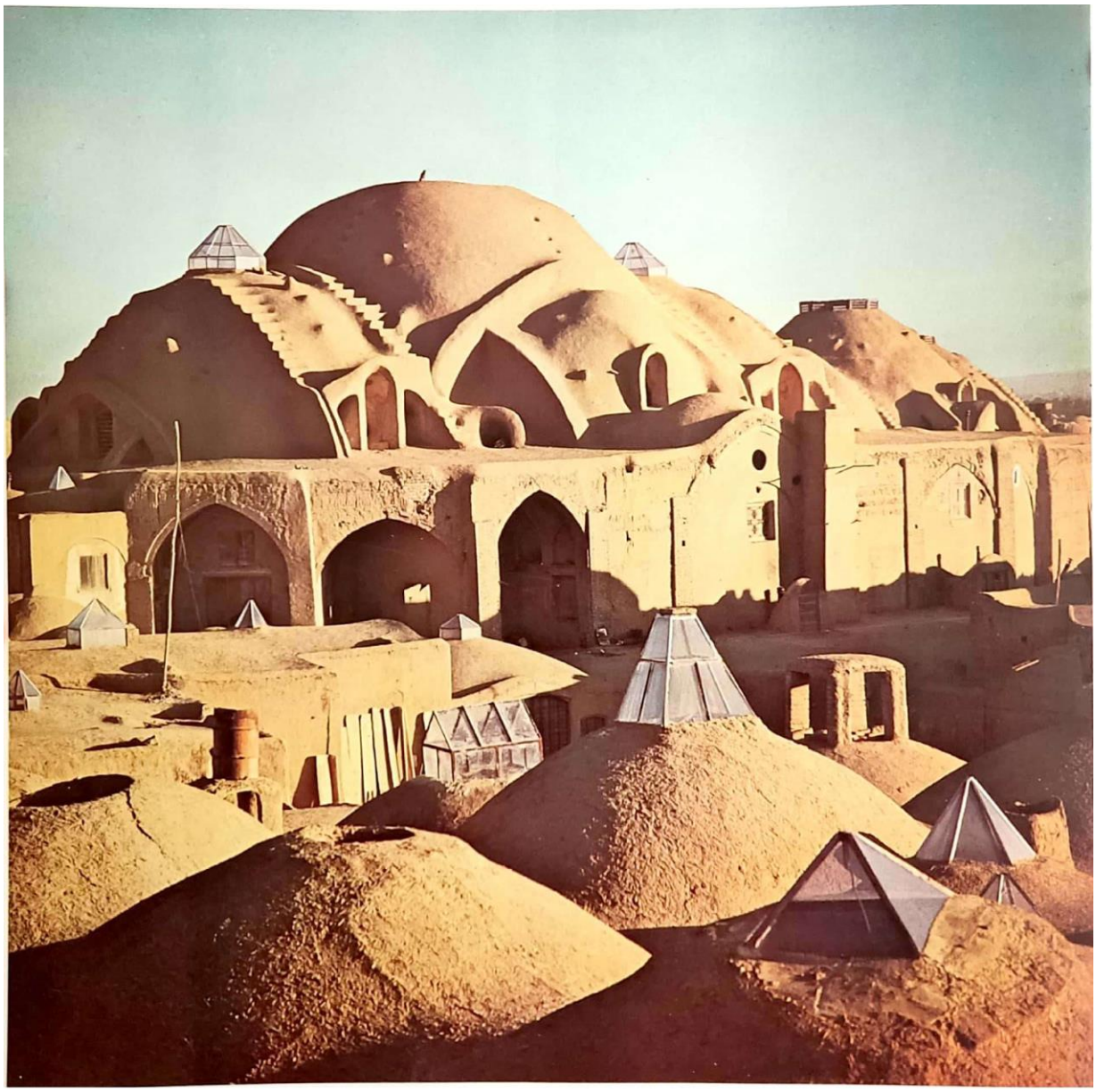


Figure 65: Roofscape of Bazaar of Kashan, showing the triangular prismatic skylight forms on top of domical and vaulted roofs, scanned from Utzon's reading.
Source: Ardalan and Bakhtiar, 52.

Figure 66: Axonometric and plan of Mosque Al-Hakim connected to the Grand Bazaar of Isfahan. Source: Herdeg, 22, 24.

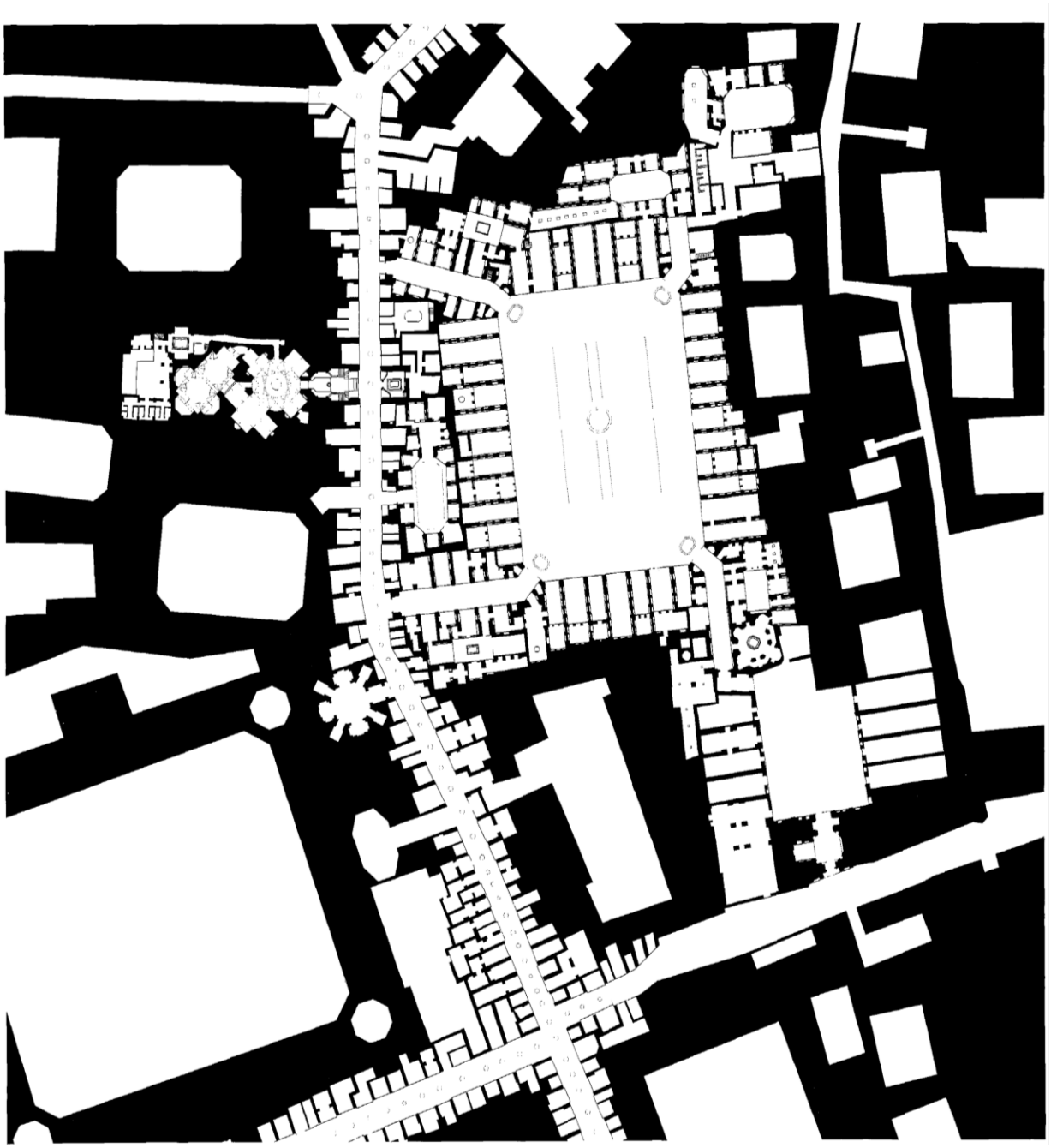
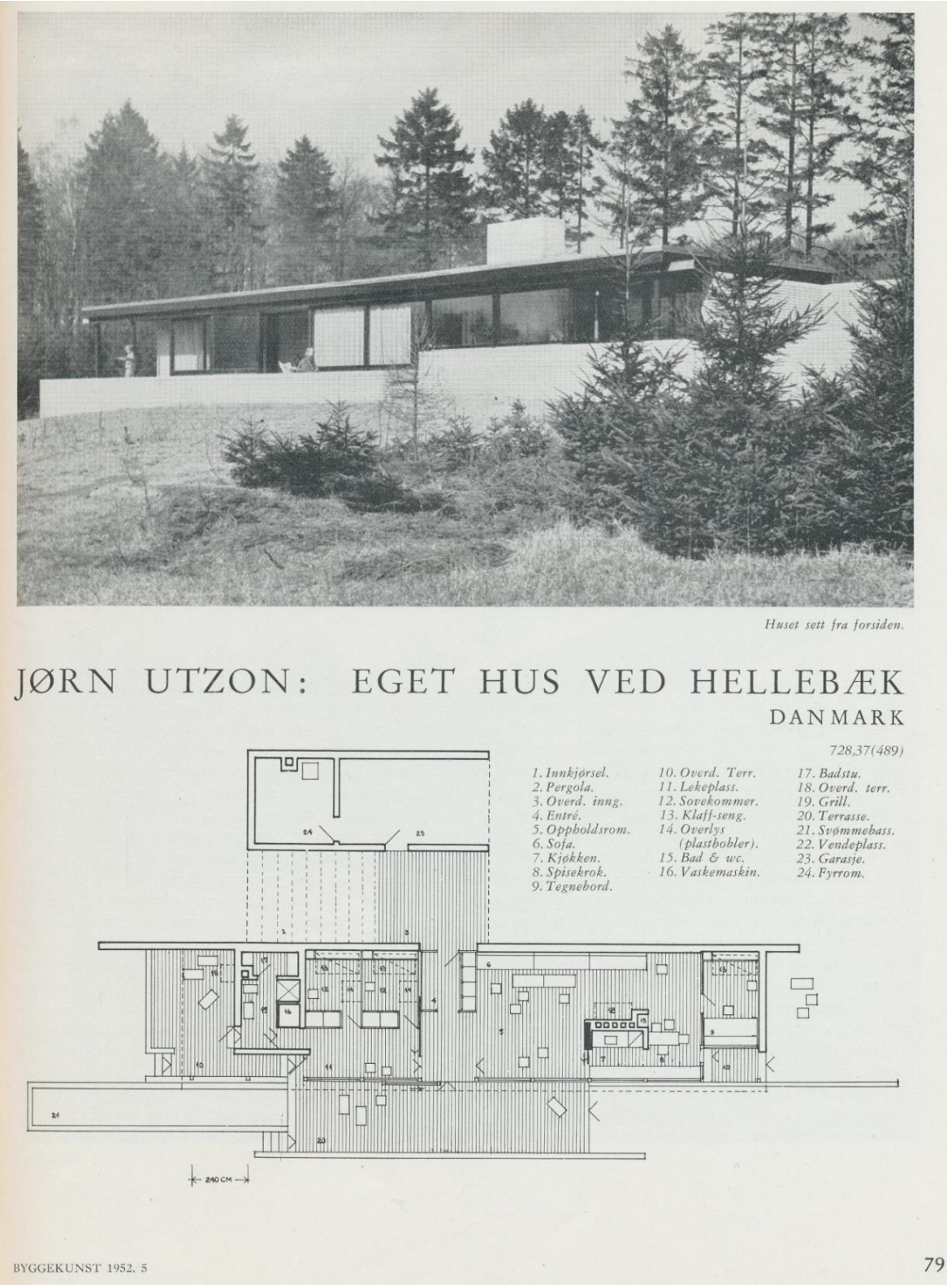


Figure 67: Caravansarai-I Gulshan situated in Grand Bazaar of Isfahan, plan drawing.
Source: Herdeg, 30.



Huset sett fra forsiden.

JØRN UTZON: EGET HUS VED HELLEBÆK

DANMARK

728,37(489)

1. Innkjørsel.
2. Pergola.
3. Overd. inng.
4. Entré.
5. Oppholdsrom.
6. Sofa.
7. Kjøkken.
8. Spisekrok.
9. Tegnebord.
10. Overd. Terr.
11. Lekeplass.
12. Sovekommer.
13. Klaff-seng.
14. Overlys (plasthobler).
15. Bad & wc.
16. Vaskemaskin.
17. Badstu.
18. Overd. terr.
19. Grill.
20. Terrasse.
21. Svømmebass.
22. Vendeplass.
23. Garasje.
24. Fyrrom.

240 CM

BYGGEKUNST 1952. 5

79

Figure 68: Plan drawing of the 1952 Hellebæk House published in *Byggekunst*, 1952.
Source: Jorn Utzon, "Jørn Utzon: Eget hus vet Hellebæk," *Byggekunst* (1952), 79.

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APPENDIX I: UTZON'S READING OF THE MIDDLE EAST

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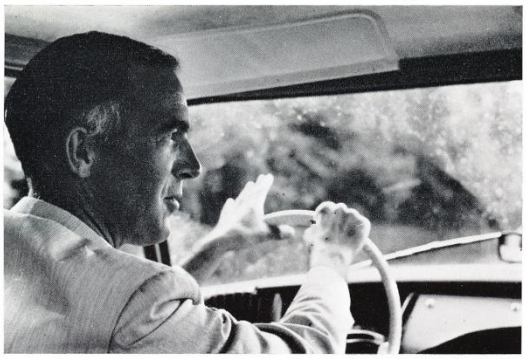
APPENDIX II: PLATFORMS AND PLATEAUS: IDEAS OF A DANISH ARCHITECT

Jørn Utzon, “Platforms and Plateaus: Ideas of a Danish architect,” *Zodiac* 10 (1962): 112-117.



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Piattaforme e altipiani: idee di un architetto danese

L'idea dell'architettura come « modifica » della natura secondo le leggi e le ragioni dell'ordine umano (idea che si oppone a quella dell'architettura organica) è il punto di partenza di queste interessanti note di un architetto fra i più vivi e intelligenti delle giovani generazioni, il danese Utzon.
Egli fissa l'attenzione su un elemento architettonico e urbanistico così importante da poter essere considerato simbolico in tutti i tempi e in tutte le civiltà: l'area circoscritta, nettamente delimitata, a terrazze, isolata dall'ambiente (per lo più mediante una marcata sopraelevazione dal livello del suolo: e talvolta si trae partito da alture naturali), e divenuta « architettonica », sulla quale vengono costruiti certi edifici della vita religiosa, civica, domestica, a seconda delle civiltà e dei costumi. Dai templi messicani e dall'acropoli greca (molti esempi italiani vi si potrebbero aggiungere), Utzon arriva così fino a noi, spiegando come la medesima idea della « piattaforma » abbia determinato le sue stesse opere più note e importanti, dal teatro dell'Opera di Sidney fino al progetto urbanistico recente di Elviria: e possa quindi suggerire (come Utzon suggerisce) soluzioni vitali per alcuni gravi problemi dell'urbanistica moderna, quali ad esempio quelli del traffico.

Platforms and Plateaus: Ideas of A Danish Architect

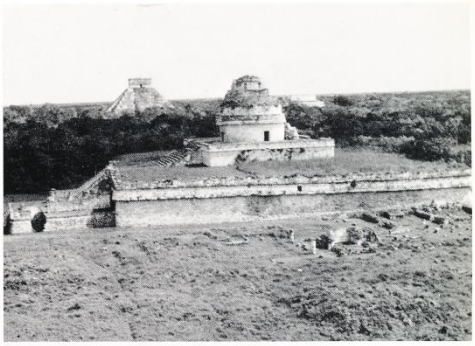
Jörn Utzon

L'idée de l'architecture en tant que « modification » de la nature selon les lois et les raisons de l'ordre humain (le contraire de l'architecture organique) est le point de départ de ces notes très intéressantes écrites par un des architectes les plus intelligents parmi les jeunes de tous les pays: Jörn Utzon, danois.
Il étudie notamment un élément d'architecture et d'urbanisme si important qu'on pourrait le considérer symbolique dans tous les temps et dans toutes les civilisations: l'aire circonscrite, nettement délimitée et même isolée de son ambiance naturelle, très souvent, parce qu'elle est surélevée du niveau du sol (et parfois on tire parti des hauteurs naturelles), et devenue partout « architectonique ». On y bâtit certains monuments de la vie religieuse, civique, domestique, suivant les civilizations et les coutûmes. Depuis les temples du Mexique et l'acropole grècque (on pourrait y ajouter maints exemples italiens), M. Utzon parvient jusqu'à nos jours, et il nous dit que c'est la même idée de la « plateforme » qui a determiné ses propres oeuvres les plus connues et importantes (l'Opéra de Sidney, par exemple, et le plan de Elviria, très récent). Il en découle un tas de suggestions capitales pour resoudre certains gros problèmes de l'urbanisme actuel: entre autres, les problemes de la circulation dans les villes.

The platform as an architectural element is a fascinating feature. I first fell in love with it in Mexico on a study trip in 1949, where I found many variations, both in size and idea of, the platform, and where many of the platforms are alone without anything but the surrounding nature.

All the platforms in Mexico were positioned and formed with great sensitivity to the natural surroundings and always with a deep idea behind. A great strength radiates from them. The feeling under your feet is the same as the firmness you experience when standing on a large rock.

Let me give you two examples of the brilliance of the idea behind. In Yucatan, in Uxmal and Chichen-Itza, the same principle is followed, based on identical natural surroundings. Yucatan is a flat lowland covered with an inaccessible jungle, which grows to a certain uniform defined height. In this jungle the Mayans lived in their villages with small pieces of land cleared for cultivation, and their surrounding, background as well as roof, was the hot, damp, green jungle. No large views, no up and down movements.



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4 2-5. Platforms, Yucatan, Mexico.

By introducing the platform with its level at the same height as the jungle top, these people had suddenly obtained a new dimension of life, worthy of their devotion to their Gods. On these high platforms — many of them as long as 100 meters, — they built their temples. They had from here the sky, the clouds and the breeze, and suddenly the jungle roof had been converted into a great open plain. By this architectural trick they had completely changed the landscape and supplied their visual life with a greatness corresponding to the greatness of their Gods.

Today you can still experience this wonderful variation in feeling from the closeness in the jungle to the vast openness on the platform top. It is parallel to the relief you feel here in Scandinavia when after weeks of rain, clouds and darkness, you suddenly come through all this, out into the sunshine again.

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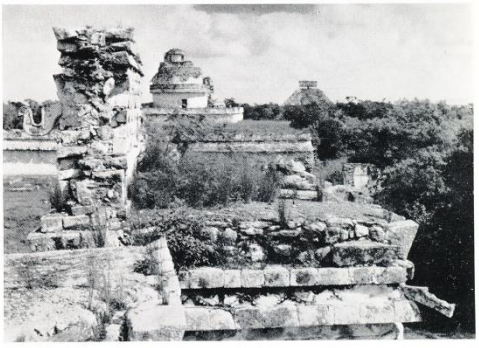

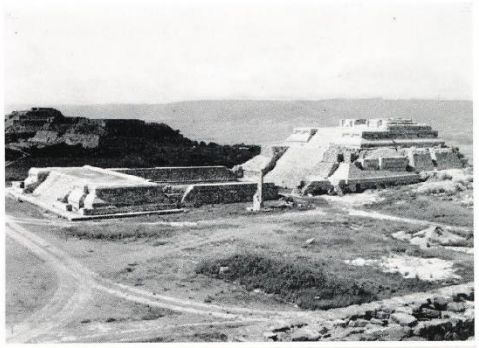

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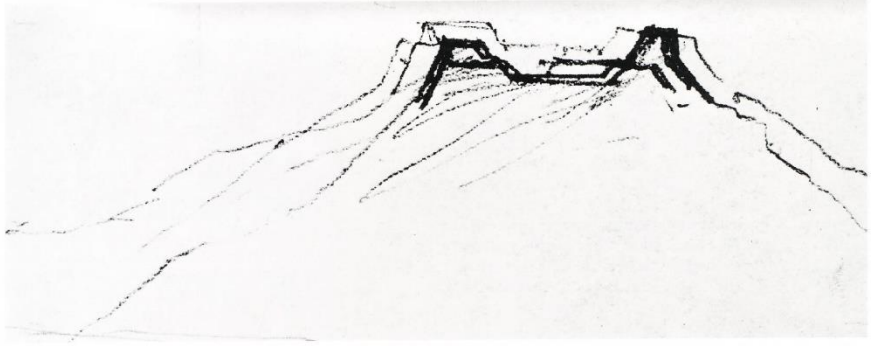

6-8. Monte Alban.

In India and the East, not forgetting the Acropolis and the Middle East, many wonderful platforms of various kinds are the backbone of architectural compositions and all of them based on a great concept.
A few examples:
The big mosque in Old Delhi is an outstanding one. It is surrounded by the markets and the bazaar buildings, placed in a pell mell of traffic, people, animals, noise and nervous buildings. Here, raised approximately 3 to 5 meters above this is an enormous red sandstone platform surrounded by arcades on the outer contours of the platform. These arcades are closed by walls on three sides of the platform, so that you can look through only at the fourth side, and here, from above, have contact to the life and disorder of the town. On this square or platform, you have a strong feeling of remoteness and com-

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plete calmness. An effect, no client or architect would have dreamed possible in advance, has been achieved by so very few means.

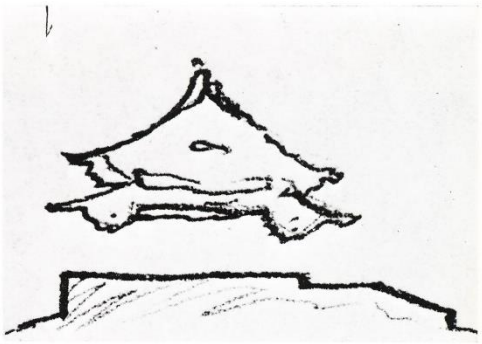
Chinese houses and temples owe much of their feeling of firmness and security to the fact that they stand on a platform with the same outline as that of the roof or sometimes even of larger size, depending upon the importance of the building. There is magic in the play between roof and platform.

The floor in a traditional Japanese house is a delicate bridge-like platform. This Japanese platform is like a table top and you do not walk on a table top. It is a piece of furniture. The floor here attracts you as the wall does in a European house. You want to sit close to the wall in a European house, and here in Japan, you want to sit on the floor and not walk on it. All life in Japanese houses is expressed in sitting, lying or crawling movements. Contrary to the Mexican rock-like feeling of the platform, here you have a feeling similar to the one you have when standing on a small wooden bridge, dimensioned to take just your weight and nothing more. A refined addition to the expression of the platform in the Japanese house is the horizontal emphasis provided by the movements of the sliding doors and screens, and the black pattern made by the edges of the floor mats accentuate the surface.

An almost violent, but highly effective and wonderful contrast to this calm, linear, natural coloured architecture is created by the Japanese women moving noiselessly around like exotic butterflies in their gaily coloured silk kimonos. The second example from Mexico is Monte Alban, an ingeniously chosen site for devotion to the Gods. The human regulation or adaptation of the site has resulted in something even stronger than nature and has given it spiritual content.

The little mountain, Monte Alban, almost a pyramid, dominates three valleys outside the town, Oaxaca, in Southern Mexico. The top of the pyramid is lacking and leaves a great flat part, approximately 500 meters to 300 meters. By the introduction of staircase arrangements and step-like buildings on the edge of the platform and keeping the central part at a lower level, the mountain top has been converted into a completely independent thing floating in the air, separated from the earth, and from up there you see actually nothing but the sky and the passing clouds, — a new planet.

Some of my projects from recent years



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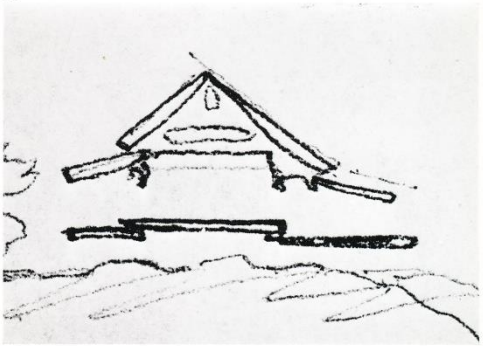

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are based on this architectural element, the platform. Besides its architectural force, the platform gives a good answer to todays traffic problems. The simple thing that cars can pass underneath a surface, which is reserved for pedestrian traffic, can be developed in many ways.

Most of our beautiful European squares suffer from cars. Buildings, that „spoke with each other" across a square, either in axis systems or in balanced composition, are not corresponding any more because of the traffic flow. The height of the cars, their speed and surprisingly noisy behavior make us seek away from squares, which used to be restful places for walking.

In some of the schemes shown, there are various traffic layers under the platform — for covered pedestrian intercommunication, for cartraffic and for parking. The buildings stand on top of the platform supporting each other in an undisturbed composition.

In the Sydney Opera House scheme, the idea has been to let the platform cut through like a knife and separate primary and secondary functions completely. On top of the platform the spectators receive the completed work of art and beneath the platform every preparation for it takes place.

To express the platform and avoid destroying it is a very important thing, when you start building on top of it. A flat roof does not express the flatness of the platform.

As shown here in the schemes for the Sydney Opera House and the High School, you can see roofs, curved forms, hanging higher or lower over the plateau. The contrast of forms and the constantly changing heights between these two elements result in spaces of great architectural force made possible by the modern structural approach to concrete construction, which has given so many beautiful tools into the hands of the architect.

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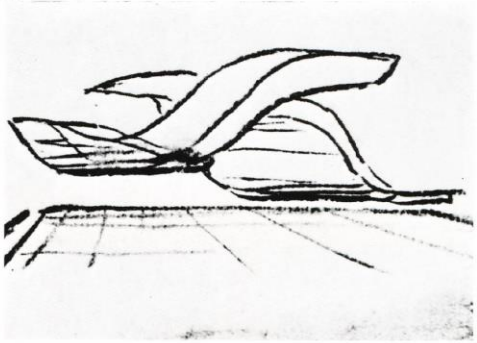

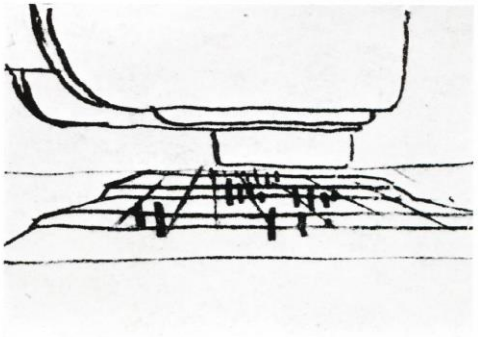

APPENDIX III: ADDITIVE ARCHITECTURE

Utzon, Jørn. “Additive Architecture,” *Arkitektur* 14 (1970): 1-48.

Additiv arkitektur

En konsekvent udnyttelse af industrielt fremstillede bygningsdele opnås først, når disse dele kan adderes til bygninger, uden at komponenterne på nogen måde skal beskæres eller tilpasses.

Et sådant rendyrket additionsprincip giver en ny arkitekturform, et nyt arkitektonisk udtryk med de samme egenskaber og samme virkning som addition af f. eks. skovens træer, grupper af dyr, sten på stranden, rangerbanegårdens jernbanevogne, det danske frokostbord, alt efter hvor mange forskellige komponenter, man føjer ind i dette spil. Spillet passer som hånd i handske på vor tids krav om en friere udfoldelse i planlægningen af bygninger og et stærkt ønske om ubundethed af huset i den form, der kunne kaldes æsken, bundet af en given størrelse, og som på traditionel vis opdeles med skillerum.

Når man arbejder med det additive princip, kan man uden vanskelighed respektere og honorere alle krav om plan- og rumform og alle krav om udvidelse og ændringer, idet arkitekturen eller måske bedre, karakteren, netop er det sammenstilledes karakter og ikke det komponeredes eller det facadebestemtes.

Man kan ligeledes, når man arbejder med det additive princip, undgå at forsynde sig mod de enkelte komponenters ret til at eksistere. De kommer alle til udtryk.

Den funktionalistiske moral, som jo er den væsentligste baggrund for sandfærdigt byggeri, er respekteret. Tegningerne er ikke en ting i sig selv med modullinier uden betydning og uden tykkelse, men modullinierne er vægtykkelser, og stregerne på papiret er konturer af færdige ting. Projekterne viser, hvilken frihed i udformningen af vidt forskellige opgaver der kan opnås med det additive princip, samtidig med at det demonstrerer kerneproblemerne ved udformningen af elementerne eller komponenterne, og der gives en antydning (f. eks. i stadion-projektet) af den overlegenhed man opnår, når det gælder kontrol af produktion, pris og opførelsestid, i forhold til det rent håndværksopførte bygningskompleks.

Jørn Utzon

Additive architecture

A consistent utilisation of industrially produced building components can only be achieved if these components can be added to the buildings without having to be cut to measure or adapted in any way.

Such a pure addition principle results in a new architectural form, a new architectural expression with the same attributes and the same effects as are obtained, e. g., from adding more trees to a forest, more deer to a herd, more stones to a beach, more wagons to a marshalling yard – or more morsels to the Danish Frokost Board; it all depends on how many different components are added in this game. Like a glove fits the hand, this game matches the demands of our age for some freedom in the design of buildings and a strong desire for getting away from the box-type house where the box has a given size and is subdivided by partitions in the traditional way.

When working with the additive principle, one is able, without difficulty, to respect and honour all the demands made on design and layout as well as all the requirements for extensions and modifications. This is just because the architecture – or perhaps rather the character – of the building is that of the sum total of the components, and not that of a composition or that dictated by the facades.

Again, when working with the additive principle, one is able to avoid sinning against the right of existence of the individual components. They all manage to find expression.

The tenet of functionalism, which is after all the essential background to true architecture, is respected. The drawings are not a thing *per se* with meaningless and dimensionless module lines: – the module lines represent wall thicknesses, and the lines on the paper form the contours of the finished thing. The projects show the degree of freedom that can be achieved with the additive principle in tackling greatly varying tasks. They also demonstrate the vital problems associated with the design of units or components, and provide some indication (e. g. in the Stadium project) of the advantages in respect of production control, costs and erection time that can be achieved in comparison with a group of buildings constructed in purely artisan fashion.

Jørn Utzon

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Espansiva

Arkitekt: Jørn Utzon, MAA, FRAIA. Producent: Espansiva Byg A/S

Følgende krav har dannet grundlag for udviklingen af dette byggesystem. Det er dels krav, fremsat af bestyrelsen, dels krav, som må ligge i tiden ved udarbejdelsen af en sådan opgave, og dels krav af teknisk og økonomisk art, som er opstået under udarbejdelsen. Resultatet af alt dette er blevet hustyper med manfoldige plan-muligheder og mangfoldige facade- og rumudformninger.

En af vanskelighederne er systemets utrolige rigdom i udtryk, både når man skal præsentere resultatet af arbejdet og forelægge mulighederne for de fremtidige klienter, altså selve salgsarbejdet.

Ved at studere énfamiliehuset gennem tiderne op til i dag fandt vi, at et stolpehus, et søjlehus hvor tag og gulv var faste ubrudte flader, mens ikke-bærende ydervægge og indervægge mellem søjler var fleksible, bedst dækkede vore krav. Vi har så opdelt søjlehuset i moduler eller enheder af størrelser, som svarer til forskellige rumfunktioner, og vi sammensætter vores huse af disse moduler efter fuldkommen frit valg.

Modulerne er små pavilloner med fire søjler i hjørnerne, et gulv lidt hævet over jorden og en tagflade med et ensidigt fald, altså et pulttag. Søjlerne er forbundet med et spær, så der dannes en ramme, som sammenboltes på byggepladsen med en trekant som standardafstivning. Søjler og spær er af lamellimet træ. Tagfladen er af stressed-skin finérelementer med Rockwoolisolation, og gulvet er af letbeton elementer, som i sig selv giver tilstrækkelig isolation.

Søjler og gulvelementer hviler på to præfabrikerede betonbjælker, som med ankre er indstøbt i et fundament, formet af kloakrør, der er nedgravet til frostfri dybde.

Nu har vi således Espansiva Bygs første komponenter, som markedsføres i fire forskellige dimensioner. Disse komponenter eller pavilloner giver mulighed for at bygge alle krævede rumstørrelser i énfamiliehuse, skoler, moteller etc. i én etage. Pavillonerne korresponderer i de forskellige størrelser med gange, birum, køkkener, badeværelser, kamre, soveværelser, spisekøkkener, spisestuer, kontorer, hobbyrum, opholdsstuer eller dele heraf, idet man ved sammenbygninger uden skillerum mellem modulerne naturligvis kan opnå enhver ønsket rumstørrelse, kun begrænset i modulets dybde af den valgte spændvidde mellem søjlerne.

Det er meningen, at disse komponenter, som vi har sammenlignet med en påklædningsdukke, skal forhandles til trælasthandlernes kunder: håndværkere, arkitekter og selvbyggere, som selv kan iklæde påklædningsdukkepavillonen den af dem ønskede dragt.

For tagets vedkommende er det, takket være taghældningen på 17 grader, muligt at dække taget med et stort register af tagmaterialer: med tegl af forskellige slags, med Eternit, metal, pap, etc.

Ydervæggene kan ved hjælp af bjælker, som tilknyttes de få fundamentspunkter, ligeledes opføres af et stort register af materialer: murværk, betonelementer, letbeton, etc. Eller hvis man ønsker det, kan diverse lette ydervægge påskrues de bærende søjler, så man kan vælge ydervægge med beklædning af f. eks. træ, finér, Eternit, Glassal og metal. Vinduer og døre kan også valgfrit monteres på træsøjlerne.

På grund af komponenternes varierende dybdemål (det varierer fra 2,00 m til 3,20 m og fra 5,00 m til 6,20 m), bliver rumhøjden takket være pulttaget stadig stigende, hvilket i modsætning til et fladt-tags hus giver en fin, rytmisk stigning og variation i rumhøjden: Små rum lave, store rum luftige og høje, samtidig med at vi beholder samme tagskægshøjde på den lave side.

I systemet er der indført en afstand på 12 cm mellem komponenterne, ligemeget i hvilken form de sammenbygges. Denne afstand er opstået efter nøje studier af additionsprincippet. I modsætning til modullinie-systemet, hvor der ikke er taget hensyn til skillerumstykkelse, er skillerummet her i sig selv et modul, et element, en komponent (hvad man nu har lyst at kalde det), som man føjer til pavilloner eller skyder ind mellem pavillonerne. Vor modullinie er således 12 cm tyk. Den er en reel størrelse, der indgår i byggeriet og sikrer klare løsninger af mødet mellem vægge og tag, indervægge og ydervægge. Vi betragter vort pavillonmodul som en bygningskomponent med egenskaber, der giver brugerne en bedre service, såvel under projekteringen som under selve byggeriet, end de komponenter der markedsføres i dag, f. eks. Gang Nail spærfag. Vi skaffer umiddelbart tag over hovedet og gulv over jorden, en tør byggeplads, ved anvendelsen af en uhyre enkel byggeproces. Samtidig giver disse neutrale elementer brugerne fuldkommen frihed til fri udfoldelse såvel planmæssigt, materialemæssigt som økonomisk.

Anden etape af Espansiva Bygs system er blevet udviklet således, at køberne kan bygge helt færdige huse, hvilket vil sige, at vi har produceret alle de nødvendige, ikke-bærende elementer, f. eks. lukkede ydervægselementer, vindues- og dørpartier, skillevægspartier og indvendige dørpartier. Disse elementer er for væggenes vedkommende 12 cm tykke af to lag finér med isolation af Rockwool imellem. De påskrues søjlerne og kan monteres med skruenøgle. De kan også demonteres, således at ændringer eller tilbygninger kan foretages når som helst. Det samme gælder vindues- og dørpartier.

Ved at studere eksisterende hustyper og eksisterende skillevægge og ydervægge er opnået en rimelig grad af frihed i planen og m. h. t. form og størrelse af vinduesåbninger – dvs. mængden af lys – og placering af vinduesåbningen i væggen. Et 10 cm modul for bredden af skillevægge og placering af døråbninger er opnået ved et matematisk system, hvorefter man kan kombinere fem elementer med forskellige breddemål. I facader er et 10 cm modul i højden opnået ved samme matematiske system med varierende højdemål af fem facadeelementer, hvilket giver fuld frihed til placering af vinduer af alle højder inden for 10 cm modulet, hvor som helst imellem søjlernes facadesider.

For eksempel kan man have et højtsiddende, smalt vindue i badeværelse og birum. Man kan have smalle vinduer fra køkkenbordshøjde til underkant af overskab, køkkenvinduer fra høje eller lave bordhøjder, vinduer fra meget lav højde i opholdsstuer og vindues- eller dørpartier til gulv i opholdsstuer eller forbindelsesgange.

Systemet er vist som det normale længehus med sadeltag, bestående af to sæt pavilloner, ryg mod ryg, eller som længehus med en lille og en stor pavillon, ryg mod ryg, eller som et længehus med forskellige arter pavilloner på begge sider af en midterakse. Det er også vist som et vinkelhus, som u-formet hus og som atriumhus. Yderligere er det vist som et hus bygget op i zigzag, med gangen som den sammenholdende rygrad og husets forskellige funktioner adskilte.

Denne rigdom i planformen er mulig takket være sammenbygninger omkring det 12 cm tykke ydervægs- eller skillevægselement, som fortsætter op over tag som brandgavlsagtigt fremspring. Man undgår derved indvendige tagrender. Dette udtrykte additionsprincip giver også huset dets logiske karakter.

Med Espansive Byg-systemet kan vi nu opnå det mål, vi har sat os: ikke alene at give den enkelte bygherre fuld frihed for udformningen af sit hus, fuld frihed til at udbygge eller ændre når som helst, men også at give bygherren mulighed til i større fælles bebyggelser at opnå et fælles udtryk, som vi kender det fra vore gamle, organisk sammenhængende bindingsværkslandsbyer, og dog lade den enkelte familie få sit helt individuelle hus, stort eller lille. Her er ingen stiv, militær gentagelse, som kendetegner mange typehusbyer, eller tilfældige udtryk, som det vi møder i de nye villakvarterer. **Jørn Utzon**

Espansiva

A group of Danish timber merchants have set up a limited company, known as »Espansiva Byg A/S«, for the purpose of developing, producing and marketing components for one-family houses. The specifications for these components were exacting. Timber was to be the predominant material; the components had to be easy to handle and erect, capable of being produced at competitive prices, and capable of being combined into a great number of design combinations.

This has been the basic programme of the Espansiva building system. The components are marketed by the timber merchants, but the houses are designed by practising architects so that they are adapted to clients' requirements and to the special site conditions.

By studying the history of the one-family house right up to the present day, we find that our requirements could best be met by a house on posts or columns where the roof and floor formed solid, uninterrupted slabs whilst the non-bearing outer walls and the inner walls between the columns were flexible. We have therefore divided the column house into modules or units of sizes which correspond to the different functions of the rooms, and we have a completely free choice in composing our houses from these modules.

The modules are small pavilions with four corner posts, a floor raised slightly above the ground, and a pent roof. The posts are joined by a rafter so that a frame is formed which is bolt-assembled on the site, using a standard triangle as support. Posts and rafter are of laminated glued wood. The roof consists of stressed-skin plywood units with rockwool insulation, and the floor of lightweight concrete units which, *per se*, provide adequate insulation.

Posts and floor units rest on two prefabricated concrete beams. These are anchored in a foundation formed by drain pipes that has been lowered to frost-free depth.

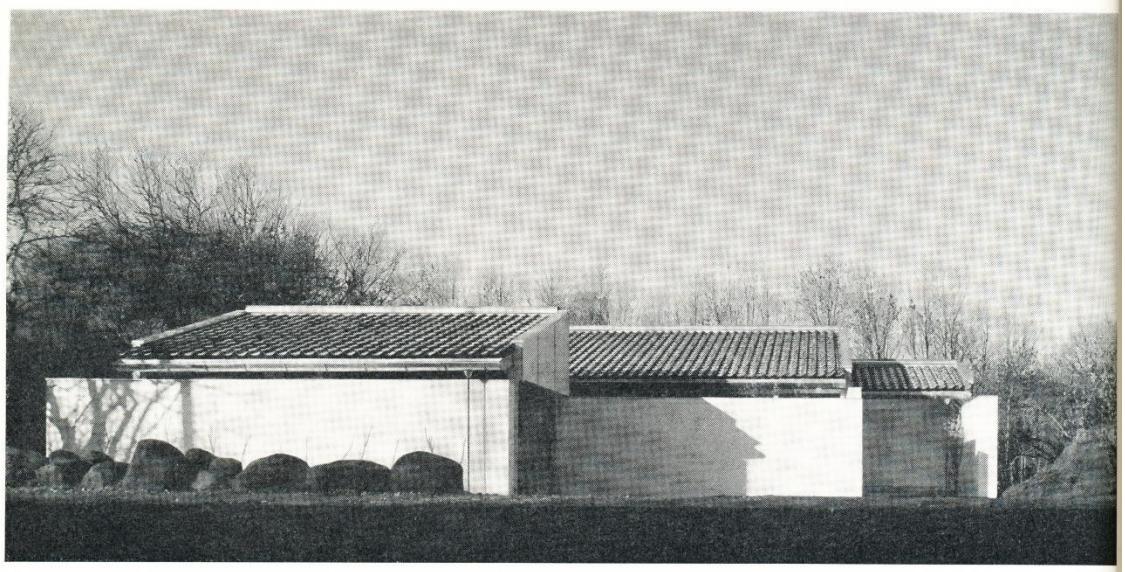
These units or pavilions permit the construction of single-storey rooms of any desired size in one-family houses, schools, motels, etc. The different sizes of the pavilions correspond to corridors, ancillary rooms, kitchens, bathrooms, small and large bedrooms, sitting rooms (or parts thereof). This is because, with a combination of these modules without partitions, it is of course possible to cover rooms of any desired size, the only limitation being the span between posts governing the depth of the module.

The roofing may consist of any of many different materials, such as tiles of different kinds, asbestos cement, metal, felting, etc.

By using beams to the few foundation points, the outer walls may likewise consist of any of many different materials: brick, concrete units, light-weight concrete, etc. Or, if desired, outer wall panels of different types can be bolted to the posts so that one has a choice of boarding, plywood, asbestos cement, glazed panels or metal as cladding material. Similarly, there is a free choice of windows and doors to be mounted on the timber posts.

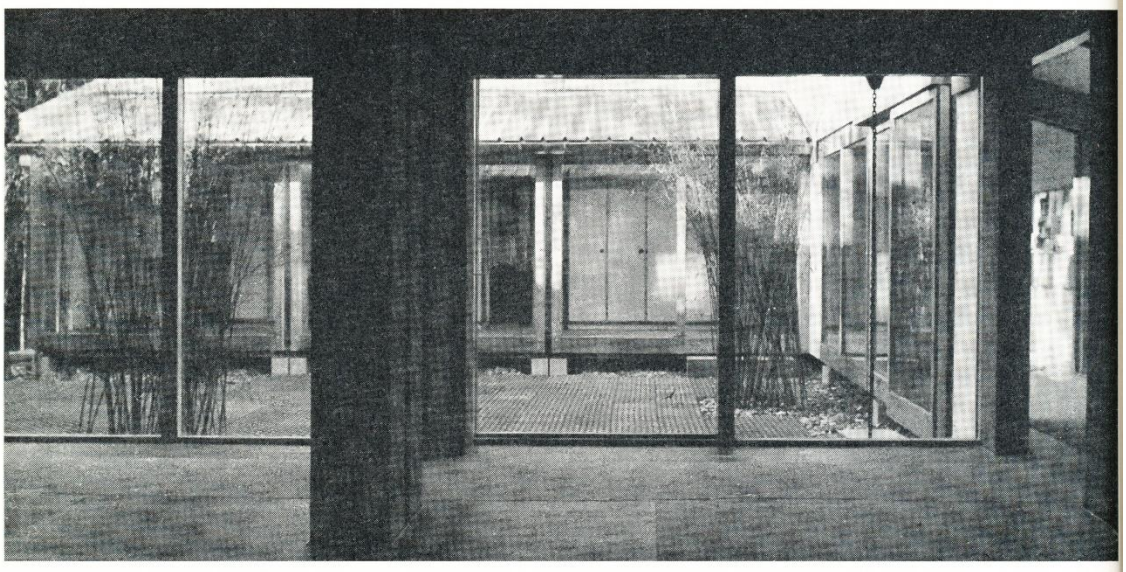
Throughout the system, a standard spacing of 12 cm has been adopted between the components, irrespective of the way in which these are combined. This spacing was chosen after a close study of the additive principle. In contrast to the linear module system, where the thickness of the partitions need not be taken into account, the partition itself here becomes a module, a unit, a component (whatever one likes to call it) which is added to the pavilions or inserted between them.

The second stage of the »Espansiva Byg« system is being developed in such a way that buyers are able to buy completely finished houses. In other words, we have produced all the necessary non-bearing units, e. g. closed outer wall panels, window and door panels, partition panels, and internal door panels. As far as the walls are concerned, these units are 12 cm thick and consist of two panels of plywood with rockwool insulation between them. They are bolted to the posts and can be assembled by means of spanners. They can also easily be removed so that the house can be modified or extended at any time. The same applies to window and door panels.



Med de til Espansiva Byg udviklede komponenter er opført en prototype, et prøvehus beliggende i Gl. Hellebæk i Nordsjælland. Prototypen har givet mulighed for at prøve komponenternes anvendelighed i praksis. I prototypen er også demonstreret forskellige tag- og facadematerialer. Til ydervægge er anvendt tegl, letbeton, træbeklædning og præfabrikerede beklædnings elementer af stressed-skin typen, isolerede med mineraluld. Der er også anvendt forskellige dør- og vindueskomponenter. Tagene er tækkede med tegl og aluminiumsplader.

■ *With the components developed for Espansiva Byg, a prototype trial house has been erected at Gammel Hellebaek, north of Copenhagen. With this prototype, it has been possible to try out the applicability of the components in practice. The prototype has also been used for demonstrating different roof and facade materials. The outer walls consist of brick, lightweight concrete, wooden cladding as well as prefabricated cladding elements of the stressed-skin type. Use was also made of different door and window units. The roofing consists of tiles and aluminium sheeting.*



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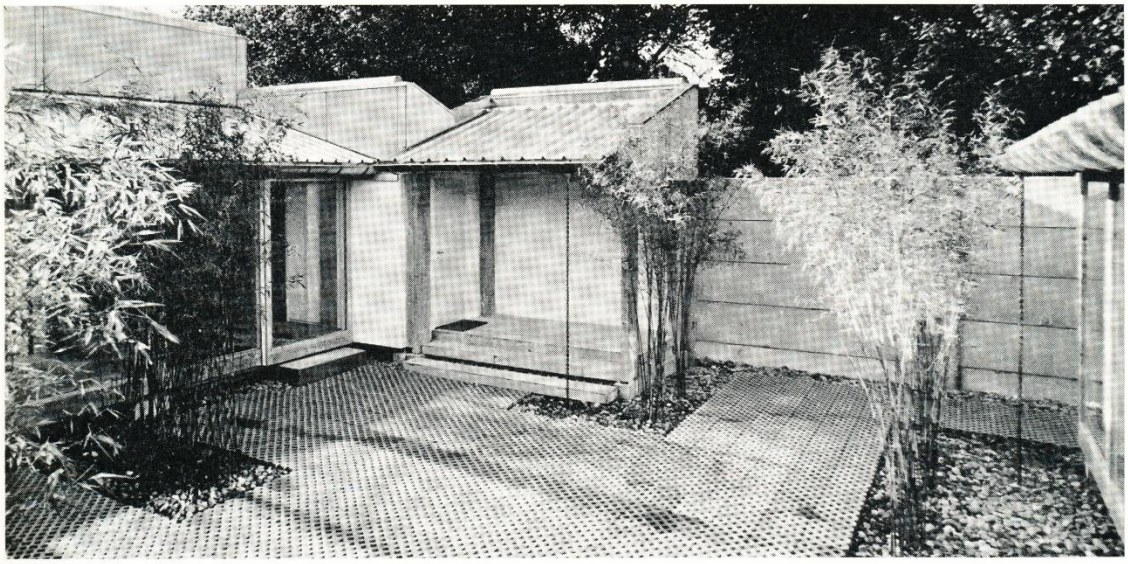
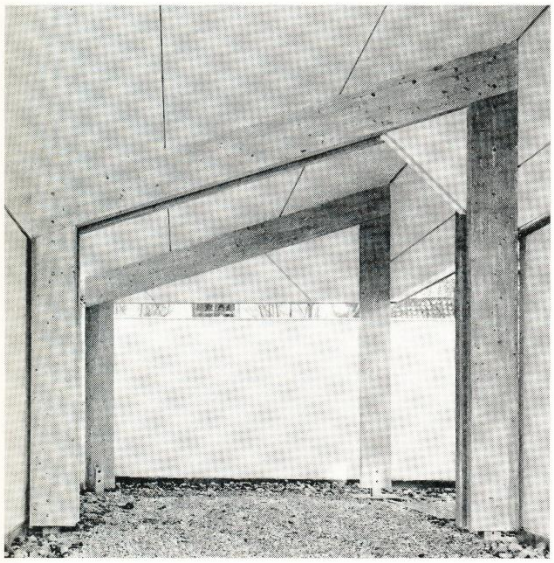


Billederne på modstående side viser facaden mod vejen med carporten i forgrunden. Det andet billede er taget fra opholdsstuen, hvorfra man ser over atriumgården mod fløjen med soverummene. På denne side vises atriumgården og nederst carporten, interiør og eksteriør. Her er byggesystemet umiddelbart aflæseligt.

■ *The photographs on the opposite page show the house facing the road, with the car port in the foreground. The other photograph is taken from the sitting room from which there is a view across the atrium towards the bedroom wing. Below: The car-port, illustrating the building principle.*



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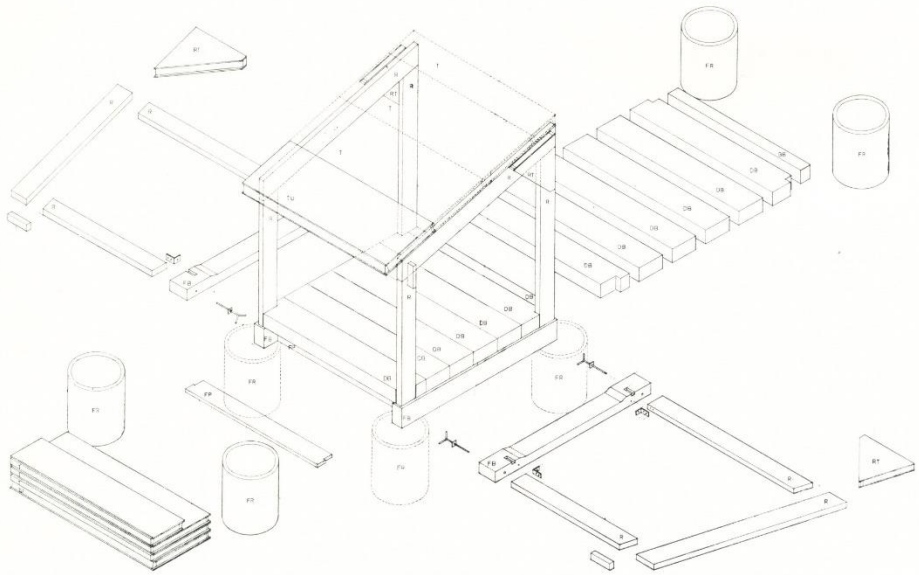

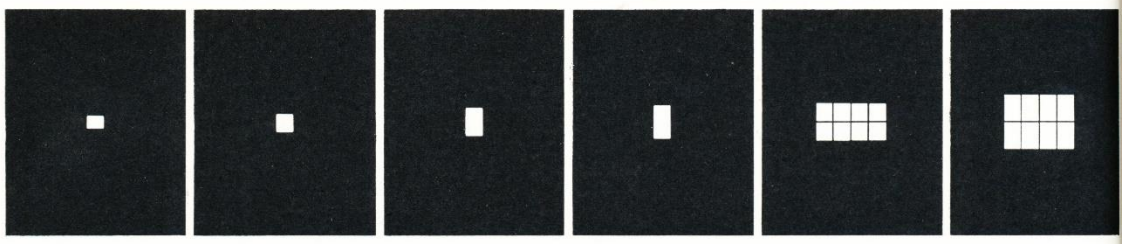

Øverst: En bygningsenhed opstillet og med de anvendte komponenter lagt ud til siderne. Fundamenterne består af nedgravede betonrør, der udstøbes med beton, hvori en ankerbolt er faststøbt. To betonbjælker boltes til fundamentet. Herpå opstilles to bukke af laminerede træplanker, der sammenboltes og afstives af en stressed-skin trekant. På fundamentsbjælkerne lægges et dæk af letbeton planker. Taget lægges af stressed-skin elementer.

Modstående side øverst: Den lukkede bygningsenhed. Omkring den er udlagt facadeelementer af stressed-skin typen, vindues- og dørelementer samt dækningslister. Taget er her vist dækket med asbest-cement plader.

I den sorte frise er i de første 4 felter vist de 4 bygningsenheder, der indgår i systemet. Derefter følger forskellige kombinationsmuligheder fra en simpel længe til de mest komplicerede enfamiliehusplaner.

Under frisen er udtegnet i mål 1:400 enkelte af de i frisen viste kombinationer.

■ *Top: One of the units is here shown assembled, and with the different components laid out at its sides. The foundations consist of drain pipes which are dug into the ground and filled with concrete in which an anchor bolt is embedded. Two concrete beams are bolted to the foundation. On them are placed two trestles of laminated wooden boards which are bolt-assembled and braced by a stressed-skin triangle. The foundation beams carry a decking of lightweight concrete boards. The roofing consists of stressed-skin elements.*

■ *Opposite top: Solid unit. Laid out around it are facade elements of the stressed-skin type, window and door units as well as cover strips. The roof shown here is covered with asbestos-cement sheets.*

■ *The first four panels of the black frieze show the four units comprised in the system. This is followed by illustrations of various possible combinations, ranging from a simple shed to the most complicated house layouts.*
Shown below the frieze, on a scale of 1 : 400, are drawings of some of these combinations.

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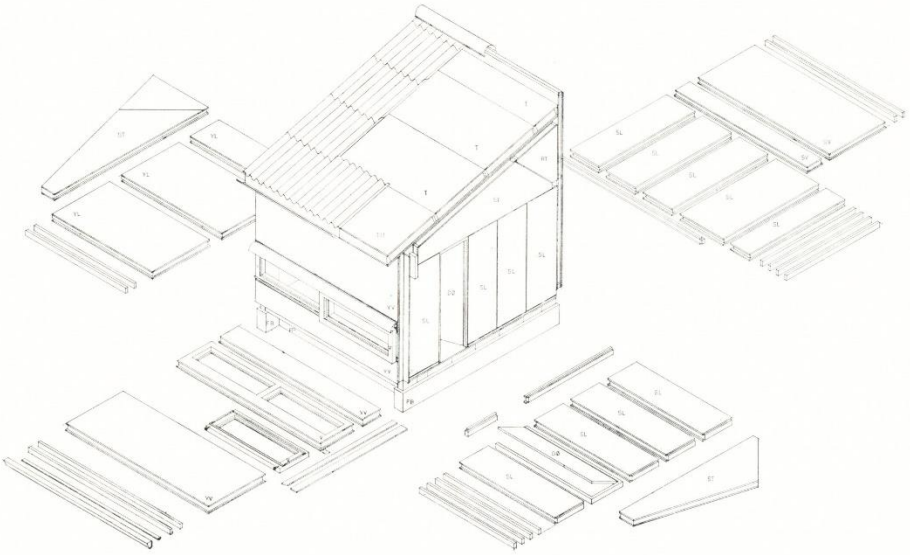

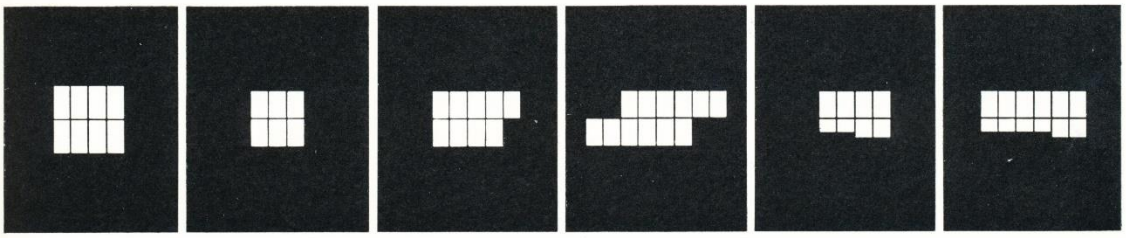

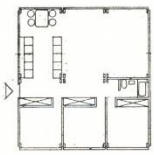

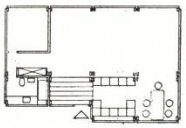

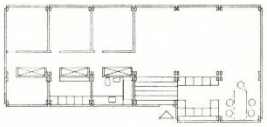

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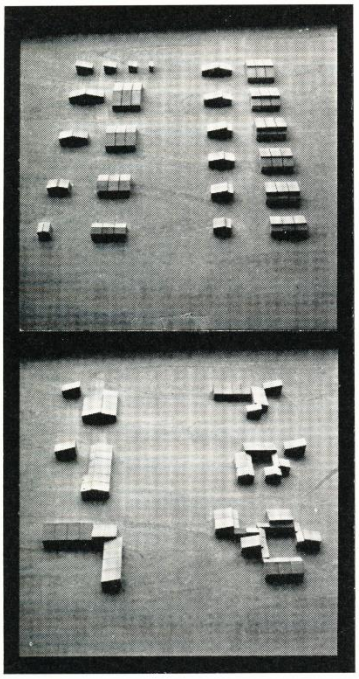

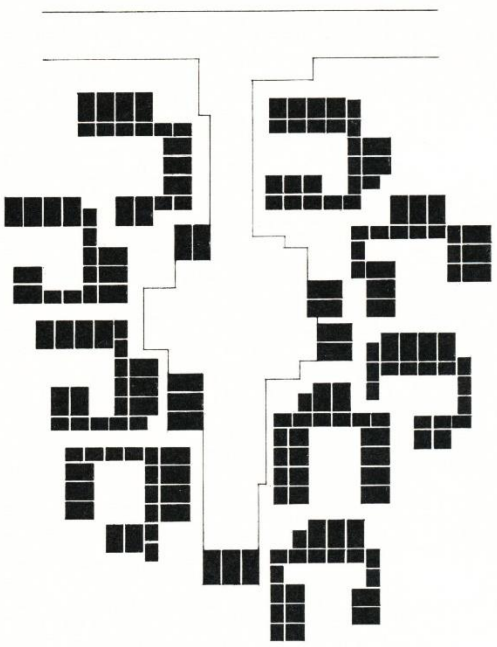

Individuelt udformede e
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■ *Individually design*
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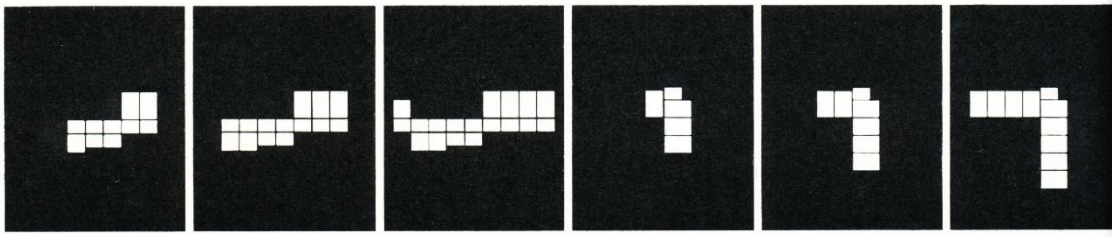

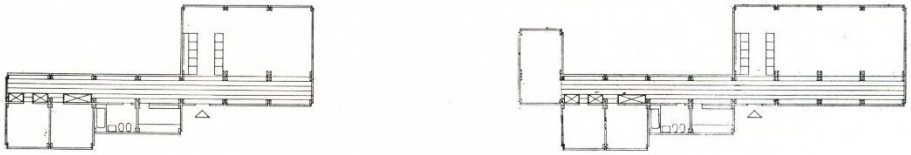

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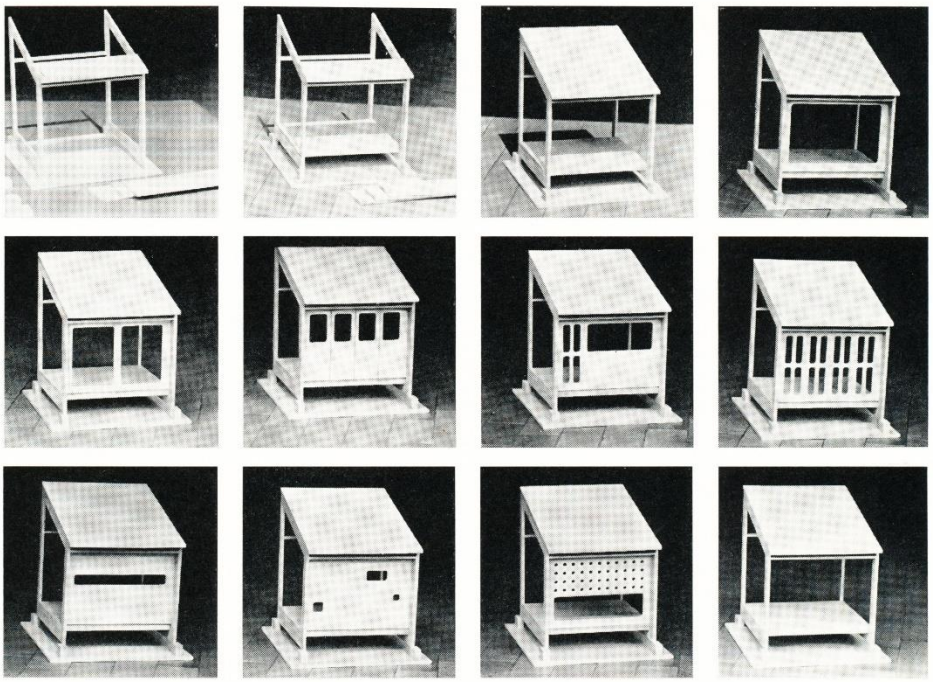
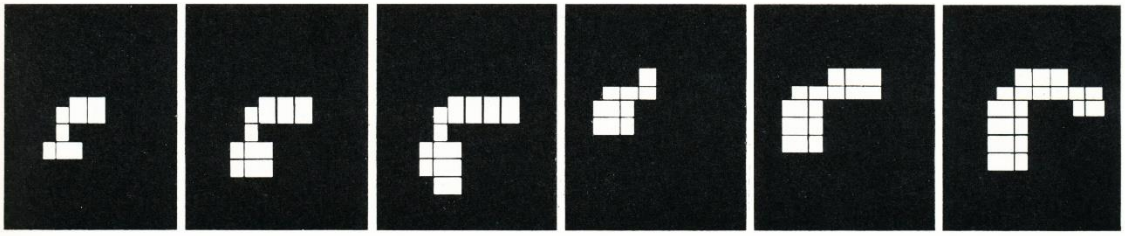
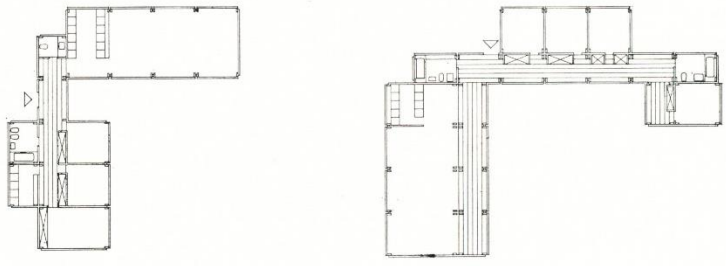
En bygningsenhed vist i model under opbygning og lukket med forskellige facadeelementer.
Ved tilbygning fjerner man blot de påskruede gavlelementer og tilføjer en ny bygningsenhed.

■ *One unit shown as a model during assembly, and enclosed with different facade units.*
If the house is to be extended, all that is necessary is to remove the bolt-assembled wall panels and to add a new unit.







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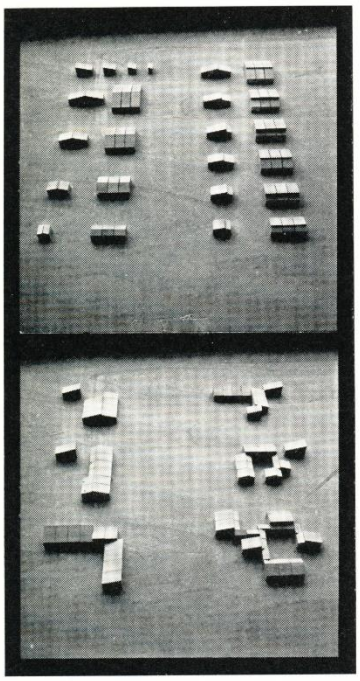
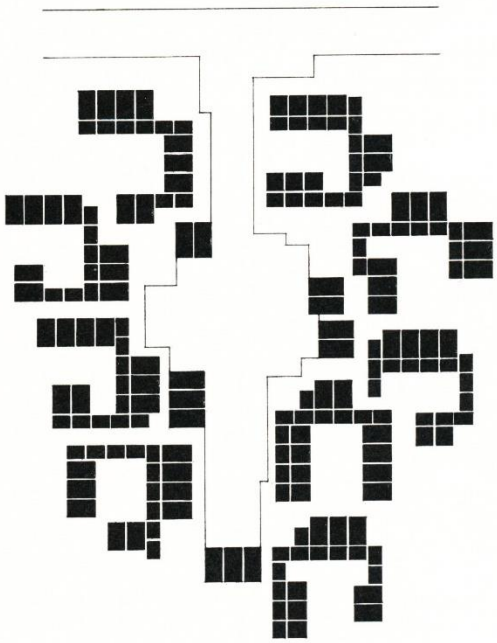
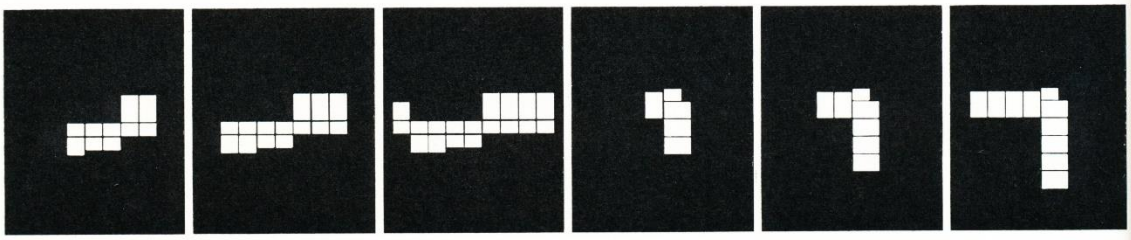
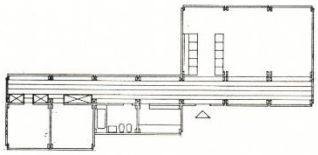


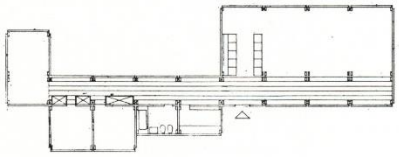


Individuelt udformede enfamiliehuse i en gruppe, som trods store variationer i plan og facader vil udgøre en helhed på grund af komponenternes beslægtede former, der går igen i alle husene.

■ *Individually designed houses, forming part of a group which, in spite of major variations in layout and facade design, will form an integral unit because of the kinship of the forms recurring in all the houses.*







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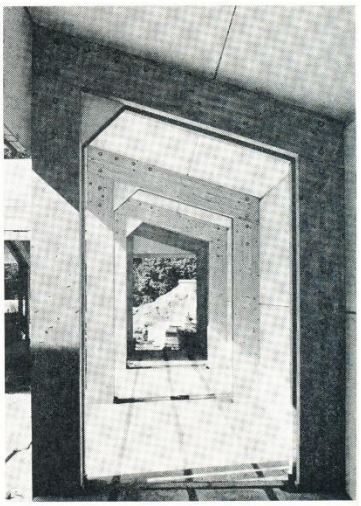
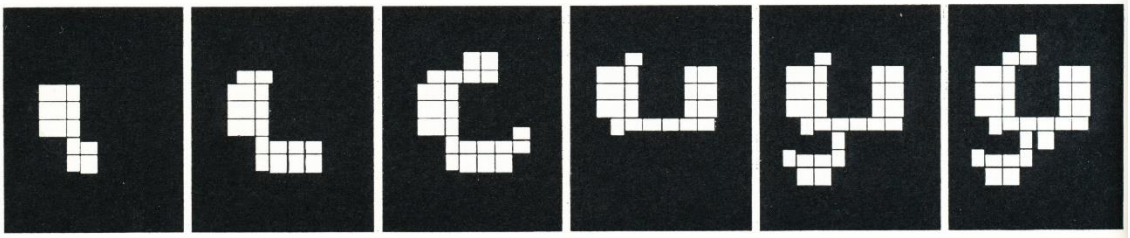
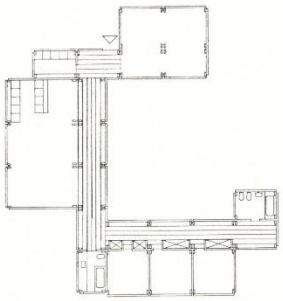
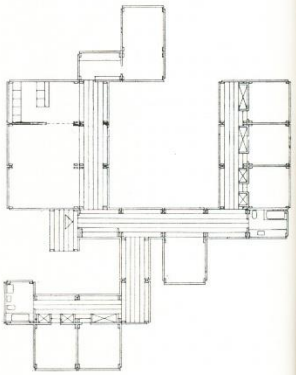


Prototypen under bygning. Dækket, der er af letbetonelementer er lagt på fundamentbjælkerne. Bukkene af lamineret træ rejses og afstives. De lukkede facadeelementer og tagelementer påskrues.
På modstående side ses forskellige facadeudfyldninger i prøve-huset.

■ *The prototype under construction. The decking, which consists of lightweight concrete elements, is placed on the foundation beams. The plywood trestles are raised and braced, and the solid facade and roof units are fastened by bolts.*
The pictures on the opposite page show a number of facade infillings.







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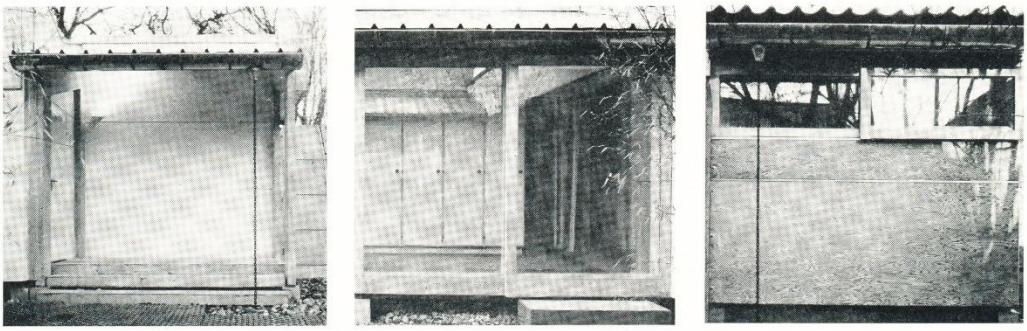

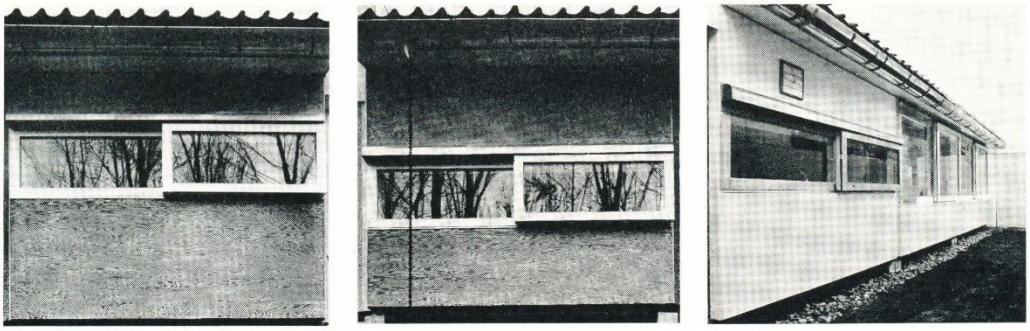

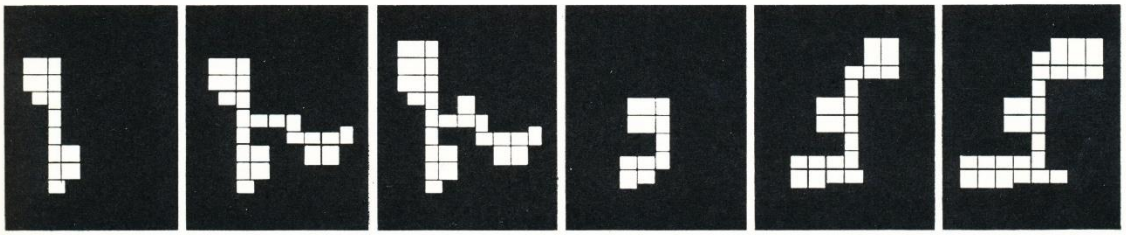

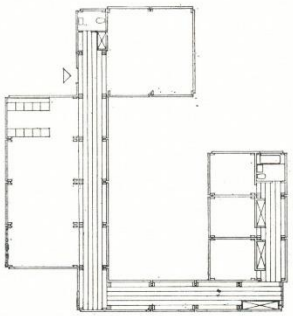

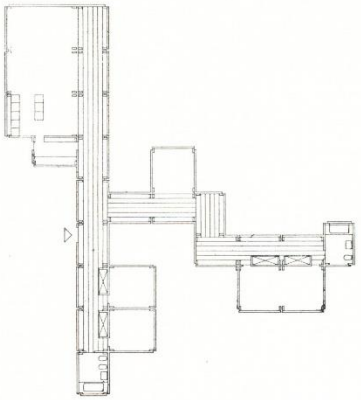

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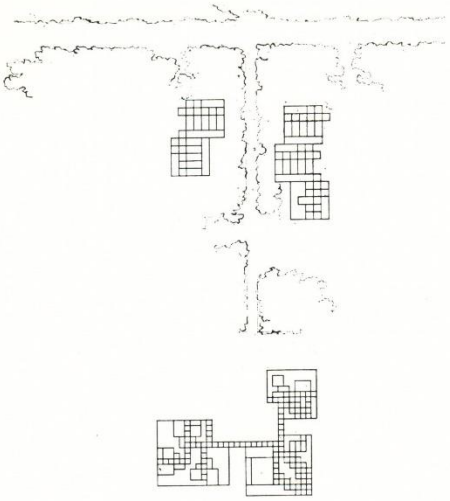


■ *The need for establishing an educational centre at Herning formed the basis of a programme for a school complex with several colleges, concerned with export, textiles, design, etc. Whilst each of these colleges was to have its own organisation, they were to share many subjects, teachers and buildings – a school centre capable of adapting itself, and of attracting other colleges as well.*

At the Herning colleges, an additive principle arose in that it was desired to have, for each type of room, a completely free choice in respect of height, size and lighting and to bring all these different types of rooms on a common denominator so that they could come together, link up, become additive. The common denominator is a horizontal frame at door level, resting on posts at the corners of the rooms. Above and on this frame, the roof is freely developed to meet the volume and lighting requirements; below the frame, in the bays between the columns, the rooms can be freely connected with each other or with the outside by means of non-bearing elements, as the load bearing function is exclusively assigned to the frame and the four columns.

It is not so difficult to imagine a continuous expansion or modification of a house, a group of buildings or a town, if the house, the buildings or the town are based on the additive principle.

En skoleby i Herning

Arkitekt: Jørn Utzon

Ønsket om at lægge et undervisningstyngdepunkt i Herning var grundlaget for et program til en skoleby med flere skoler: eksport, tekstil, design etc., skoler som havde deres egen organisation, men som delte mange fag, lærere og bygninger med hinanden. En skoleby som ændrede sig og trak flere skoler til stedet.

Organisationsdiagrammer for sådanne skoler viser rumgrupperinger med rum af forskellige størrelser, form og belysningskrav, forbundet med hinanden på en bestemt måde. Sådan boblelignende diagrammer, som er smukke, frie og rigtige som boblerne i bølgeskummet, bliver normalt presset ind i bygningslænger uden større variation i loftshøjder og med ensartede faginddelinger.

I Herning-skolerne er et additivt princip opstået ved at udforme hver rumtype helt frit med sin egen rumhøjde, størrelse og belysningsform og ved at påføre alle disse forskellige rumtyper en fællesnævner, for at de skal kunne mødes og forbindes, addere sig. Fællesnævneren er en vandret ramme i dørhøjde, hvilende på søjler i rummenes hjørner. Oven over og på denne udfolder taget sig frit efter kravet om lys og volumen, nedenunder rammen i felterne mellem søjlerne kan forbindelse med andre rum eller med naturen ske frit med ikke-bærende elementer, da rammen og de fire søjler er den bærende konstruktion.

Tagrenderne følger rammerne eller mellemrummet mellem rammerne. Spillet med denne arkitekturform bliver som en leg med chokoladestykkerne, når man brækker en plade chokolade i fugerne og samler den igen. I dette spil er chokoladestykkerne blot ikke ens, men kan variere. Fugen er fællesnævneren.

Karakteren af komplekset er som et frokostbord: kopper, glas, fade, tallerkener og de forskellige retter i al deres frodighed præsenterer måltidet og indbyder til udfoldelse og variation – i modsætning til en servering med vand og brød – i arkitektursproget: en puritansk æstetik.

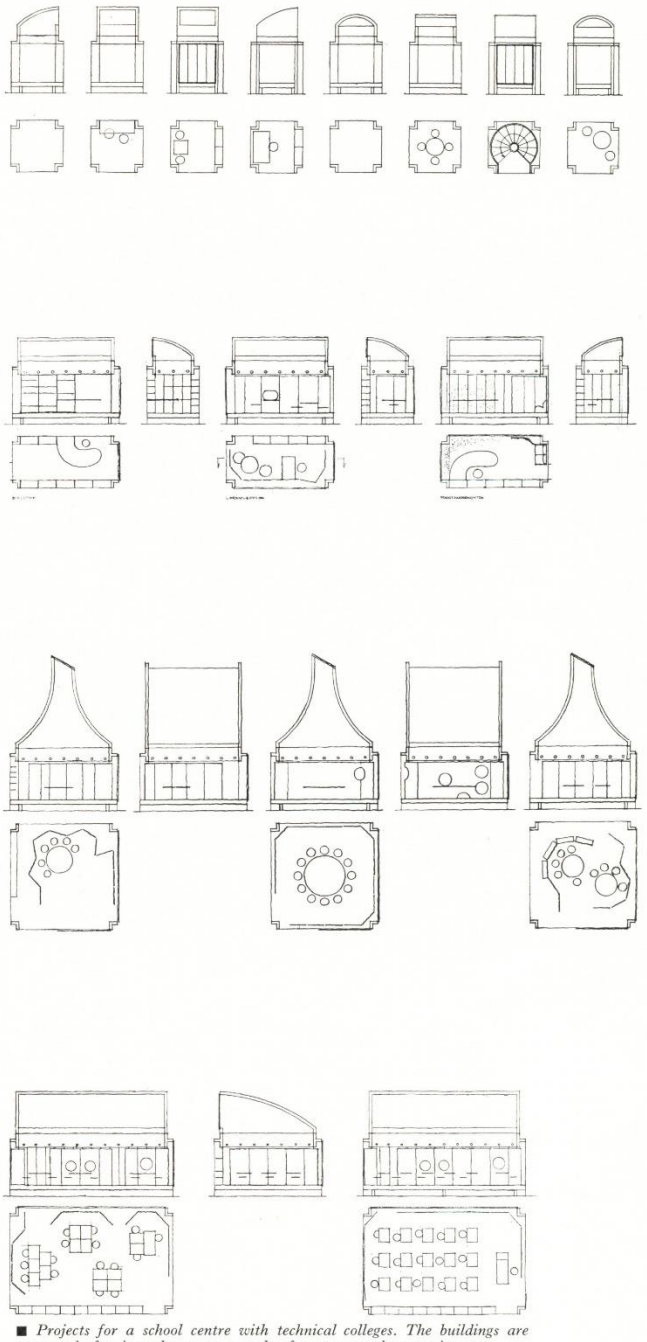
Det er ikke spørgsmålet, hvordan tingene ser ud, det er spørgsmålet, hvad de repræsenterer.

Der har længe været stærke tendenser til en frigørelse fra den lammelse, som æstetik- og facadearkitektur påtvinger vore bygninger og omgivelser.

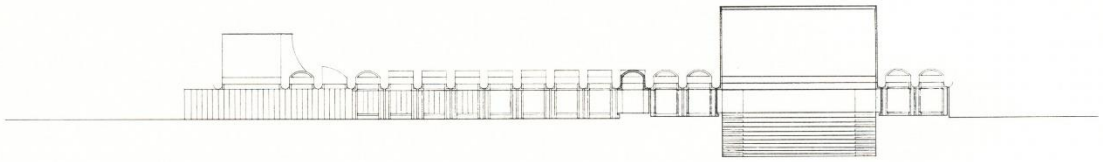
Alt dette her er et forsøg på at skabe større frihed og mindre bundethed, et forsøg på at muliggøre en forløsning af de kreative kræfter; men disse projekter viser også, at en disciplin er nødvendig for at tingene ikke skal falde fra hinanden. Denne disciplin er her snarere en fællesnævner end et valgt tal.

Hvis man betragter et stykke natur, et skovbryn, en strandbred, havet eller en blomstrende græsmark, ser man, at f. eks. græsmarkens karakter er opstået ved en addition af så og så mange forskellige typer af blade og stængler, alle sammensat efter bestemte love. Det er de mange gentagelser – i let variation – der giver karakteren.

Det er ikke så svært at forestille sig en konstant vækst og ændring af et hus, af en gruppe huse eller af en by, når huset, husene eller byen er baseret på additionstanken.

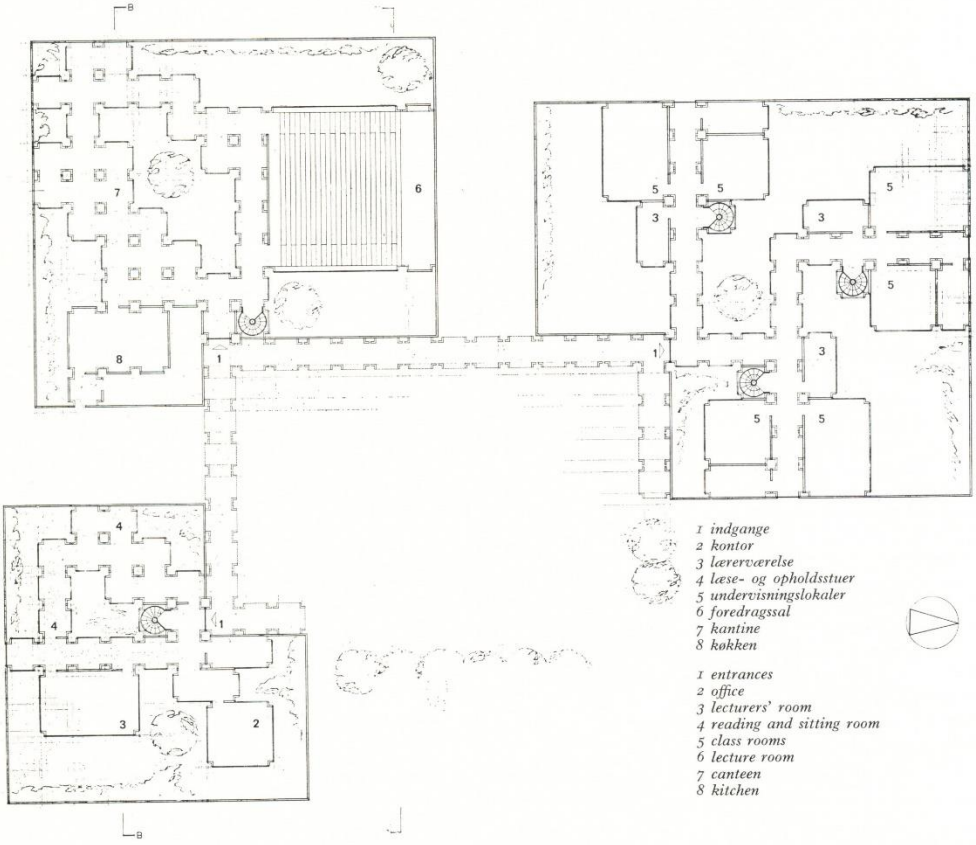


■ *Projects for a school centre with technical colleges. The buildings are composed of units as shown, on a scale of 1:300, on the opposite page. The plan can be developed in stages or continuously as a growing organism.*



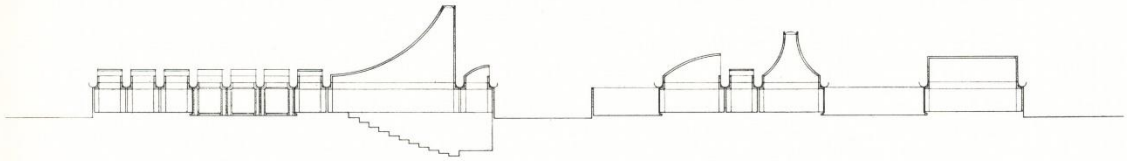
1. etape af skolebyen. Planer og snit i mål 1:500.

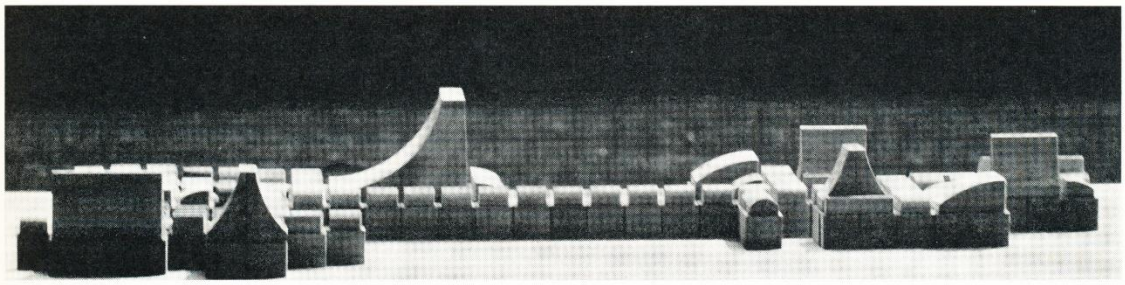
■ *First stage of the school centre. Plans and section, 1:500*

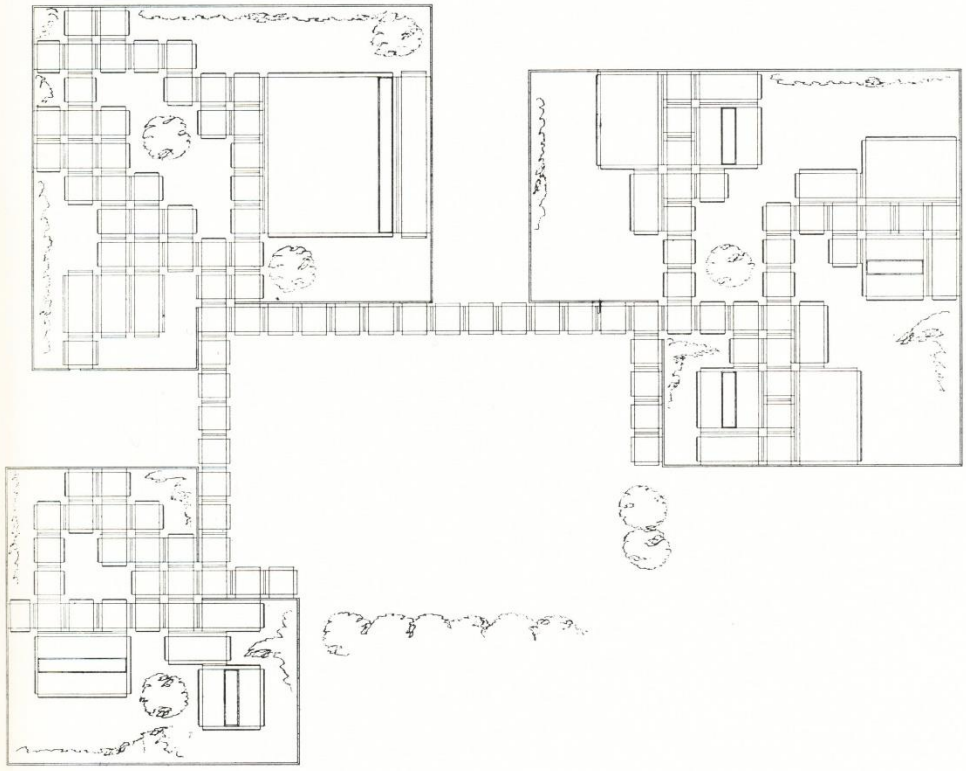


1 indgange
2 kontor
3 lærerværelse
4 læse- og opholdsstuer
5 undervisningslokaler
6 foredragssal
7 kantine
8 køkken

1 entrances
2 office
3 lecturers' room
4 reading and sitting room
5 class rooms
6 lecture room
7 canteen
8 kitchen



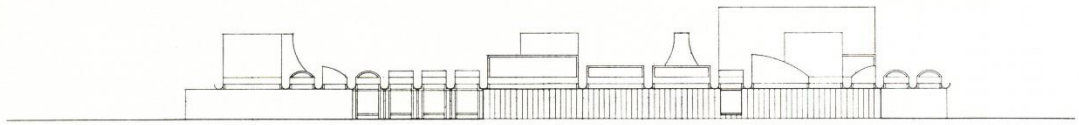




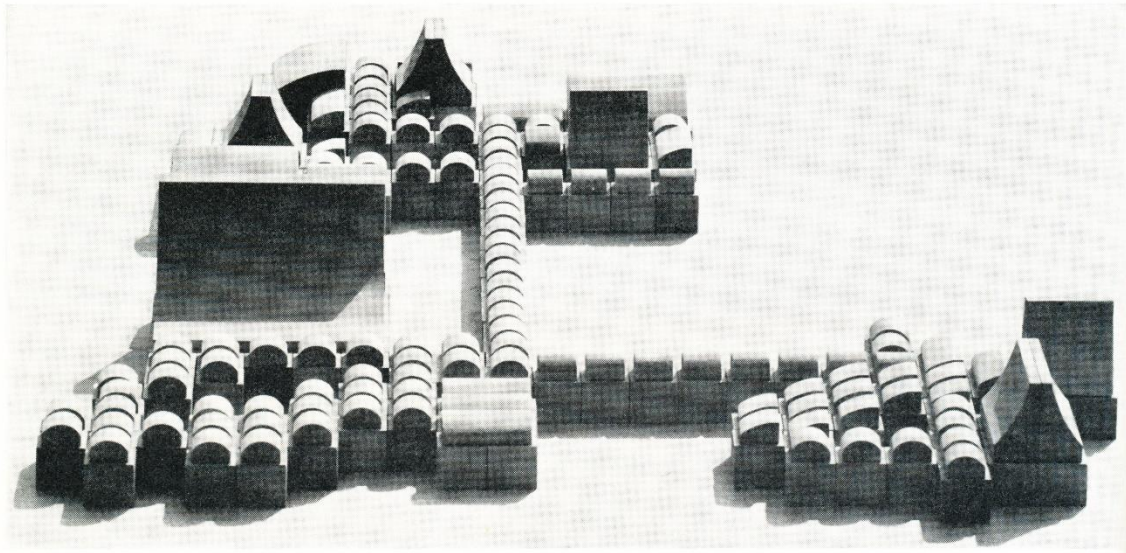
Tagplan af skolen.

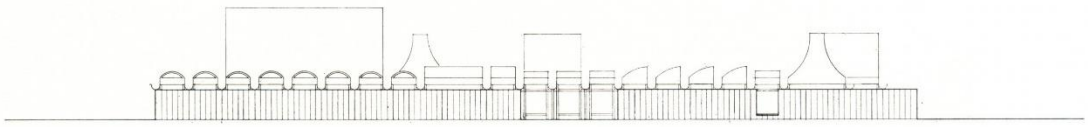
■ *Roof plan.*

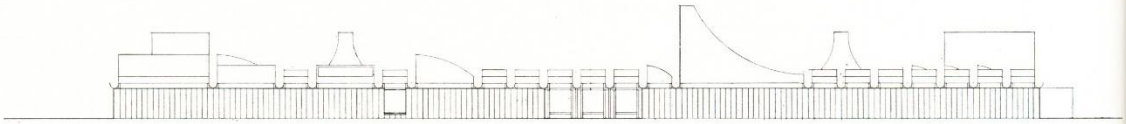
15



Model af skolens 1. etape. Facader i mål 1:500. ■ *Model of the first stage of the school project. Elevations, 1:500.*







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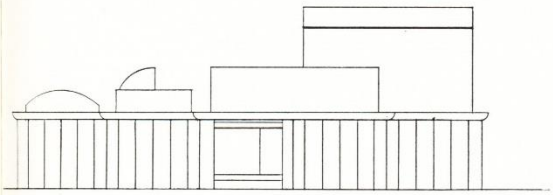
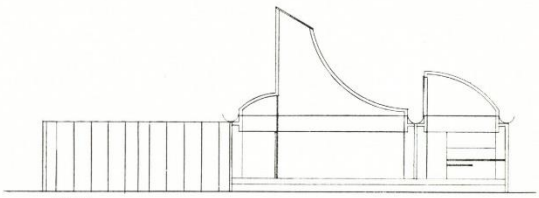
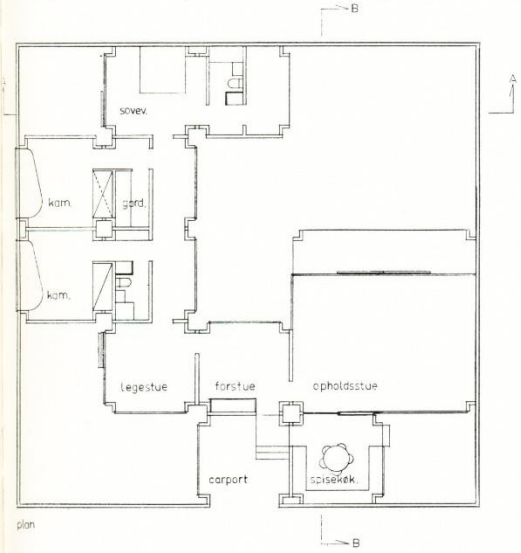
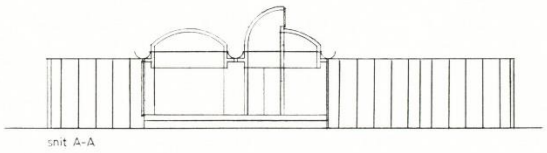


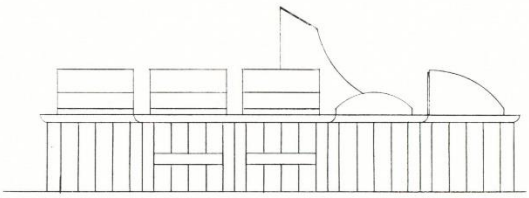


Forstanderbolig. Plan, facader og snit, mål 1:250.

■ *Inspector's house. Plan, elevations and sections, 1:250.*

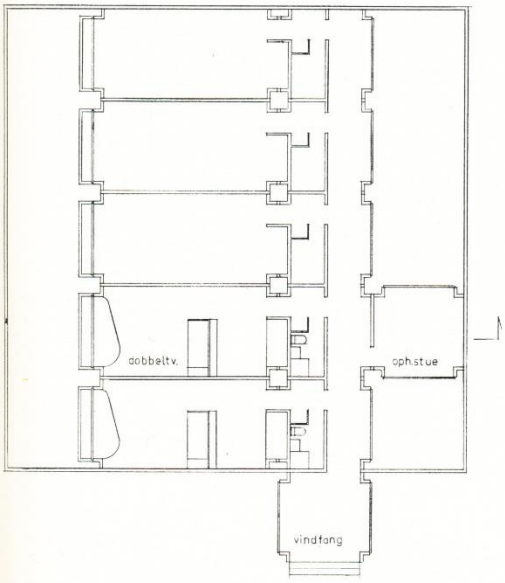


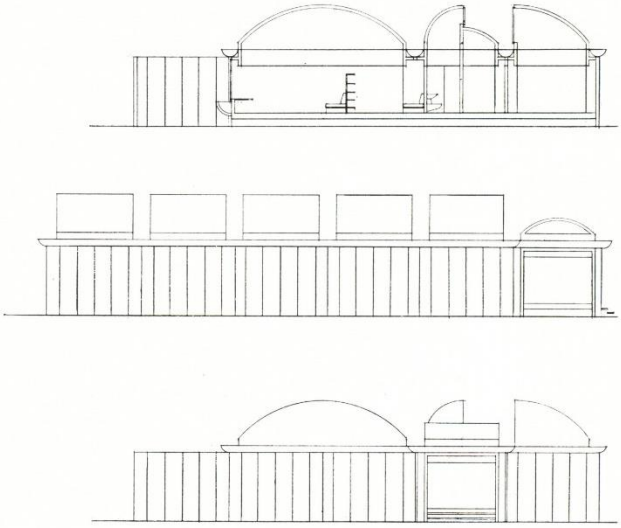




Elevværelser. Plan, snit og facader, mål 1:250.

■ *Students' rooms. Plan, section and elevations, 1:250.*





Farum bycenter

Arkitekt: Jørn Utzon

Projektet er udarbejdet til den af Farum kommune i 1966 udskrevne konkurrence om et nyt bycenter. Grunden ligger i udkanten af den eksisterende by, begrænset af en skole og facadeløse veje. Adgangen til centret må ske på få punkter. Det har motiveret udformningen som et lukket basaranlæg med få, arkitektonisk fremhævede indgange, og iøvrigt lukket mod omgivelserne. Anlægget er udformet med bygningsfacader mod de overdækkede gader og torve, og leddelingen er fremhævet, så de enkelte butikker og udstillinger er underordnet helheden. I de lange perspektiver ser den besøgende sammenhængen i bygningsanlægget, og når opmærksomheden rettes mod butiksvinduerne udgør de led i en kæde af afvekslende udstillinger.

Anlægget er formet som en voksende struktur, bygget op af led, der kan fremstilles af præfabrikerede komponenter. Ved en etapevis udbygning vil anlægget ikke på noget tidspunkt fremtræde som et ufuldført bygningsanlæg.

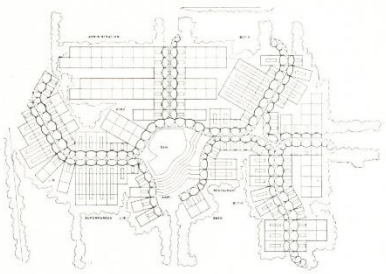
Farum Town Centre

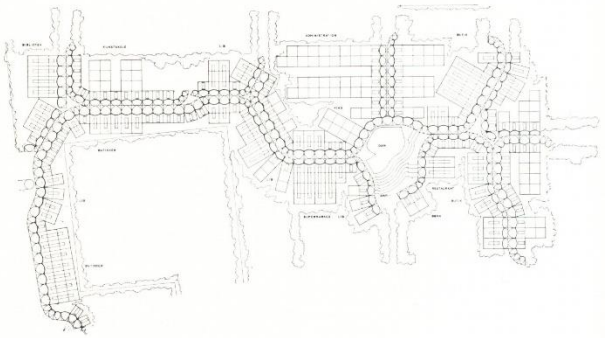
The project was prepared in response to a contest for a new town centre, sponsored by the Farum Borough Council in 1966. The site is at the edge of the existing town, bordered by a school and access-free roads. Access to the town centre must therefore be confined to a few points. In consequence, the town centre has been designed as a closed bazaar with a few, architecturally emphasized entrances, but otherwise turning its back to the surroundings. The buildings face covered streets and piazzas and the segmentation is emphasized so that the individual shops and displays are subordinated to the whole.

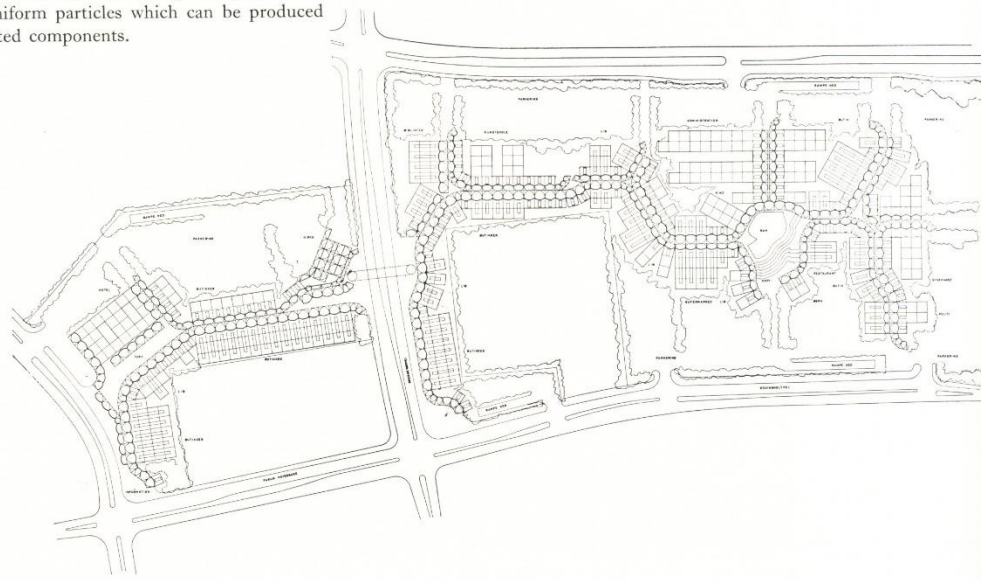
The town centre is conceived as a growing structure, composed of uniform particles which can be produced from prefabricated components.

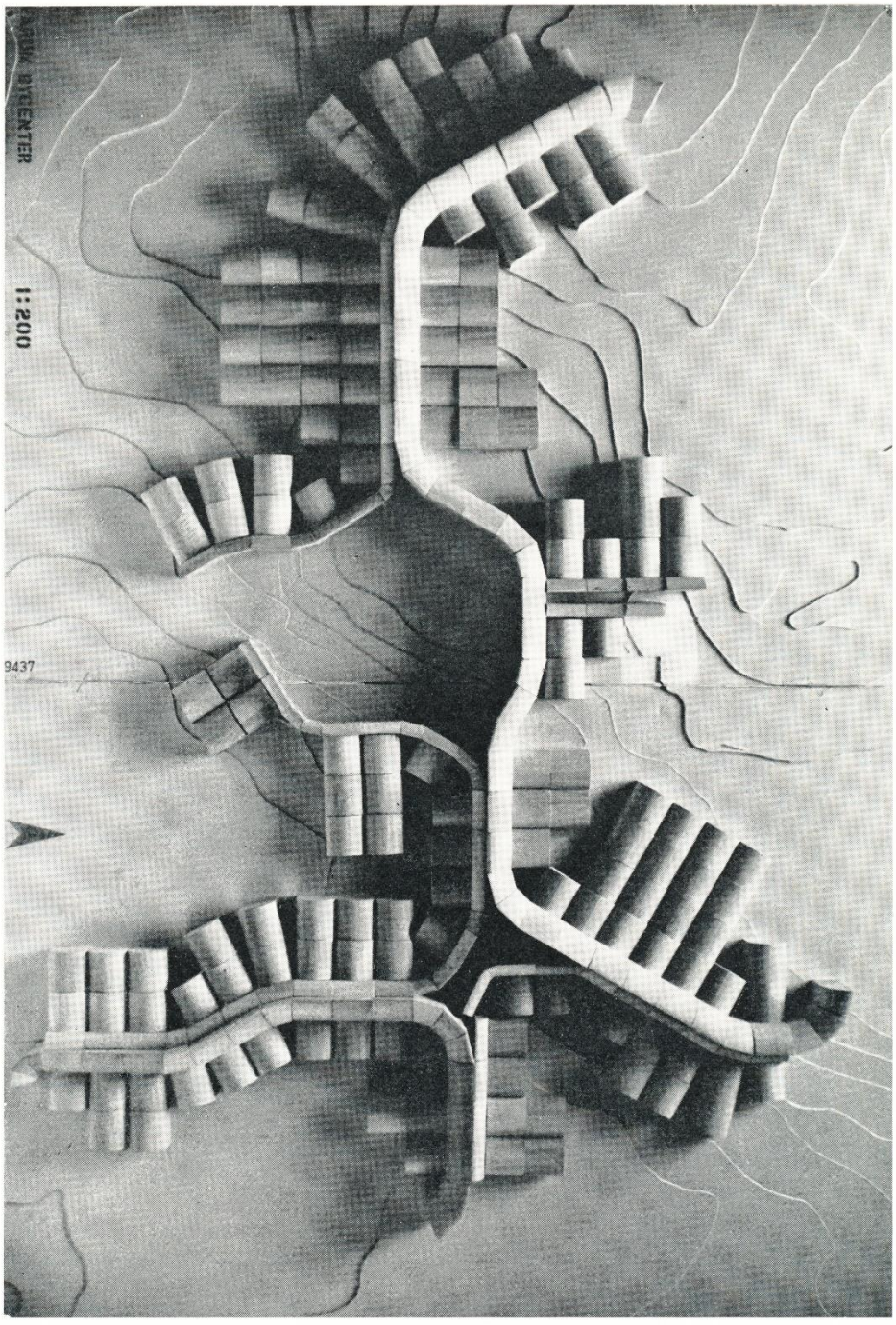
Etapeplaner, 1:4000.

■ *Three stages.*





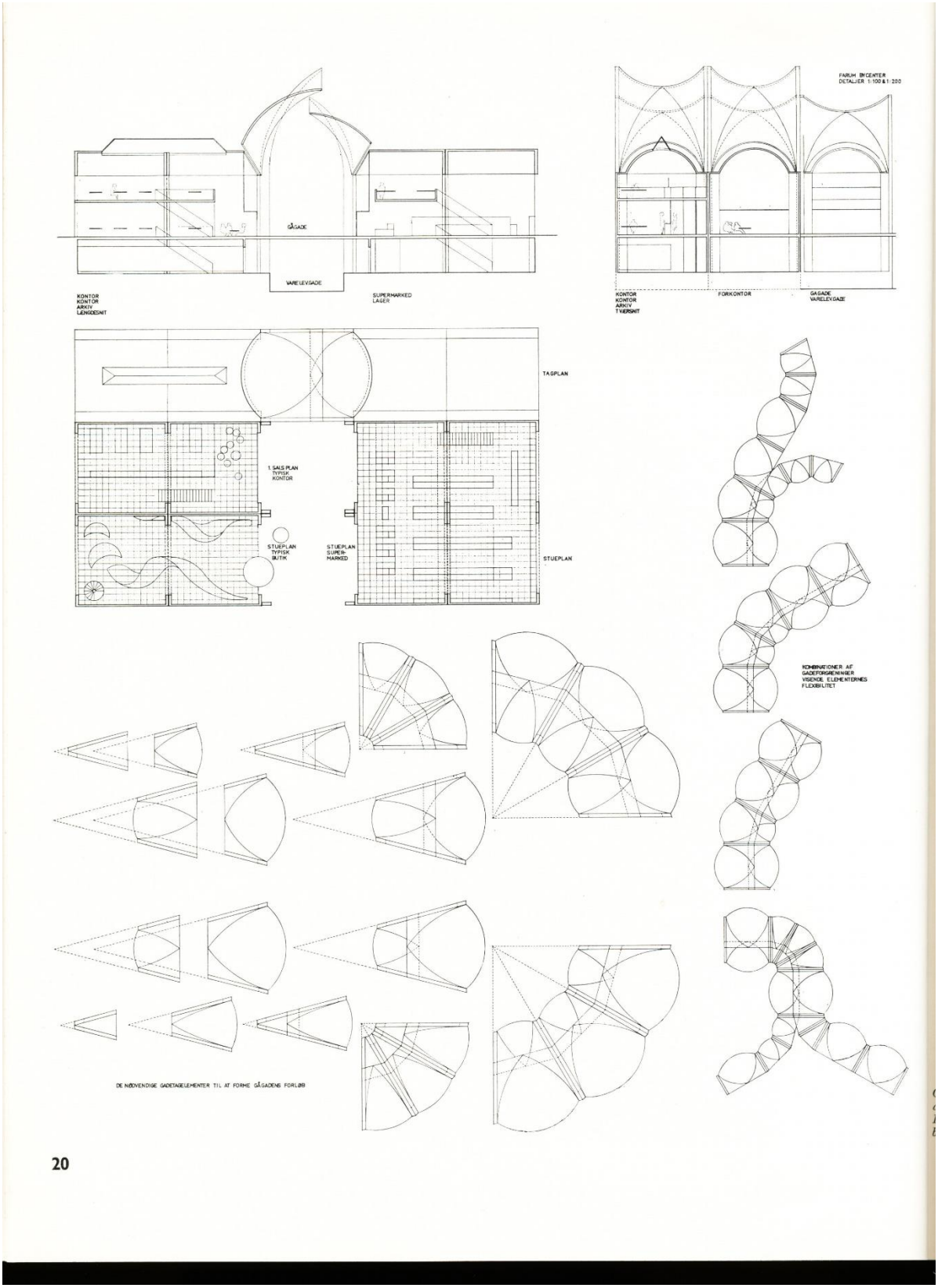




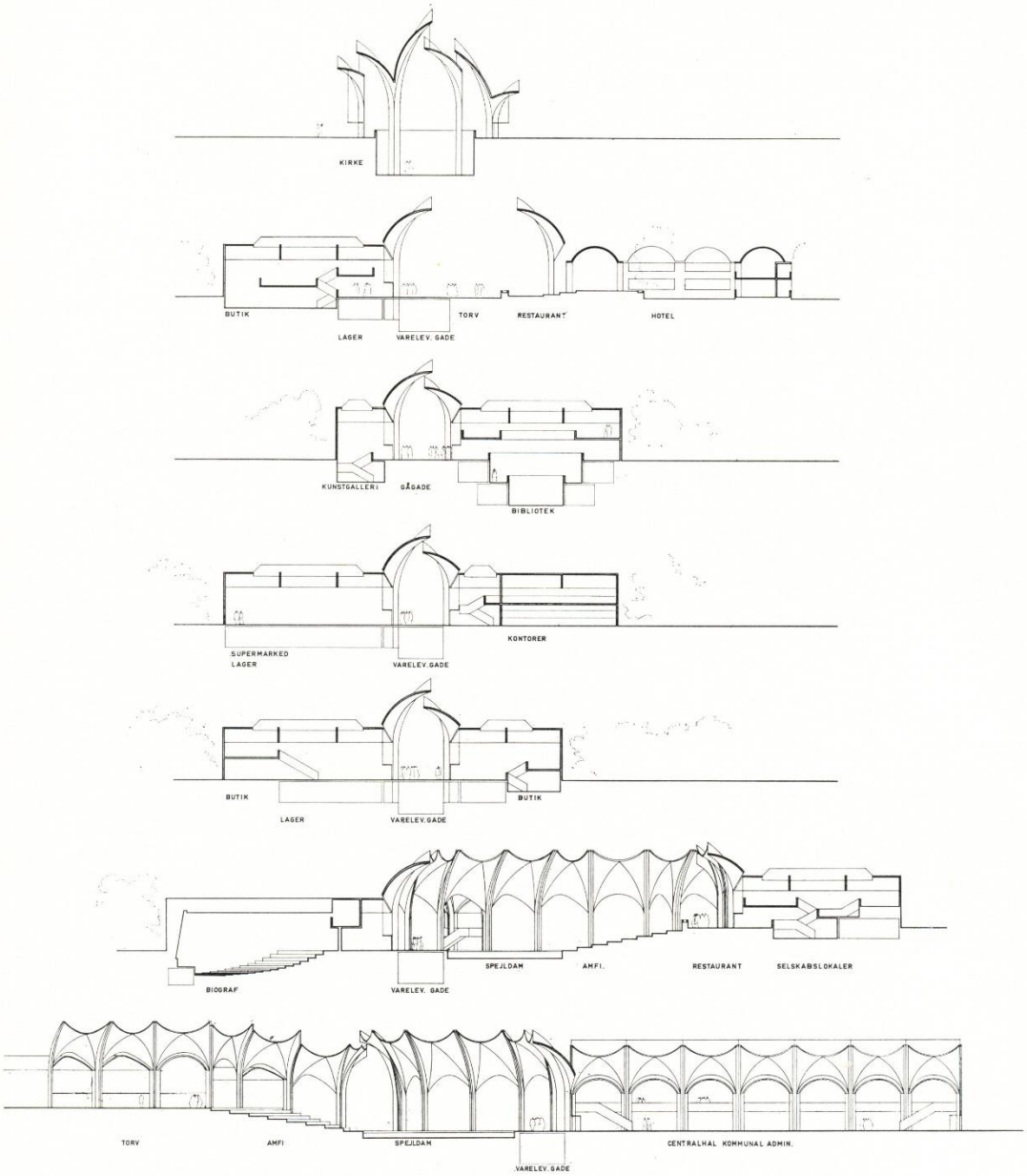
Model af Farum bycenter, 1. etape.
Forslaget kommer ikke til udførelse.

■ *Model af Farum town centre, first stage.*
The project will not be realized.

19

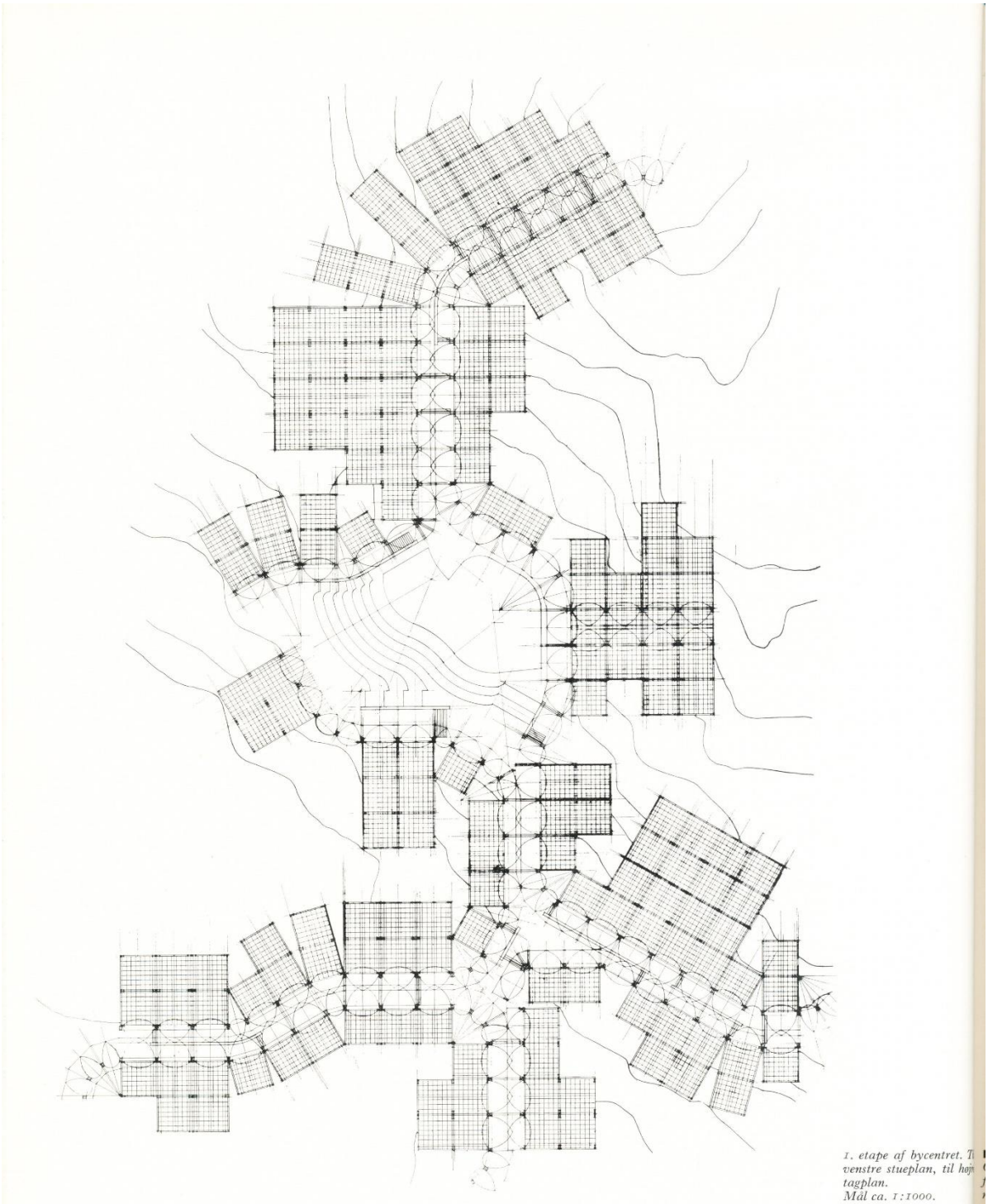

FARUM BYCENTER
DETALJER 1:100 & 1:200
GÅGADE
VARELEVGADE
KONTOR
KONTOR
ARKIV
LÆNGDESNIT
SUPERMARKED
LAGER
KONTOR
KONTOR
ARKIV
TVÆRSNIT
FORKONTOR
GÅGADE
VARELEVGADE
TAGPLAN
1. SALS PLAN
TYPISK
KONTOR
STUEPLAN
TYPISK
BUTIK
STUEPLAN
SUPER-
MARKED
STUEPLAN
KOMBINATIONER AF
GADEFORGRENINGER
VISENDE ELEMENTERNES
FLEXIBILITET
DE NØDVENDIGE GADETAGELEMENTER TIL AT FORME GÅGADENS FORLØB

20



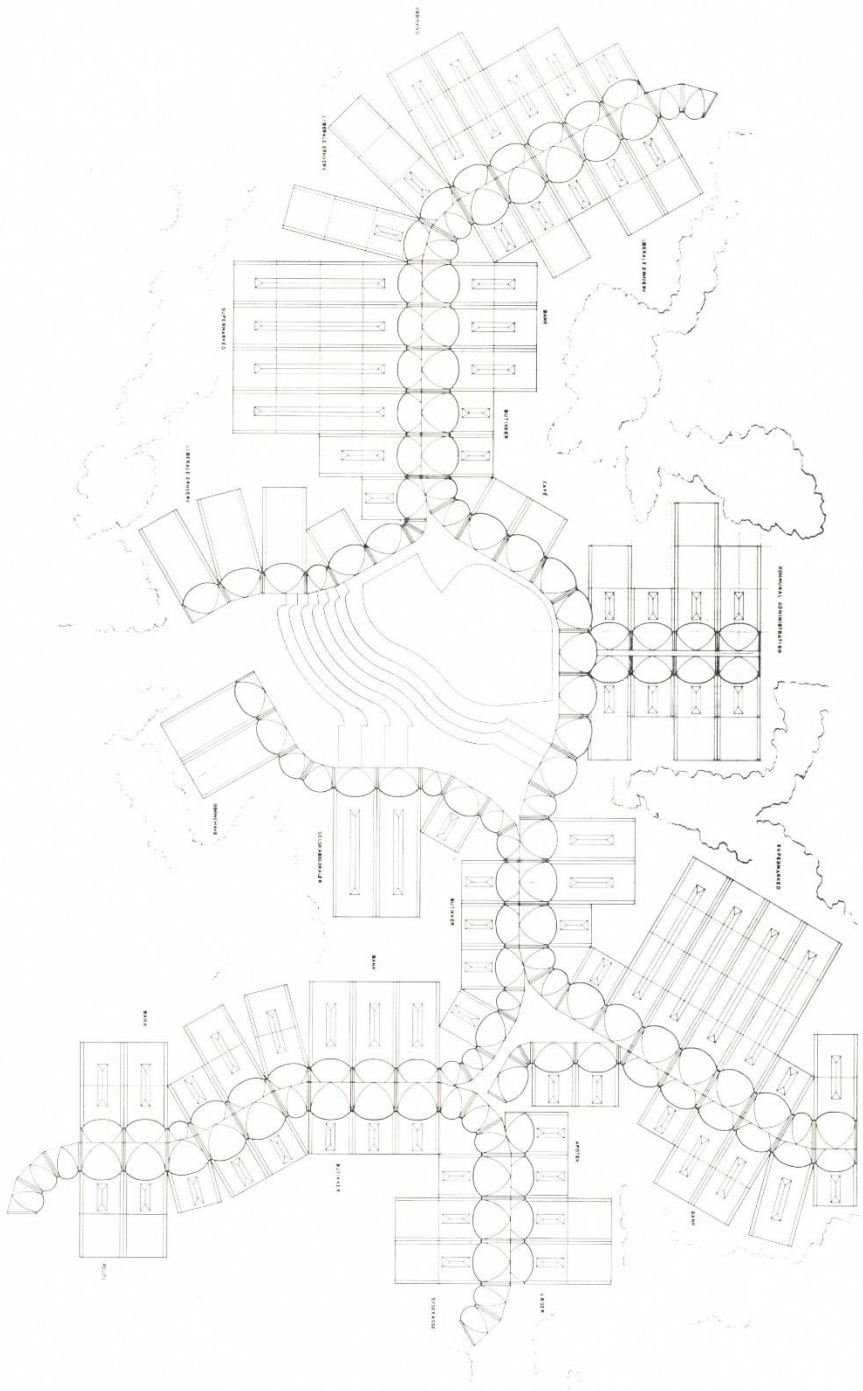
Centret er opbygget af led, udformet over et geometrisk princip, som gør det muligt at præfabrikere komponenterne i beton i et stærkt begrænset antal varianter. Leddene kan sammenbygges til et blødt kurvet forløb af basargader, hvorfra butiks- og institutionslokaler kan udbygges i etaper efter behov.

■ *The centre is composed of units designed to a geometrical principle so that the components can be prefabricated in a strictly limited number of variants. The units can be combined to form a gently curved bazaar street from which the shops and other premises can be built in stages as required.*

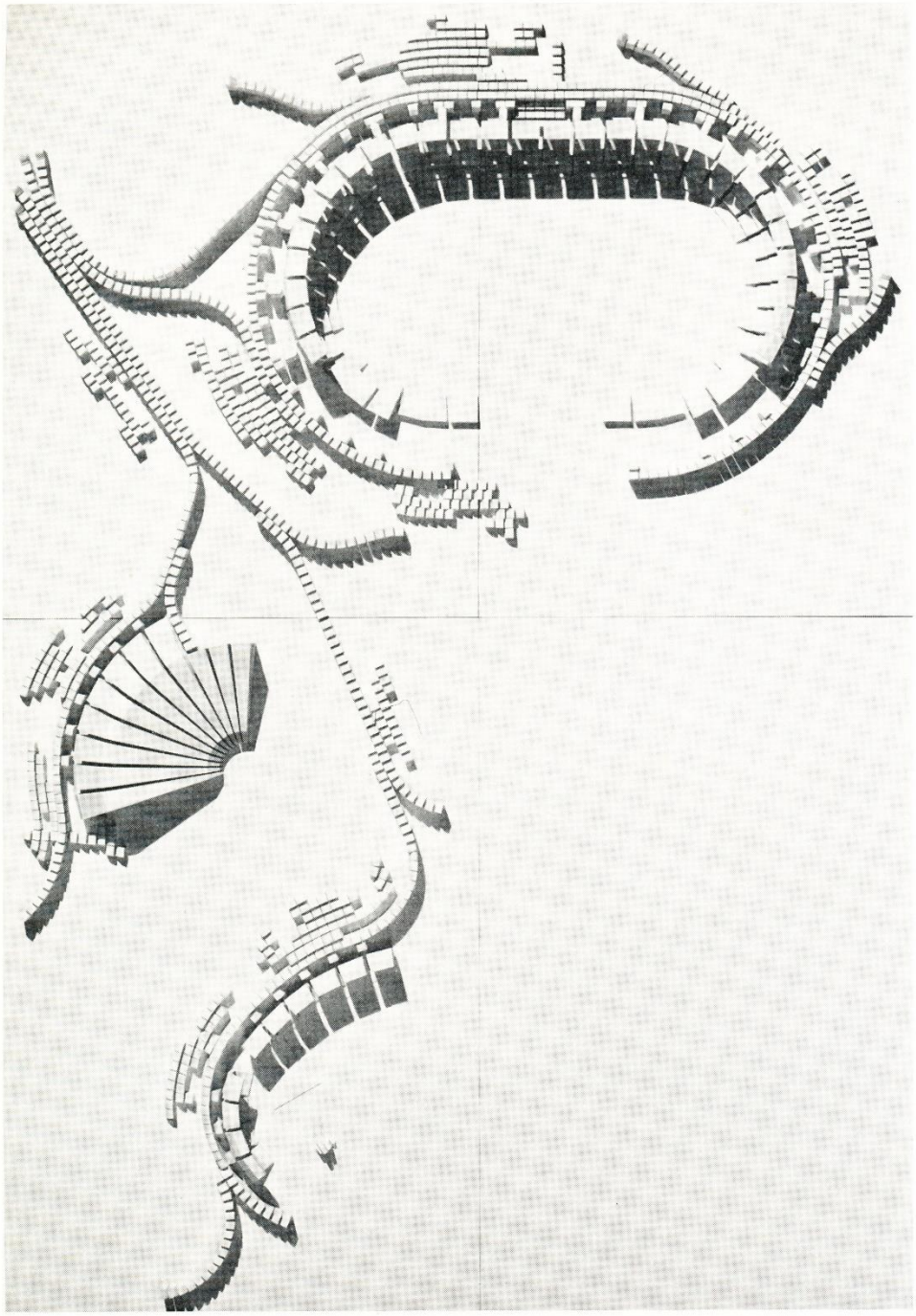


1. etape af bycentret. T
venstre stueplan, til høj
tagplan.
Mål ca. 1:1000.

22



■ *Town centre, first stage. On the left the ground floor plan, on the right the roof plan. Scale c. 1:1000.*



Stadionanlæg. Bebyg-gelsesplanen vist i mo-del.

■ *Stadium project. The layout plan is shown in the model.*

24

Jeddah stadion, Saudi-Arabien

Arkitekt: Jørn Utzon

Stadionanlægget er udformet under hensyntagen til de lokale, klimatiske betingelser, der nødvendiggør, at flest mulige tilskuerpladser er placeret i skygge. Tilskuertribunerne vender ryggen mod syd, mod den varme søndenvind og er åbne for den kølige nordenvind.

Ved planlægningen er der ligeledes taget hensyn til, at der bliver overensstemmelse mellem anlæggets form og adfærdsmønstret for tusinder af tilskuere, som bevæger sig fra og til anlæggets enkelte dele. Endelig har ønsket om, at anlægget kan udbygges i etaper, været stærkt bestemmende for udformningen.

30.000 mennesker kan bevæge sig ad de overdækkede, brolignende adgangsveje i skygge, følgende de bløde kurver, som giver en flydende passage uden opstuvninger. Broerne tvinger tilskuerne til umærkeligt at følge de afstukne veje og giver en 100 pct. sikker kontrol med indgangene til de enkelte sportspladser.

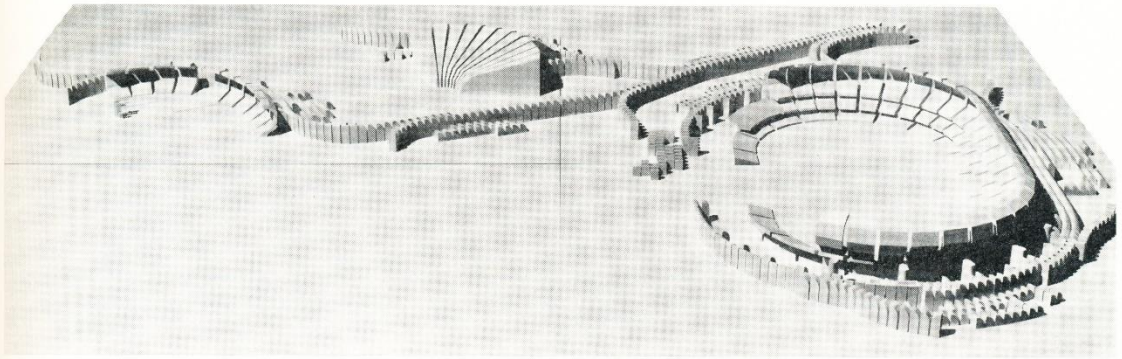
I det ekstremt varme klima er det vanskeligt at arbejde med in situ støbte konstruktioner, hvor de store betonmasser bliver udsat for revnedannelser og andre tekniske problemer. Alle dele af anlægget er derfor udformet således, at de kan opbygges af simple betonkomponenter, der kan fremstilles på lokalt placerede, overdækkede feltfabrikker. Anvendelsen af sådanne præfabrikerede komponenter sikrer også under de lokale vilkår en højere kvalitet og en lettere kvalitetskontrol.

Adgangsvejene danner hele anlæggets rygrad, der kan sammenlignes med et træs stamme, hvis grene leder til de forskellige områder. Systemet er i stand til at vokse lige så naturligt som træet i skoven, således at der ikke på noget tidspunkt opstår uønsket fornemmelse af noget ufærdigt, som ellers kendetegner bygninger, der opføres i etaper. Anlægget behøver ikke at være planlagt i fuld udbygning før påbegyndelsen. Ændringer i planen vil være mulig ved de senere etapers bygning, da komponenterne kan adderes i enhver ønsket kombination.

Struktur nr. 1. Adgangsbroerne er opbygget af et broelement, to etager høj. Det består af fire ben, der bærer en flise i første etages højde og et tag, der er formet som en kvart cylinder, åben til den ene side for at give skygge og ventilation.

Denne strukturenhed er udført i beton, støbt i stålforme af høj kvalitet, motiveret med, at den gentages mange gange.

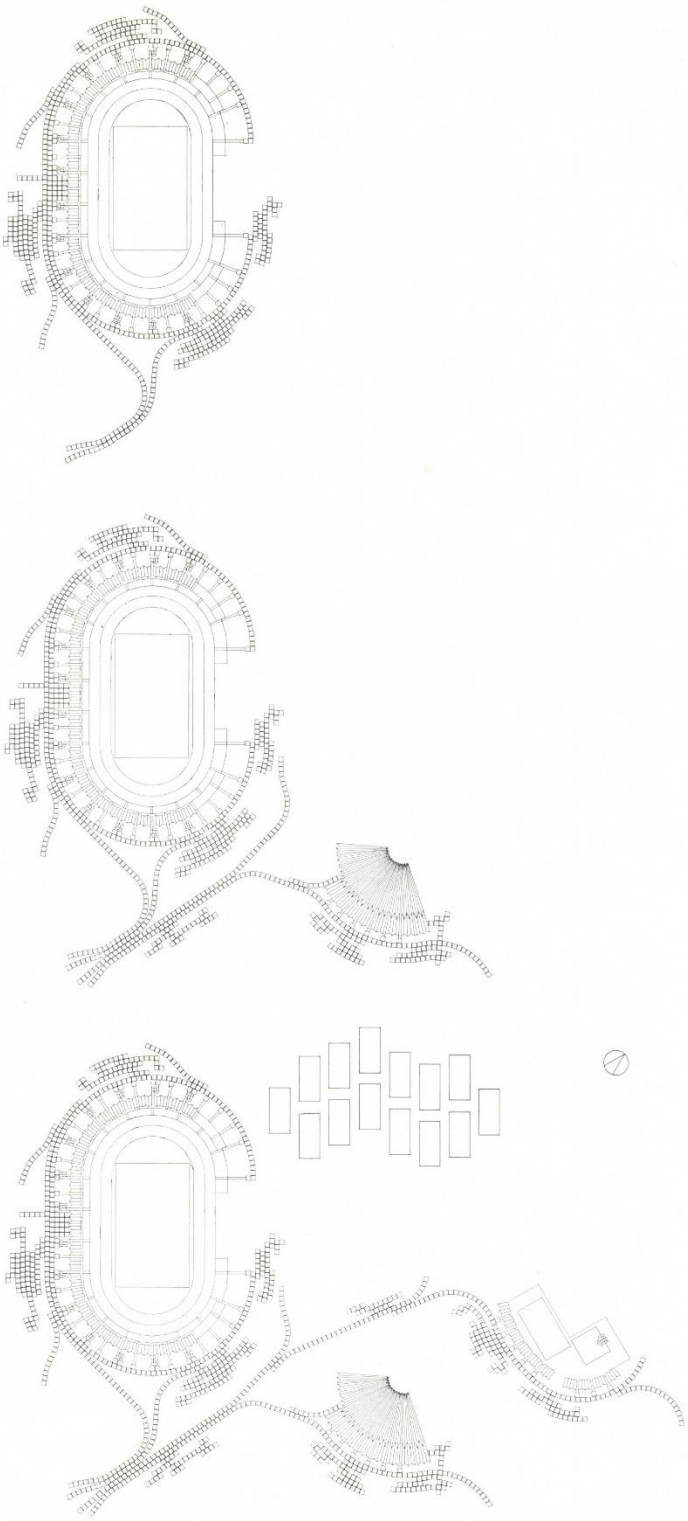
Struktur nr. 2 er et tagelement, én etage høj med et tag, dannet af en kvart cylinder, der åbner sig til den ene side, for at give skygge og ventilation og med ventilerende skærmvægge. Det skal tjene sådanne funktioner som restauranter, toiletrum for tilskuere, administrationskontorer, omklædningsrum etc. Dette element fremstilles på samme måde som broelementet. Også for dette elements vedkommende er det åbenbart, at addition til det allerede byggede let kan ske på ethvert tidspunkt. Og det samlede arkitektoniske udtryk ved sammensætningen af disse tag- og broelementer i enhver kombination og mængde vil blive harmonisk og danne en overbevisende kontrast til den vældige, skærmlignende tilskuertribune rundt om stadion og svømmestadion, og også til sportshallens enorme konstruktion.



Struktur nr. 3. Stadions tilskuertribune er ordnet i tre forskudte lag. Enhver tilskuer har et perfekt overblik over sportspladsen, og de fleste tilskuerpladser vil blive placeret i skygge. Den konstruktive løsning med tynde, foldede plader giver en elegant, facetteret skærm, der fremhæves stærkt ved samspillet mellem lys og skygge. Det er en meget økonomisk konstruktion, som er let at montere af små komponenter.

Struktur nr. 4 er svømmestadions tribune. Den er i én etage, men svarer til struktur nr. 3 i struktur og konstruktion.

Struktur nr. 5. Sportshallen er helt lukket, men den består også af præfabrikerede segmenter og er også en foldet struktur. Den har, på grund af behovet for skygge, fået et ekstra, bladlignende lag af tagelementer, som på samme tid ventilerer og giver skygge til oversiden af den foldede tagstruktur.



Tre etaper i stadionanlæggets udbygning.

■ *Three stages in the development of the stadium project.*

Jeddah Stadium, Saudi-Arabia

Architect: Jørn Utzon

The design of the stadium has been governed by the local climatic conditions which require the greatest possible number of seats to be in the shade. The grandstands turn their backs to the south and the hot south wind, and are open towards the cooler wind from the north.

The design was also influenced by the desire to match the layout to the movement pattern of the thousands of spectators who walk from and to the different parts of the ground. Finally, the wish to permit construction in stages has been a major factor in the design.

Some 30,000 people can move along the covered, bridge-like, shaded, gently curved passages without causing traffic jams. The bridges imperceptibly force the spectators to follow the marked paths and ensure a complete control of the entrances to the different venues.

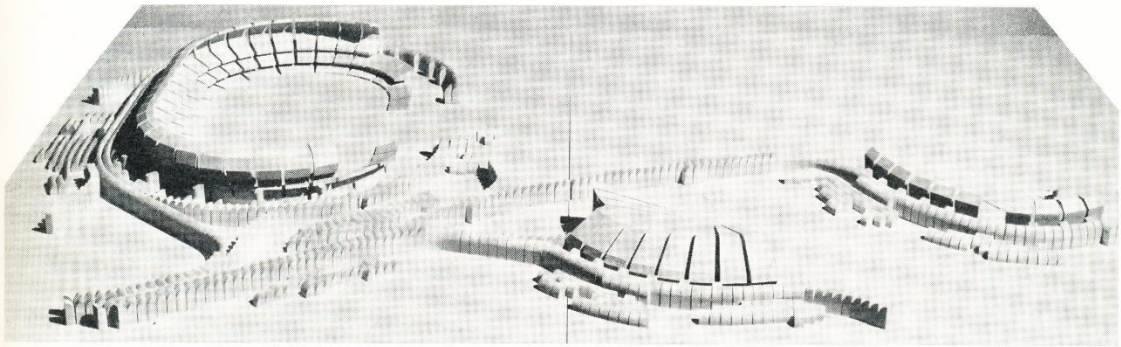
In this extremely hot climate, it is difficult to work with in-situ cast concrete structures which would be exposed to cracking and other technical problems. All the parts of the buildings are therefore so designed that they can be assembled from simple concrete units which can be produced in local field factories under cover. In the local circumstances, the utilisation of such precast units also ensures a higher standard of quality and easier quality control.

The access roads form the backbone of the whole establishment; they may be compared to the trunk of a tree, with branches leading to the different parts of the ground. The system is able to grow just as organically as a tree in the forest, avoiding at all times that unpleasant impression of unreadiness otherwise associated with buildings erected in stages. It is not even necessary to plan the final stage before work is commenced on the first. As the components can be assembled in any desired combination, the plan can still be altered during later stages.

Structural Unit No. 1. The access bridges are assembled from two-storeys high bridge units with four legs which carry a paving slab at first floor level and a roof at second floor level. This roof is designed as a quarter-cylinder, open on one side, so as to provide shade as well as ventilation.

This structural unit consists of concrete cast in steel moulds which, being used many times over, are of high quality.

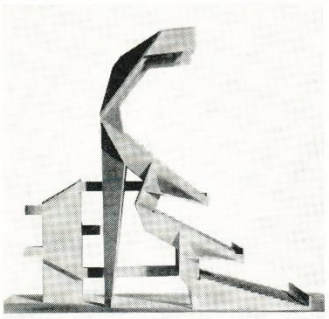
Structural Unit No. 2 is a one-storey high roof element, composed of the quarter-cylinder roof which, as already mentioned, is open on one side to provide shade and ventilation, and of louvred screen walls. This unit is designed for use with restaurants, lavatories, offices, changing rooms, etc., and is produced in the same way as the bridge unit. Again, this unit is obviously capable of being added to the pre-existing posts at any time without difficulty. And the architectural overall impression derived from the composition of these roof and bridge units in any combination and quantity will remain harmonious and will form a convincing contrast to the colossal, screen-like grandstand surrounding the stadium and swimming pool, and also to the enormous structure of the indoor sports arena.

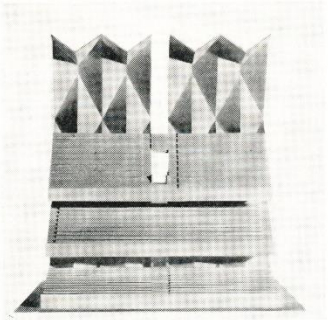


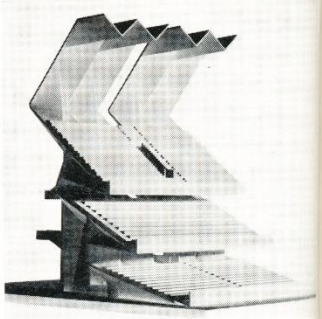
Structural Unit No. 3. The stadium grandstand is arranged on three staggered tiers. Each spectator has a perfect view over the sports ground, and the great majority of them will sit in the shade. The structural design, using thin, angled slabs, provides an elegant, facetted screen which is further emphasized by the interplay of light and shade. It represents a very economic structure which can easily be assembled from small components.

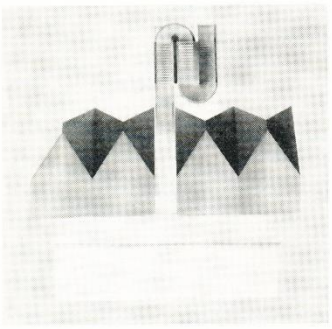
Structural Unit No. 4 is the grandstand of the swimming pool. Apart from being confined to a single storey, this unit is similar in structure and design to Unit No. 3.

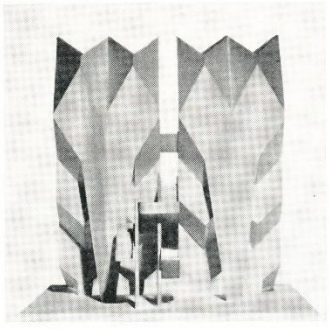
Structural Unit No. 5. The sports arena is entirely enclosed. Even so, it also consists of prefabricated segments and also forms a folded structure. Because of the need to provide shade, it has been given an additional, leaf-like layer of roof elements which have the dual function of affording ventilation and of giving shade to the upper side of the folded roof structure.

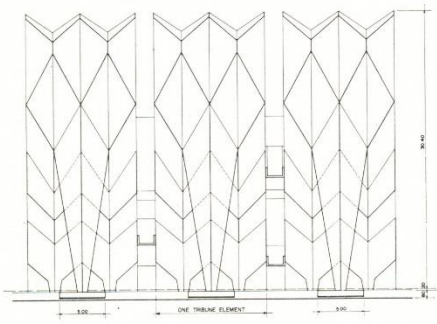


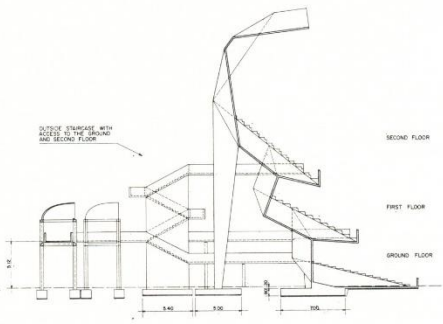


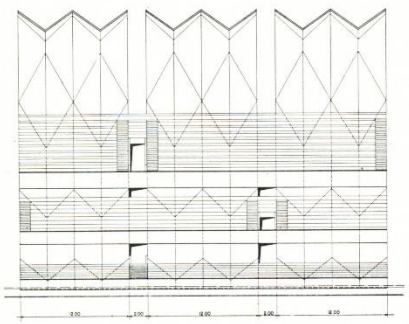


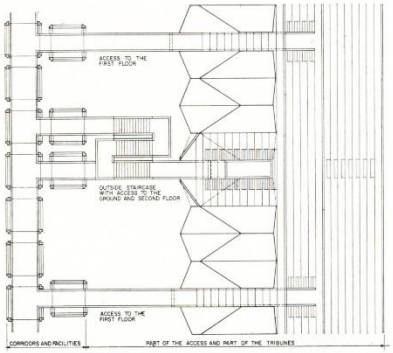












Det store stadion me
fodboldbane og atletikba
ner. Et udsnit af tilskue
tribunen er vist øverst
model, nederst i plan, sn
og opstalter, mål 1:60
På modstående side pla
1:1200.

■ *The great stadiu*
with football pitch an
tracks. A part of th
grandstand is shown as
model (top) and, belo
in plan, section and elev
tions, scale 1:600.
Opposite page: Plan, sca
1:1200.

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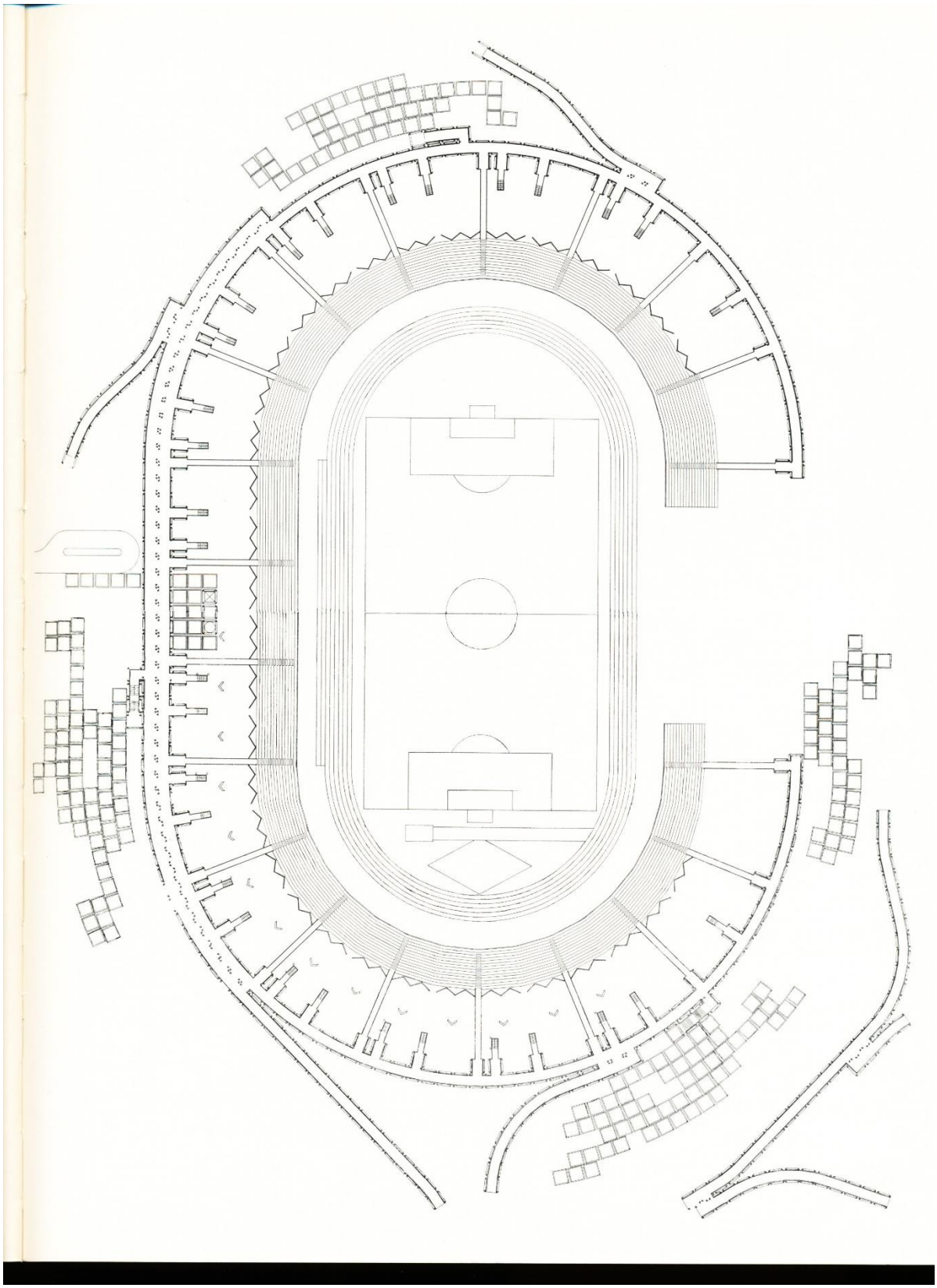

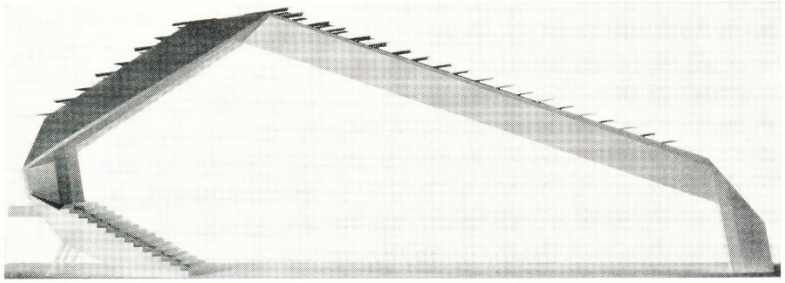

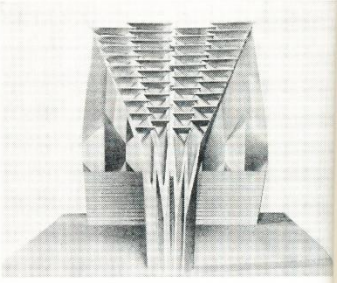

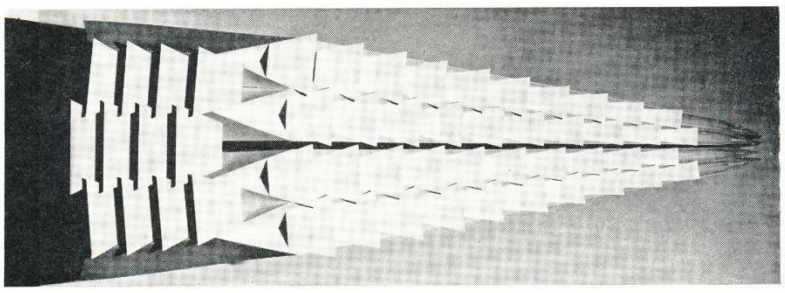

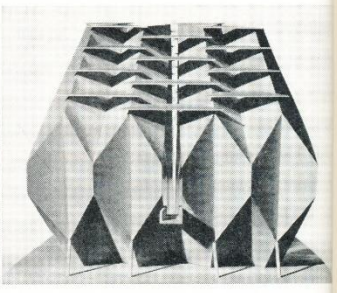

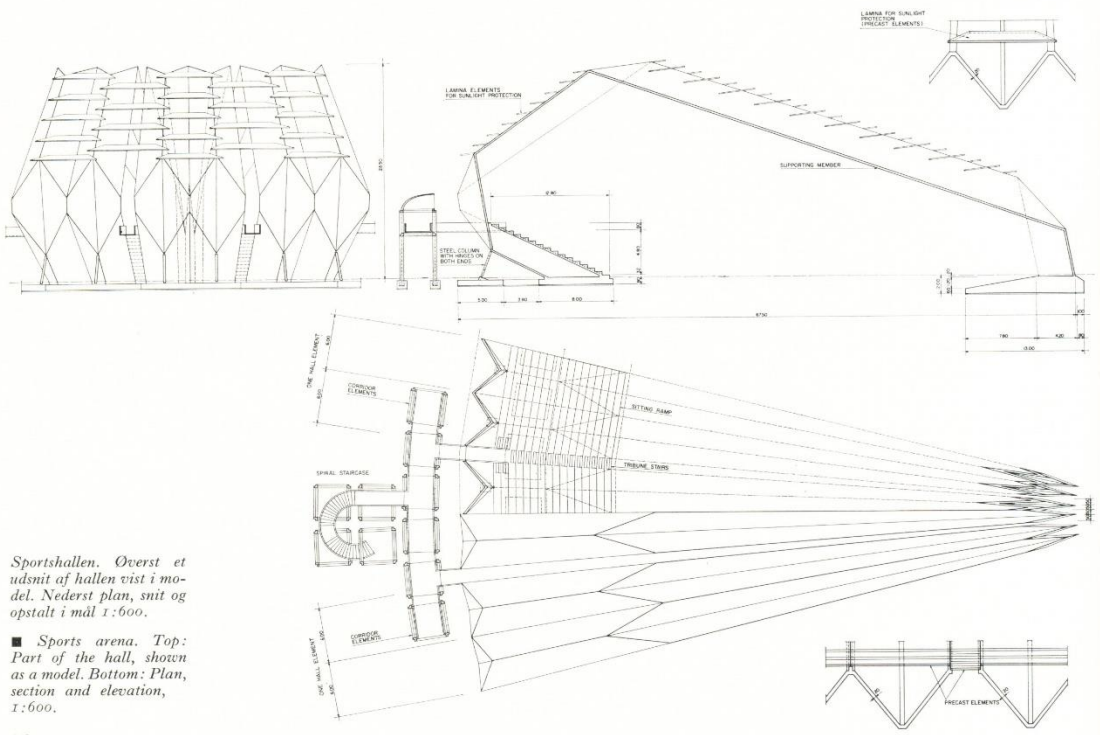

Sportshallen. Øverst et udsnit af hallen vist i model. Nederst plan, snit og opstalt i mål 1:600.

■ *Sports arena. Top: Part of the hall, shown as a model. Bottom: Plan, section and elevation, 1:600.*

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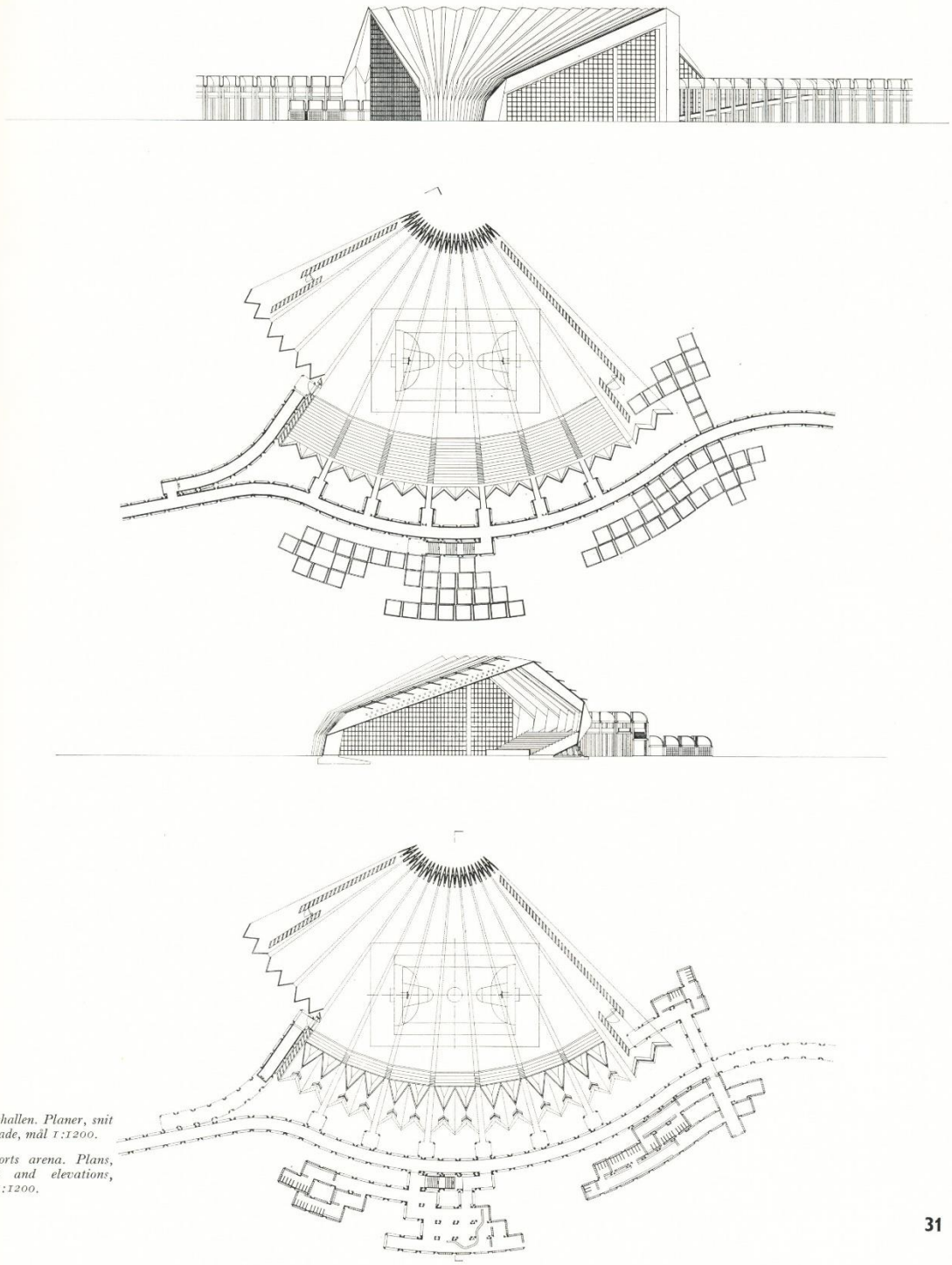
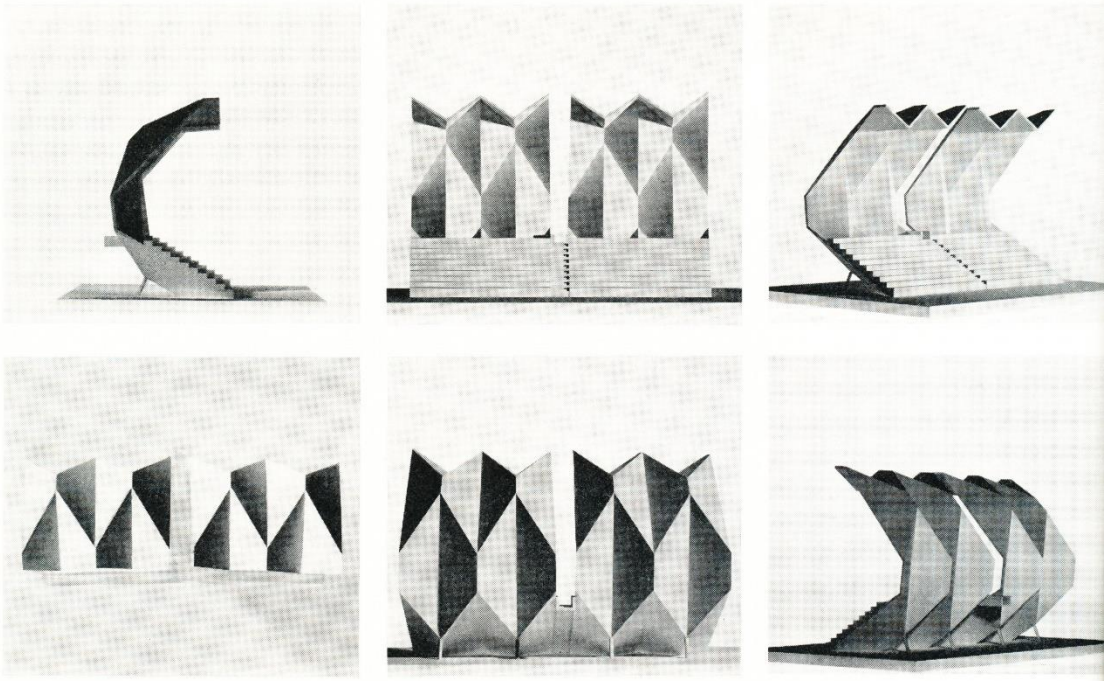
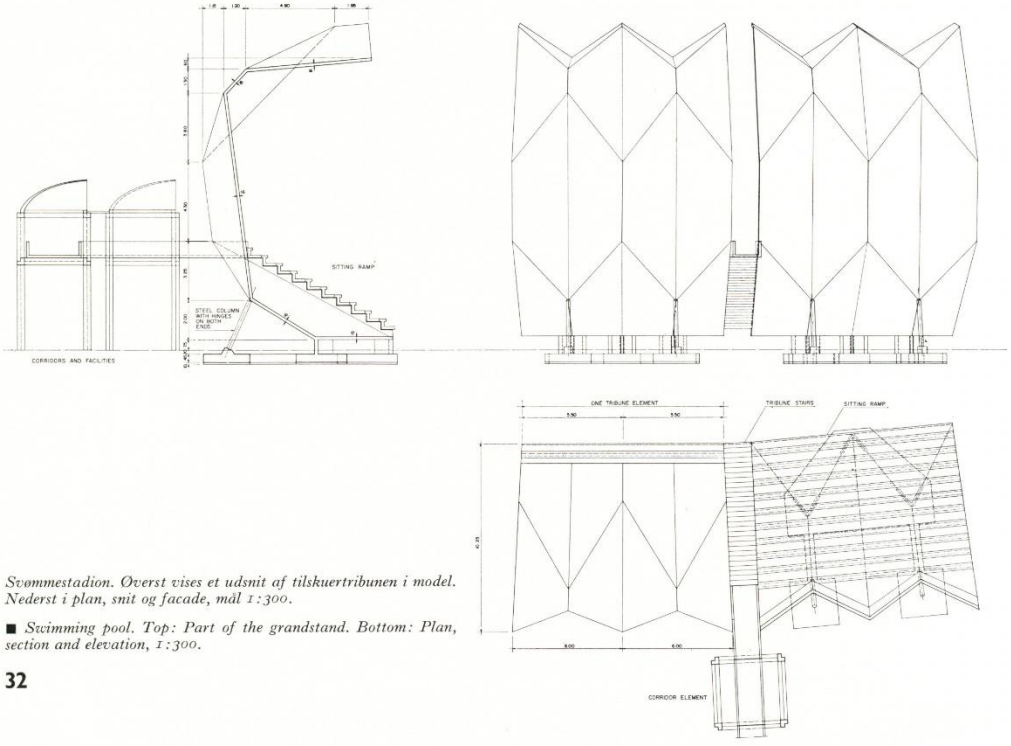


Sportshallen. Planer, snit og facade, mål 1:1200.

■ *Sports arena. Plans, section and elevations, scale 1:1200.*





Svømmestadion. Øverst vises et udsnit af tilskuertribunen i model. Nederst i plan, snit og facade, mål 1:300.

■ *Swimming pool. Top: Part of the grandstand. Bottom: Plan, section and elevation, 1:300.*

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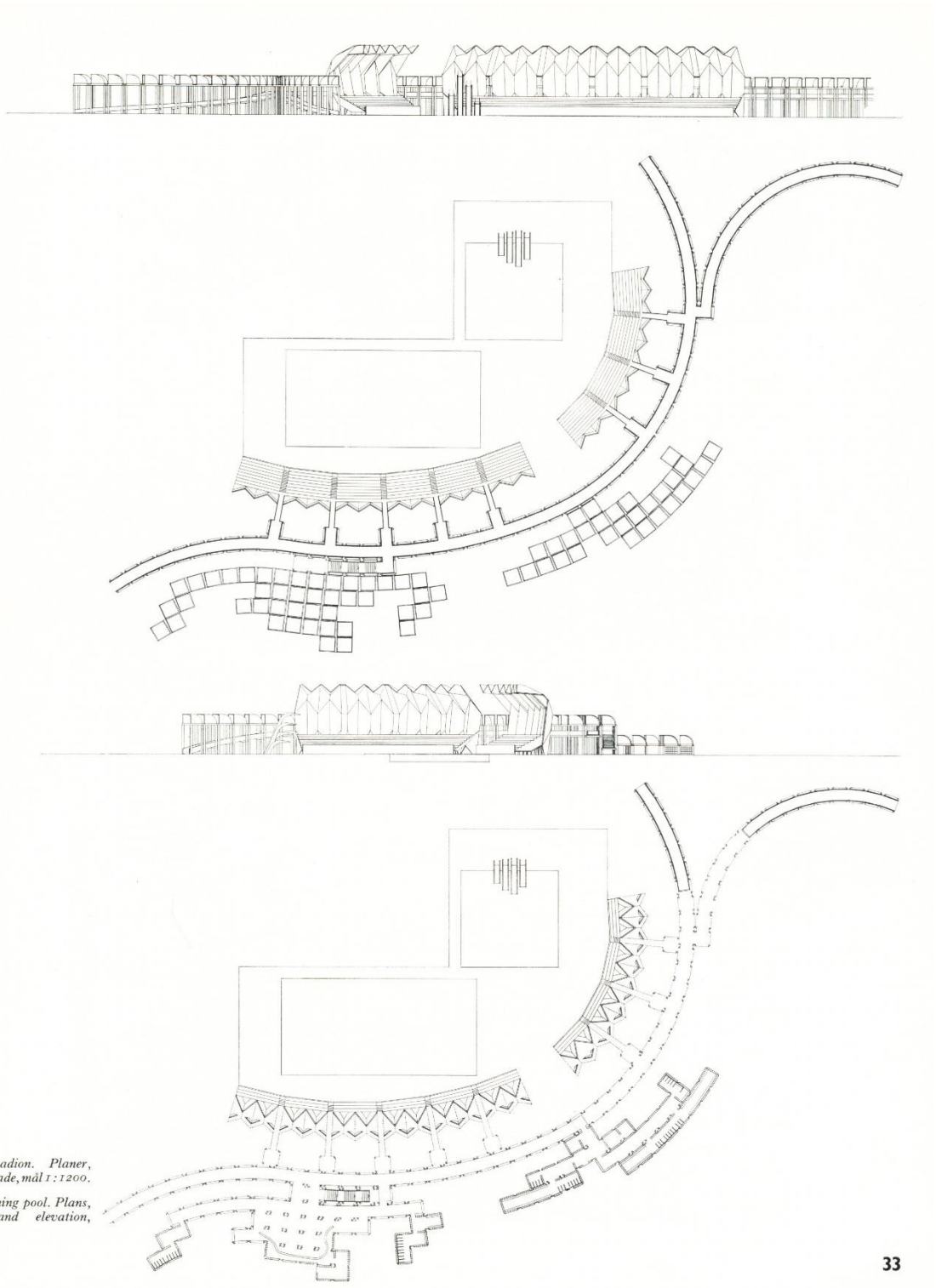
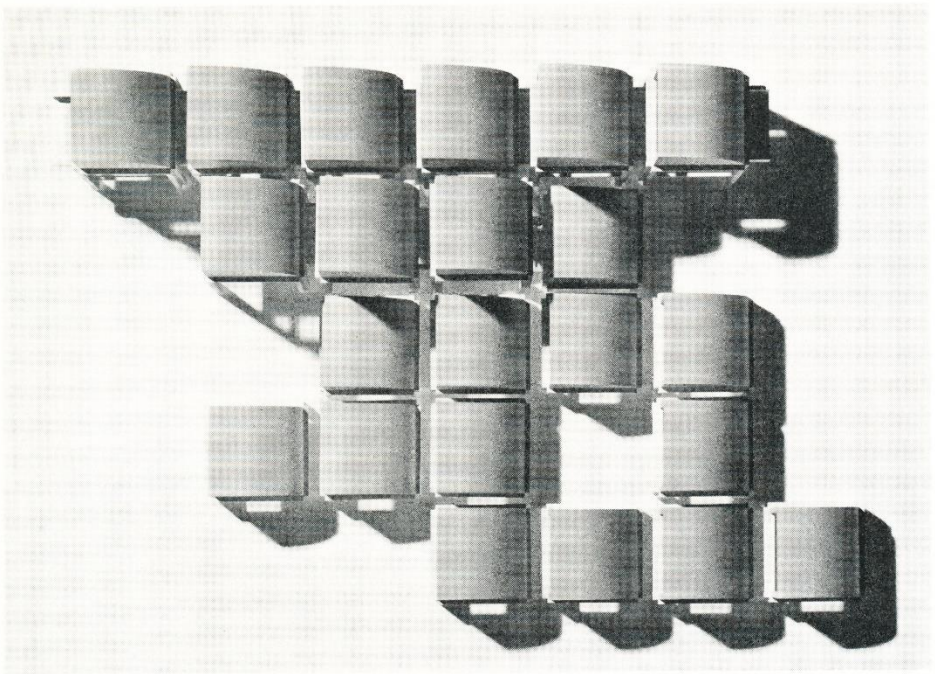


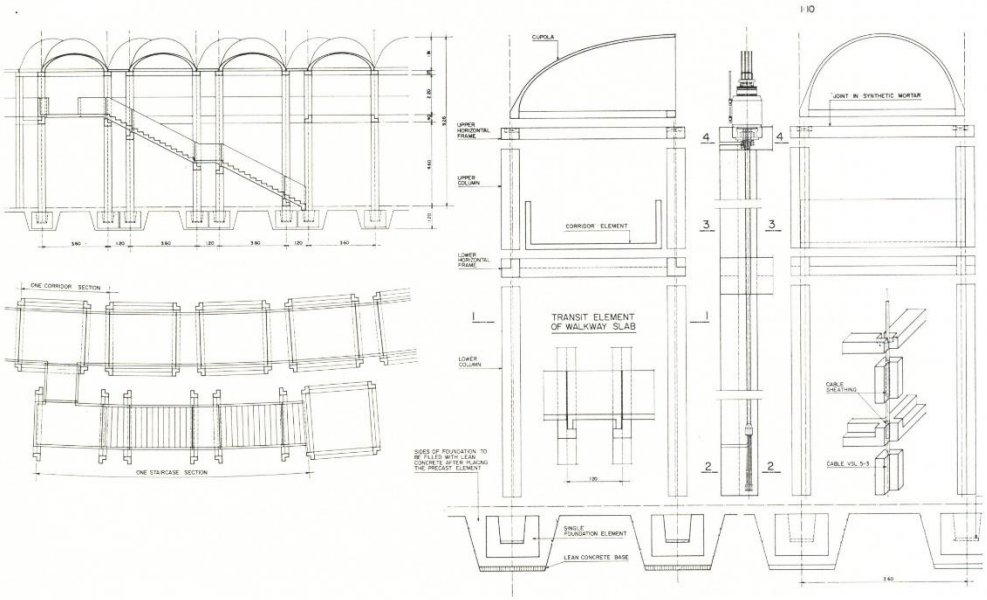
Svømmestadion. Planer, snit og facade, mål 1:1200.

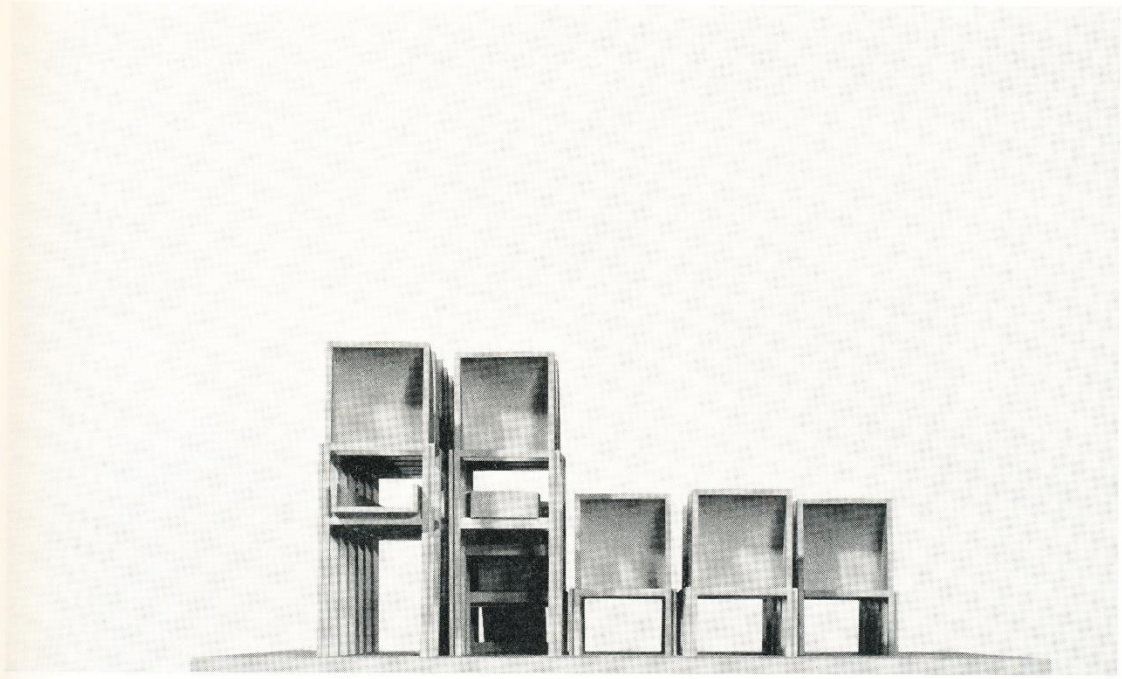
■ *Swimming pool. Plans, section and elevation, 1:1200.*

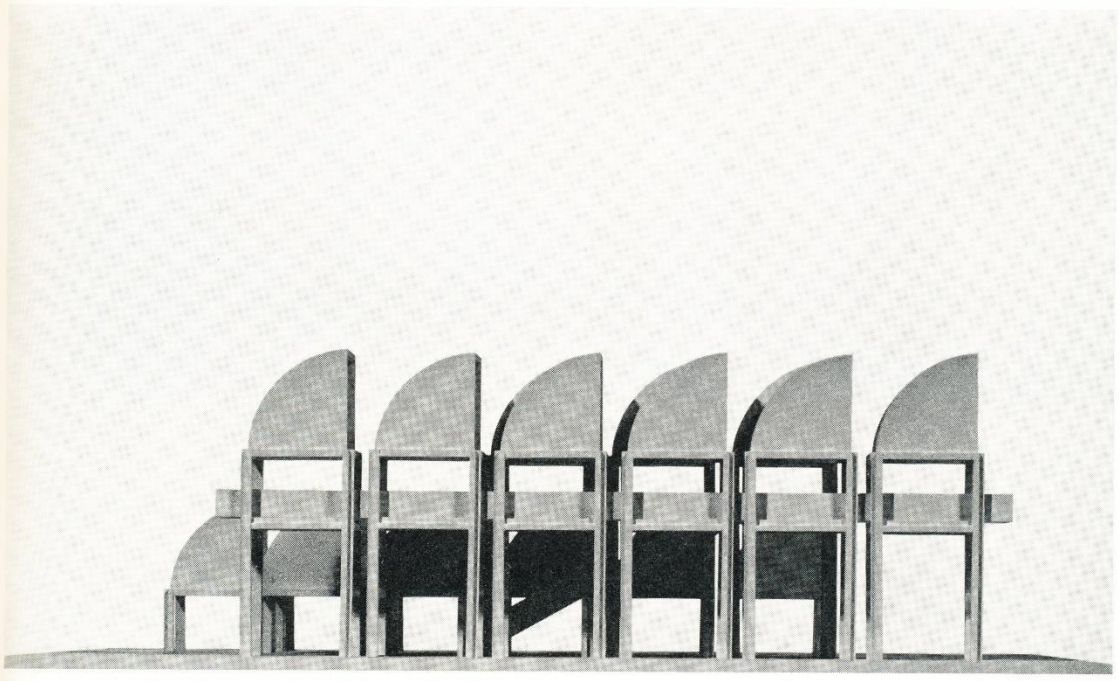


Model og tegning, mål 1:300 og 1:120, af de bygningsenheder, der kan sammenstilles til overdækkede adgangsveje og til lokaler med publikumsfaciliteter.

■ *Model and drawing, scale 1:300 and 1:120, of the units designed to be used for covered access roads and for premises open to the public.*







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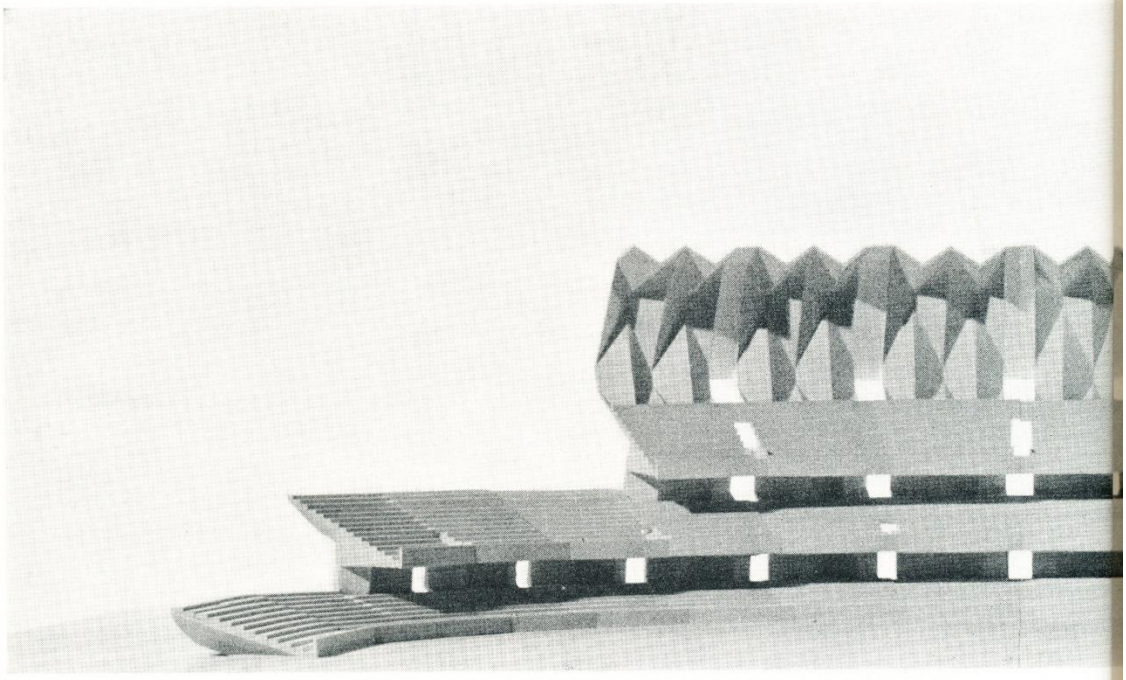
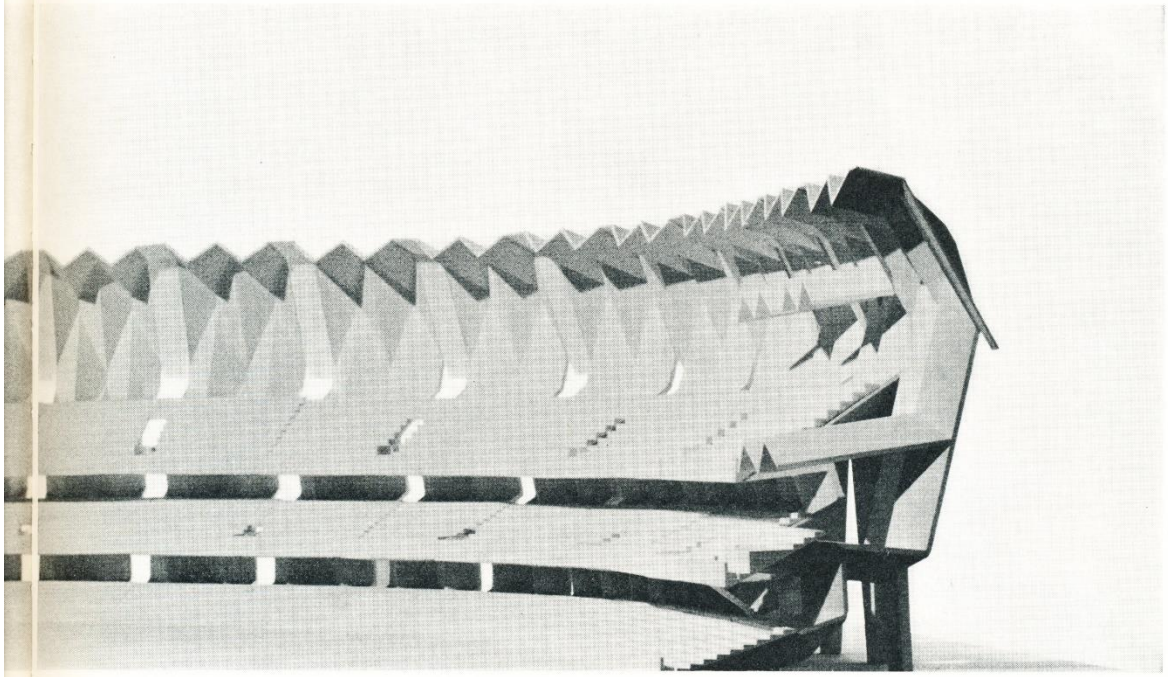


Model af tilskuertribunen ved det store stadion. ■ *Model of the stadium grandstand.*

36



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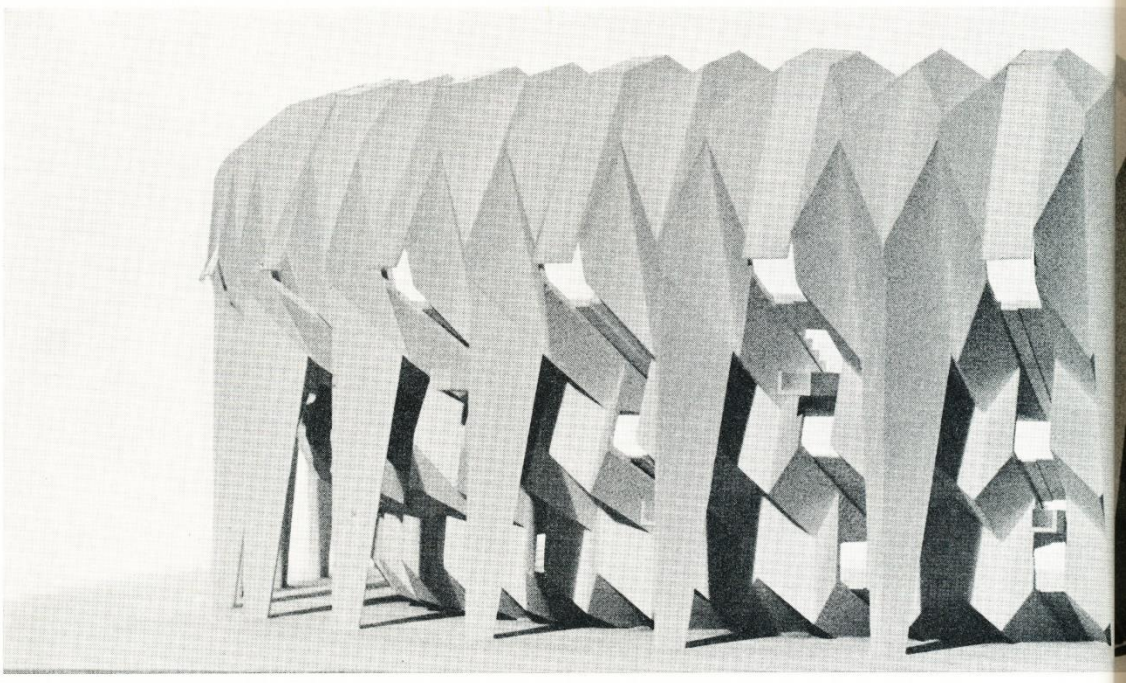
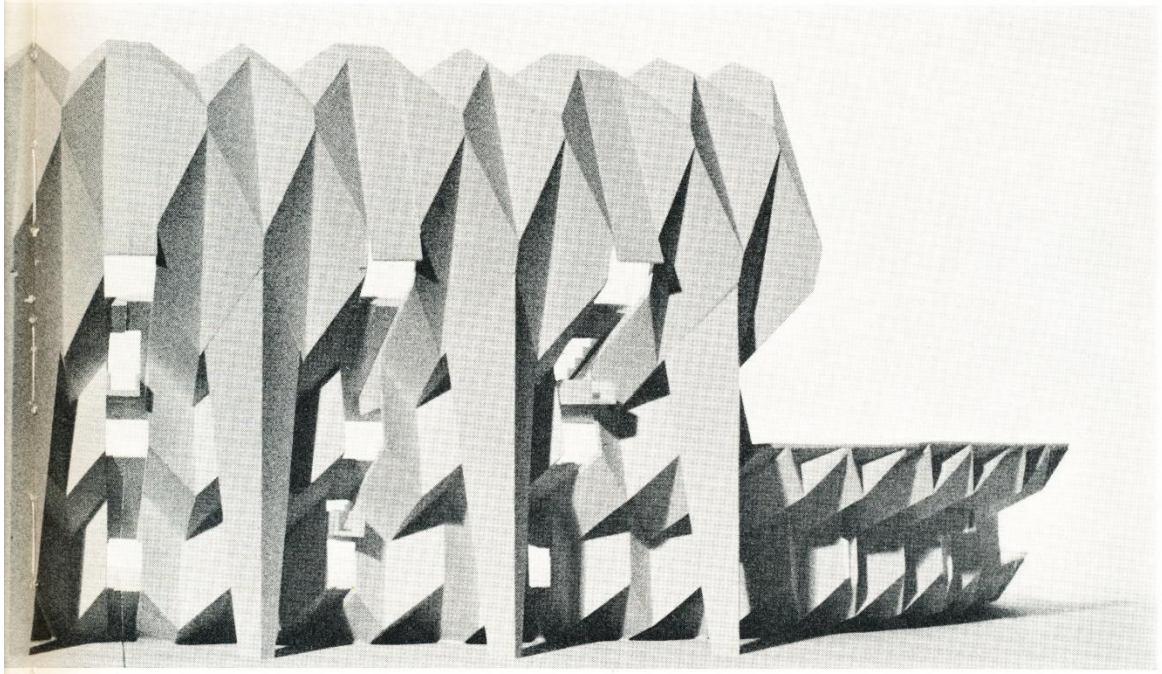


Model af tilskuertribunen ved det store stadion. ■ *Model of the stadium grandstand.*

38



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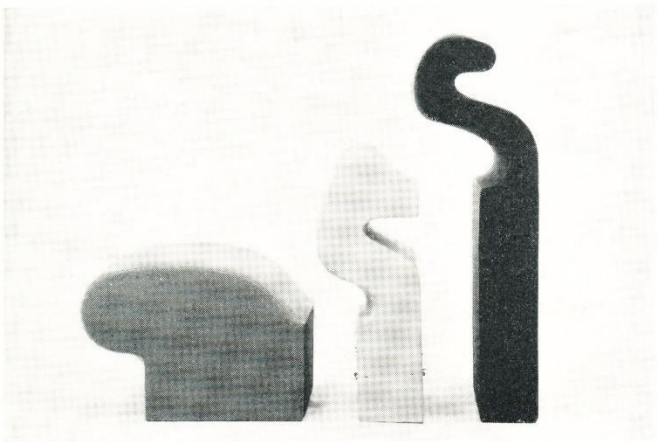

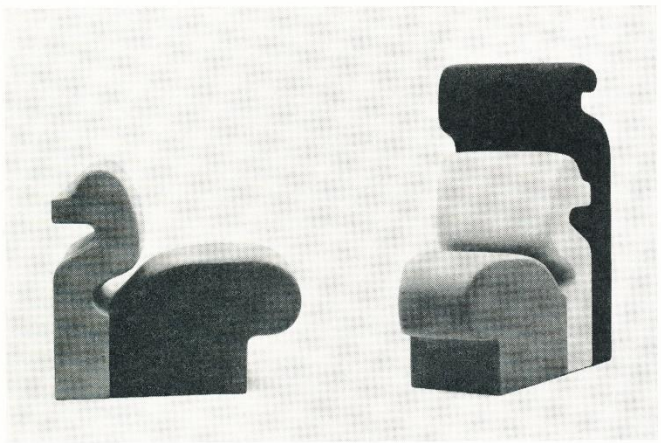

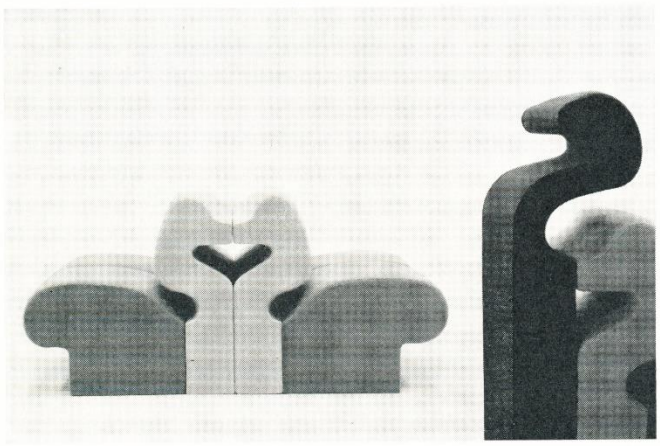

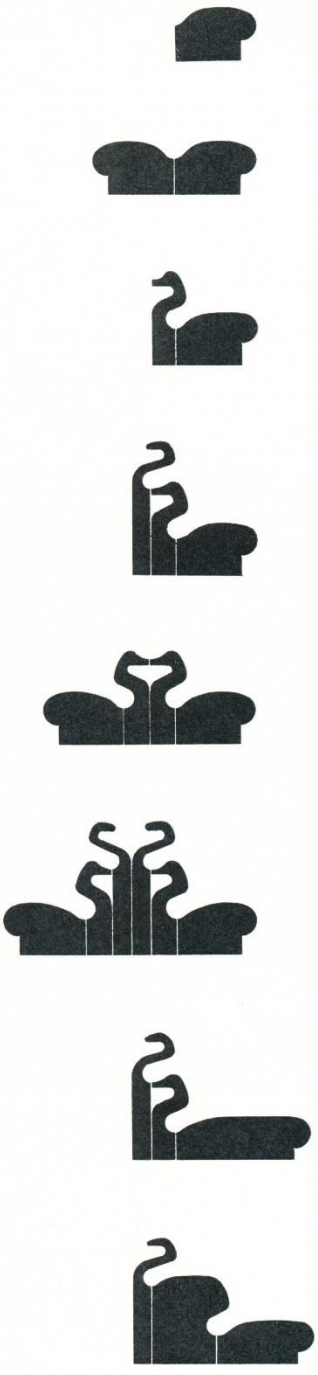

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Utsep møbler

Arkitekt: Jørn Utzon

Møbelsystemet er opstået ved at studere menneskers naturlige trang til at forme grupper og til at sidde sammen i større eller mindre klynger. Hele vores selskabelige liv baseres på en sådan trang til at samtale og agere sammen med andre mennesker.

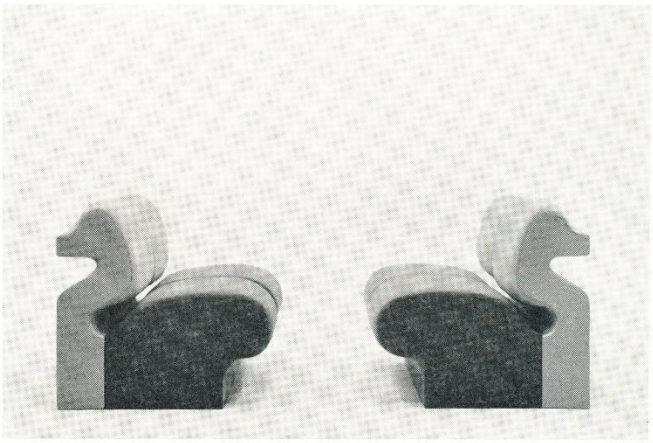
Den firkantede 90 graders møbelopstilling i opholdsstuer, selskabsrum, foyerer og venterum lokker ikke til nogen intim samtale. Mødebordet er, fra at have været rektangulært, blevet rundt. Alle ser hinanden, alle er af samme betydning, og alle har derved samme mulighed for udfoldelse.

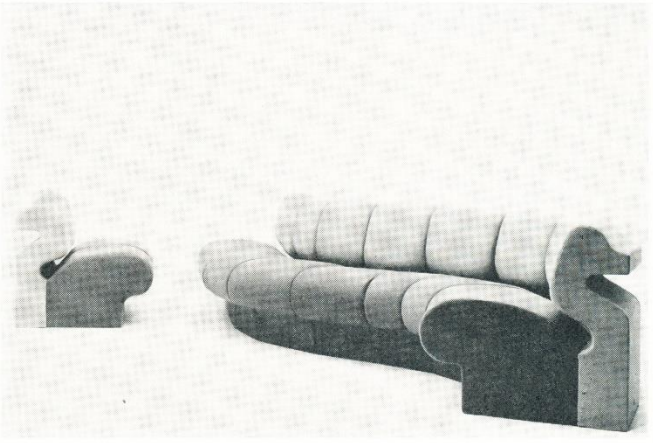
Det runde bord er blevet lighedens symbol i modsætning til det rektangulære bord med den dominerende person ved bordenden, symboliserende et autoritært system. Den krumme møbelopbygning giver gruppen, som slår sig ned, den samme fornemmelse af venlig samhørighed, som det runde mødebord giver mødedeltagere. Praktisk taget alle krumninger er med dette møbelsystem blevet mulige på grund af de vinkelformede elementers evne til kombination med rektangulære elementer. Man kan opbygge små siddemøbler med cirkulær plan, der helt lukker sig, så møblerne næsten danner et rum, eller man kan bygge snoede møbelkombinationer med siddepladser, ryg mod ryg.

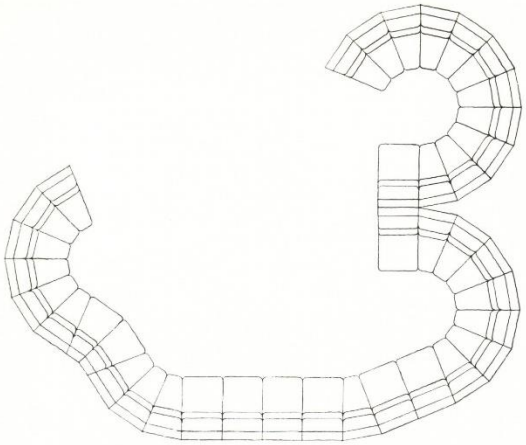
Disse bevægede møbelformer er, selv ubenyttede eller med kun enkelte personer, fine skulpturer på en gulvflade, mens de militærisk-opstillede bænkerader, kendt fra ventehaller, lufthavne og stationer, har en uinspirerende tomhed over sig.

I Tuilerierne i Paris er parkmøbleringen ikke bænke, men jernstole. Det er et meget inspirerende syn at se, hvorledes grupper af unge flytter stolene sammen i cirkler og klumper, så gruppens samvær rigtigt understøttes af den enkeltes position i forhold til de andres.

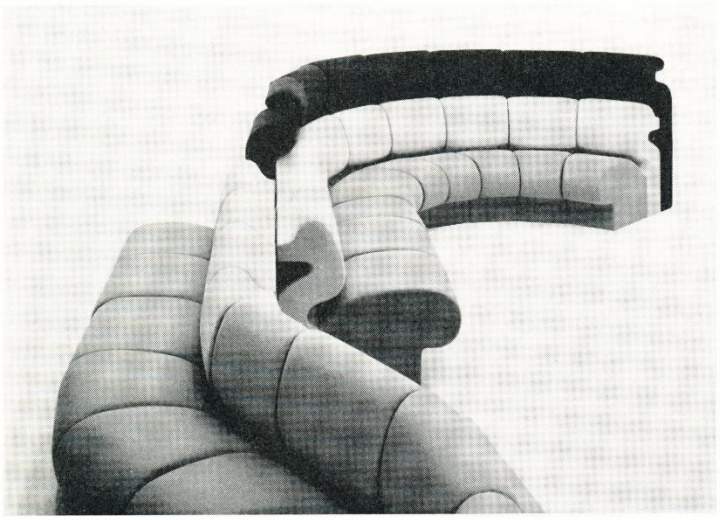
I vores nuværende konstruktive, fagdelte, rektangulære arkitektur kommer møblerne med deres levende former ind som en fin kontrast til et klart kubisk-opbygget rum. Ved arbejdet med rum og opbygninger, hvor mange mennesker samles eller føres igennem, er det i arbejdet med at finde den arkitektoniske løsning en støtte at forestille sig mennesker, uafhængige af deres omgivelser, løsrevet fra vægge, gulv og møbler, og betragte dem, som når man betragter store fugleflokke. Ser man på en fuglefloks pludseligt ændrede karakter, når den efter en fri flugt lander og sidder i lige rækker på telefontrådene, forstår man, hvor stærkt arkitekten binder menneskers bevægelsesfrihed og naturlige bevægelseslyst med sine gange, sine trapper, sine møbel- og bordopstillinger og sine bænkerader.

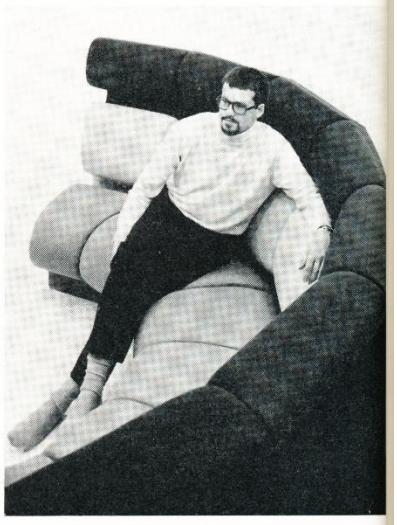


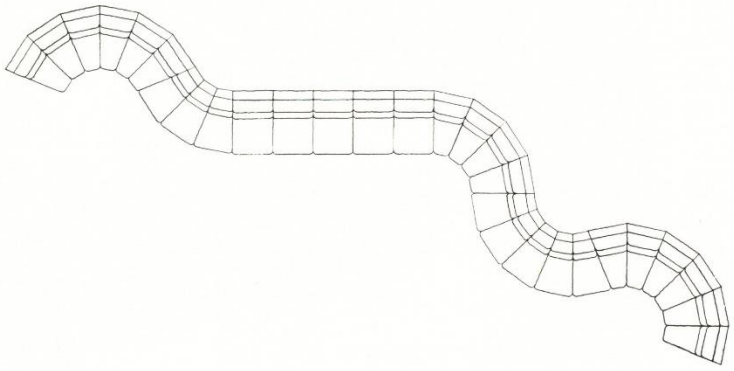


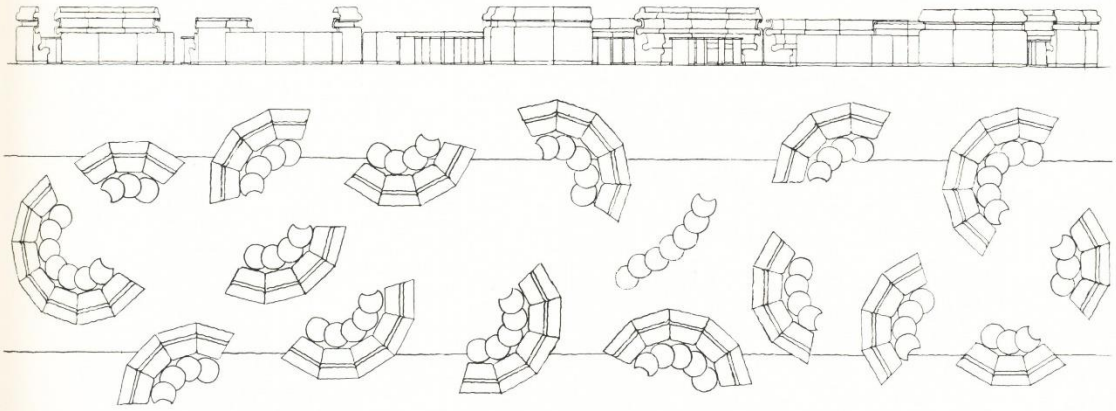


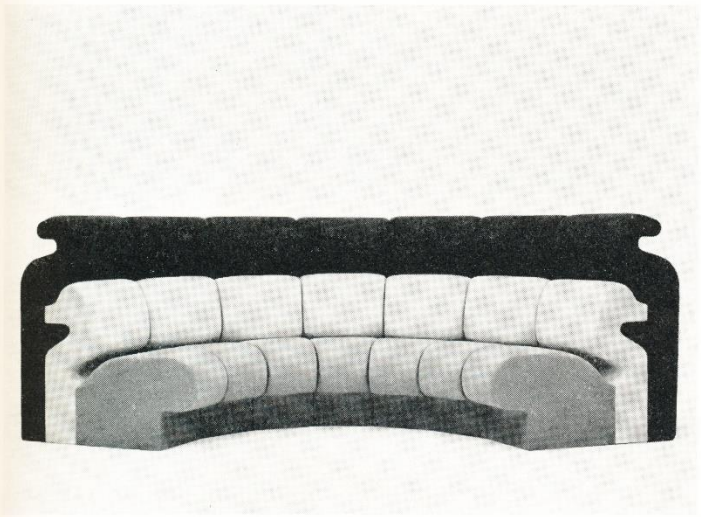
■ *This furniture system has been developed from a study of man's natural desire to form groups and to sit together in large or small clusters. Our entire social life is based on such a desire to conserve and act together with other people.*
Such intimate conversation is not promoted by our usual rectangular pattern of square furniture in sitting rooms, lounges, foyers and waiting rooms.
With this furniture system, virtually any curves can be obtained because of the capacity of the angle-shaped units to combine with rectangular units.
Even when not used, or when used by a few people only, these flowing shapes of furniture represent attractive sculptures on a floor, in contrast to the uninspiring emptiness of the rows of benches in military formation, well known from waiting rooms, airports and railway stations.
In our contemporary, module-dominated rectangular architecture, these furniture pieces with their lively shapes form an attractive contrast to an uncompromisingly cubic room.
Opposite, top: Project for the furnishing of a restaurant.

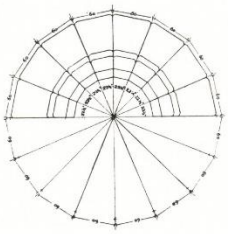


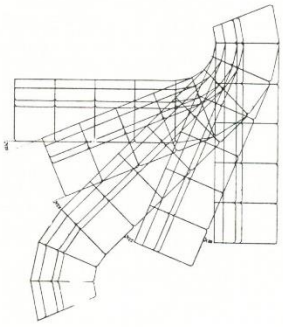












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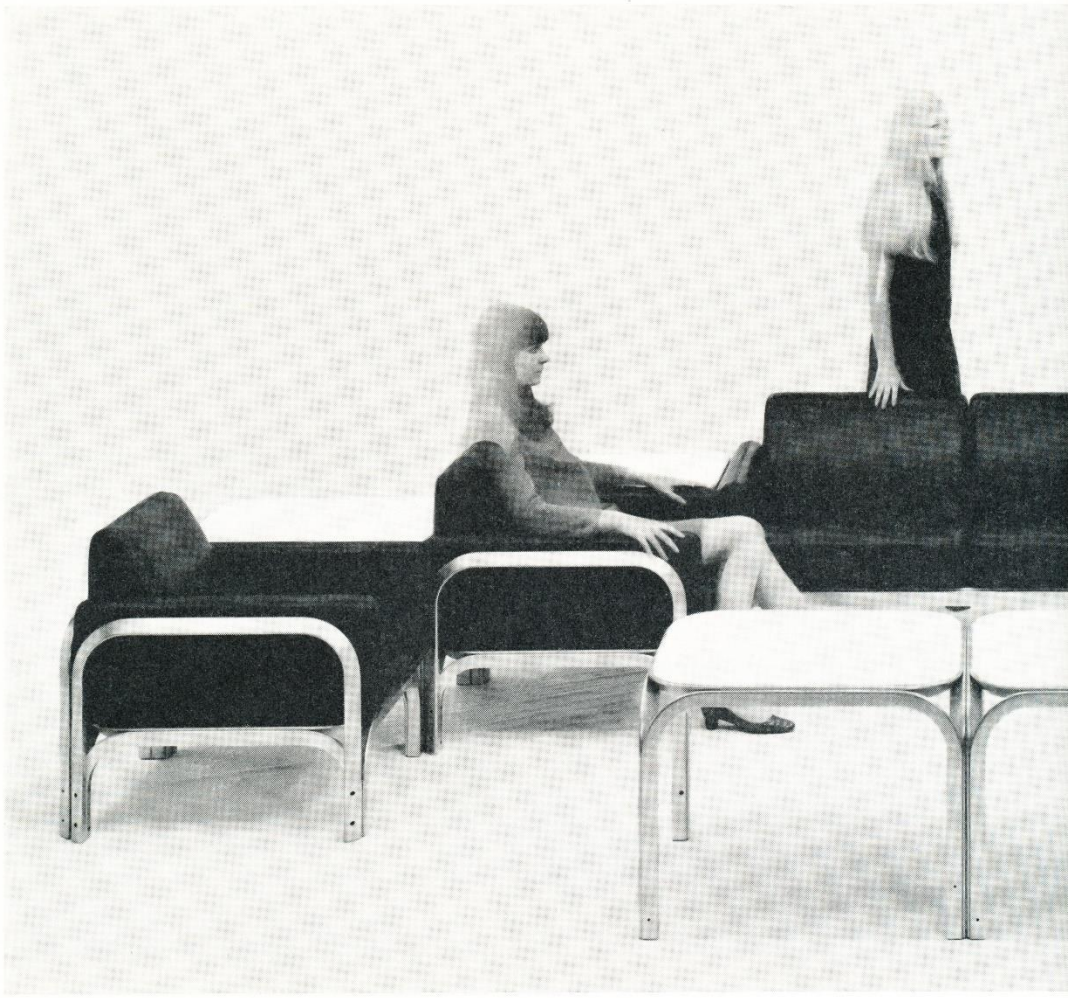

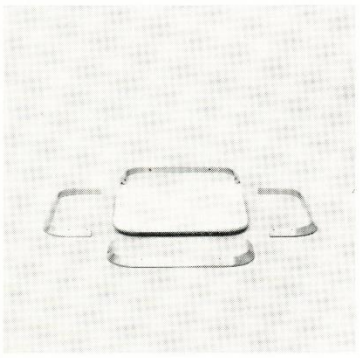

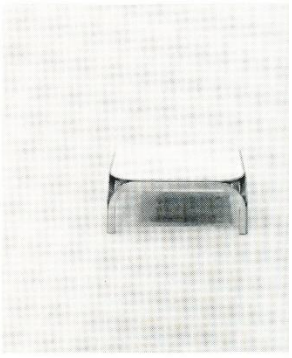

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A new angle

Arkitekt: Jørn Utzon

Dette møbel-byggesystem er først og fremmest udviklet til brug for udformningen af offentlige miljøer. Med det kan der skabes harmoni i interiører af kompleks natur, indgangshaller, hotel-lobbies, ventehaller i lufthavne, kontorer – og det vil i øvrigt også være anvendeligt i boliger.

Med systemets enheder kan opbygges møbellandskaber, og de masseproducerede komponenter kan kombineres på enhver individuel måde. Det er muligt at ændre opstillingen, at foretage nye kombinationer og på den måde søge sig frem til den ideelle løsning. Denne mulighed for stadig at foretage ændringer gør systemet fremtidssikkert. Det vil altid kunne tilpasses nyopståede krav.

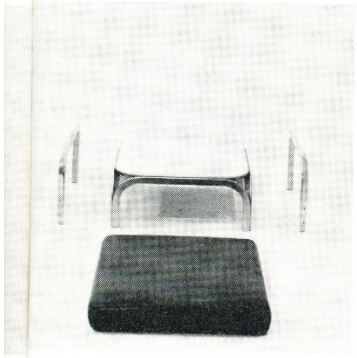
Møbelelementerne danner vertikale og horisontale overflader i forskellige højder og positioner i rummet. Det er et rammesystem som kan fyldes med flader af forskellig karakter efter behov.

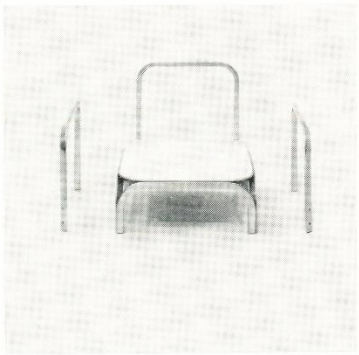
De konstruktive rammer er fremstillet af aluminium i ni forskellige størrelser, svarende til et udvalg af stole, sofaer, borde og montrer. Bordfladerne er udført af Mipolam, stole og sofaer er forsynet med skumgummihynder, betrukket med oksehud eller stof.

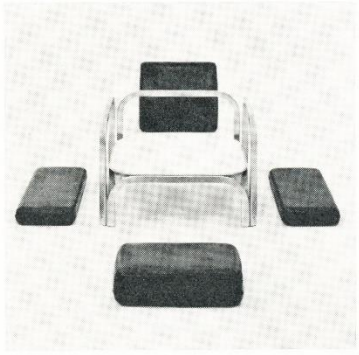
This furniture system has been mainly developed for use in designing public premises. It can be used to create harmony in complex interiors – entrance halls, hotel lobbies, airport lounges, offices – but it can also be used in dwellings.

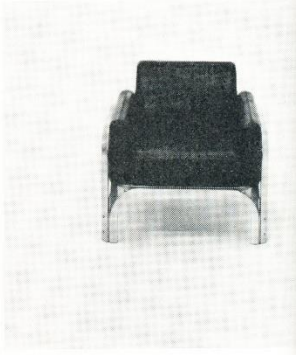
The units of the system can be combined to form furniture landscapes, and the mass-produced components can be assembled in any, individually desired fashion. The arrangement can be altered, and new combinations can be tried out until the ideal solution has been found.

The structural frames, made of aluminium, are available in nine different sizes, corresponding to a selection of chairs, settees, tables and show-cases. Table tops are of Mipolam; chairs and settees have foam-rubber cushions and are covered with oxhide or fabric.









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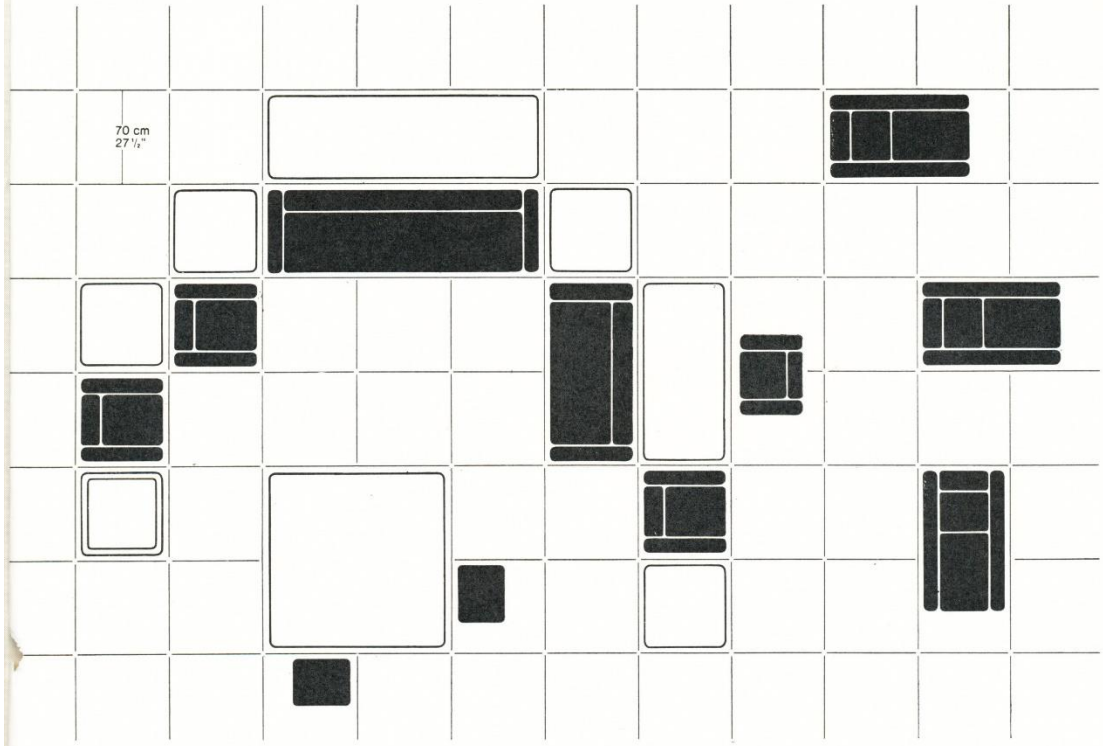
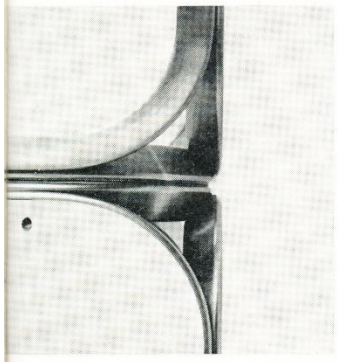
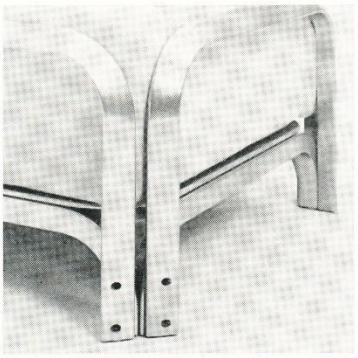
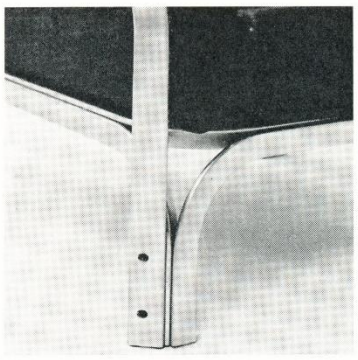


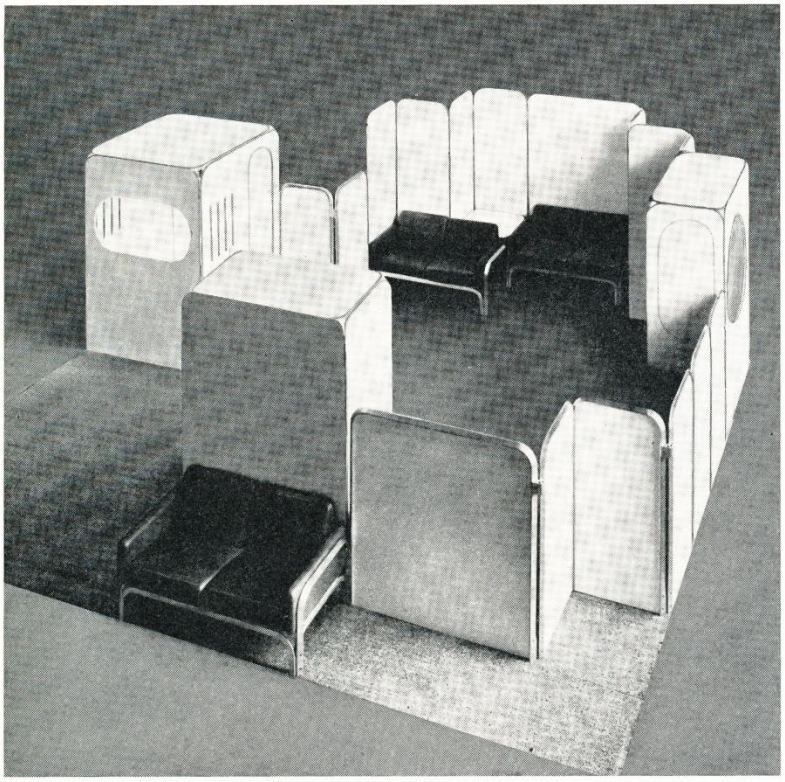
møbellandskab opbygget af modulbestemte møbelenheder. Af relativt få komponenter kan der opbygges sofaer, stole, taburetter og borde.

■ A »furniture landscape«, built up from units governed by modules. With relatively few components, it is possible to build up settees, chairs, stools, and tables.









Jørn Utzon: A new angle

Til møbelsystemet er udviklet komponenter, der kan sammenstilles til skærmvægge. Derved bliver det muligt i haller eller andre store rum at opbygge en møbelgruppe med det mindre rums intimitet. Denne mulighed kendte man i det gamle Kina allerede for 1000 år siden, når man møblerede de store sale i paladserne.

■ *Components forming part of the furniture system can be combined to form screen partitions. In this way, vestibules or other large rooms can be furnished in the intimate manner of smaller rooms. This possibility was known in China already 1000 years ago for the furnishing of large rooms in palaces.*

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