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Fumihiko Maki and His Theory of Collective Form: A Study on Its Practical and Pedagogical Implications

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Acknowledgements

Table of Contents

Appendices

Abstract

This thesis seeks to reexamine Fumihiko Maki's *Investigations in Collective Form* (1964) from a historical and educational point of view, speculating the practical and pedagogical implications of Maki's collective form theory. Firstly, to better understand the formation of both the writer himself and the book, the historical context in the 1950s and 1960s will be unfolded to reveal what Maki had encountered during his formative years that had contributed to his cross-cultural background and had inspired his thoughts in the book. Secondly, the three paradigms and the notion of linkage, as proposed in the book, will be analyzed through comparisons with other influential architectural theories and studies. The understanding of the collective form theory will be expanded through exploring parallel ideas and examining Maki's practice. Moreover, past educational integrations of the design philosophies derived from collective form will be studied, which will include, but not limit to, the earliest urban design studios in School of Architecture at Washington University (WU) and the Graduate School of Design (GSD) at Harvard. Last but not least, contemporary application and development of collective form theory will be explored. Conclusions will be drawn upon the possibilities of how the inherited nature of collective form can further contribute to the future architectural practice and pedagogy.

Chapter One: Introduction

Before opening the discussions in this thesis, a series of questions should be raised to better understand the premise of this study: Who is Fumihiko Maki? What is special in Maki as an architect? Why do we need to study his collective form theory? And lastly, what will this study achieve through researching Maki and his collective form? This chapter will provide a point of view of addressing the answers.

Pedagogical Value of Studying Fumihiko Maki

Fumihiko Maki (born September 6, 1928 in Tokyo) has been a distinguished figure in the architectural world viewing from both geographical and temporal perspectives.

On one hand, Maki presents international characteristics. He is one of the few Japanese architects of his generation to have been deeply influenced and shaped by both domestic and international culture ever since his youth. He has studied, worked, and taught in the United States and Japan from 1952 to 1965, during which he travelled around Asia and Europe. Since 1965, he began his own practice - Maki and Associates, an international architecture firm based in Tokyo, dedicated to producing architectural works featured by the mix of

Eastern and Western experience. Most of Maki's practices reflect a sense of local culture and traditions while incorporating universal and contemporary materials and technologies. Moreover, as for the academic activities, Maki continues his contact with abroad and has taught and lectured at numerous universities and institutions around the world. As a result, Maki's achievements have been widely recognized, both in Japan and abroad, with some of the profession's highest honors, including the Wolf Prize (1988), Pritzker Architecture Prize (1993), Union of International Architects Gold Medal (1993), Prince of Wales Prize in Urban Design (1993), and the *Praemium Imperiale* by The Japan Arts Association (1999). Apparently, the fusion of Eastern and Western influence is evident throughout Maki's education, practice and accomplishments. Such international involvement blended with local traditions is especially relevant to today's practitioners and educators. To achieve innovations under the globalization trend, it is inevitable and even crucial for contemporary designers to establish their unique positions and characteristics deriving from their inherited background while receiving international influences. Thus, Maki's cross-cultural formation could be considered as a paradigm to be further analyzed.

On the other hand, Maki's design philosophy is long-lasting. Maki has stated that "architecture must not only express its time but survive it."[1] With such preoccupations, Maki has been constantly exploring architectural ideas through time. In addition to his widely acknowledged design works in different parts of the world, Maki has been contributing to the realm of academics and architectural theory by continuously publishing writings ever since the 1950s. Learning from his own international experience during the past sixty years, Maki theorizes ideas that are gradually emerged and evolved from his teaching and practice. The philosophical beliefs demonstrated in Maki's writings have been deeply derived from his urbanistic and humanistic concerns, especially from his consistent considerations on the contextual and timely aspects. That is to say, Maki's respect to both the existing conditions and the future growth has been continuously underlying his design philosophy. This notion has been the key to his success in creating numerous places with sustaining vitality through decades. With such understanding, Maki's contribution to architectural thinking has been and will be enduring. His theoretical writings have been widely published and studied and should continue to be included in contemporary architects' and urban designers' learning materials.

Viewing from the aspects mentioned above, one could argue that understanding Maki's formation and analyzing his design philosophy can be an inspiring and rewarding lesson for today's designers, practitioners and educators.

Investigations in Collective Form (1964) – A Starting Point of Understanding Maki

As is mentioned above, the cross-cultural and long-lasting philosophy lies in the nature of Maki's architectural visions. To understand Fumihiko Maki and his work, the best starting point would be his book *Investigations in Collective Form (1964)*. It is one of his earliest publications written during his "formative years" (which begins with his university training as an architect around 1958 and covers almost 10 years he spent in the United States (U.S.) and the early years of his practice in Japan started in 1965).[2] The discussion of collective form in this book could be considered as Maki's own starting point of exploring his design philosophy, which largely contributed to the formation of his distinctive characteristics.

The influence of the collective form theory could be demonstrated by its development ever since 1960. Following the original essay *"Toward group*

form" co-authored with Masato Ōtaka and published in *Metabolism: The proposals for New Urbanism (1960),* it was developed into the book *Investigations in Collective Form (1964),* published by Washington University in St. Louis. From then on, the theory of collective form has been widely spread and read in different parts of the world. In 1965, it was included as *"Some thoughts on collective form"* in *Structure in Art and in Science,* edited by György Kepes. In 1967, it was published in Japanese entitled *"Four studies in collective form – A summary"* and illustrated by four projects: The Boston Study, Risshō University Campus, Golgi Structures, and the Senri New Town Civic Building.[3] Additionally, it has reappeared in numerous architectural journals during the following fifty years, such as the Special Issue on Maki in the *The Japan Architect (Winter 1994),* as *"Notes on collective form."* Moreover, the *Investigations in Collective Form* is republished at Washington University in 2004, reiterated in Maki's *Nurturing Dreams: Collected Essays On Architecture And The City (2008)* and is translated into French recently (since 2012). Last but not least, contemporary interpretations of collective form are presented in *"Redefining Collectivity"* in *The Japan Architect 78 (Summer, 2010)* and in Thom Mayne's *Combinatory Urbanism : the complex behavior of collective form (2011).*

While acknowledging collective form's significance throughout Maki's career, the emergence of such theory is also worth noticing. What inspired him to write this book on collective form was his growing interest in urban design issues resulting from his experience during his "formative years." In Maki's writing *Exploration of Urban Design Language (2009)*, he recalled his impression of postwar Tokyo, which was still recovering from the devastation of the World War II (WWII). Maki also explained his impression on the U.S. at that time: "America was one of the epicenters for architecture in the early 1950s. I came across a special issue of *L'Architecture d'Aujourd'hui* on Walter Gropius's time at Harvard. Harvard and MIT were portrayed as places where new ideas had been transplanted from Europe ... something new was emerging, a kind of fusion."[4] With the curiosity of the Western academy, Maki went to the U.S. for study in 1952, following which he encountered the advocates of urban design led by Josep Lluís Sert at Harvard, as well as the Metabolists and a number of Team 10 members. Maki pointed out that during this period his interests were gradually drawn to "the issue of identity in a mass society and the search for ways in which cities might accommodate distinctive places."[5] It was the postwar social and cultural conditions that had nurtured his exploration of the relationships between the whole and the parts. Such

relationships were concluded in his book *Investigations in Collective Form (1964)* and continuously experimented and evolved throughout his career.

To introduce his proposals of collective forms in the book, Maki firstly addresses his urbanistic position at the very beginning: “there is no more concerned observer of our changing society than the urban designer.”[6] Following this sense of responsibility as an urban designer, Maki points out the humanistic, physical and technological changes in the everyday life and advocates that we must see our urban society as “a dynamic field of interrelated forces” and “a state of dynamic equilibrium,” which will “change in character as time passes.”[7] Additionally, responding to such dynamics, he points out that there is inadequacy of spatial languages that can be applied to designing meaningful physical environment, especially to creating the urban space as a coherent and consistent entity. Under such circumstances, as one of the extensive efforts in searching for effective design languages, Maki brings up his search for adaptable concepts – the collective forms, investigating their nature as “the segment of our cities” and as “a collection of buildings that have reasons to be together.”[8] From the collections of collective form that had been evolved in history throughout the world, Maki includes three major

approaches in his book: compositional form, mega-form (megastructure) and group form.

Nowadays, although numerous efforts have been invested in studying the methodology of planning for future growth, the dynamics of the physical world is still barely meeting the rapidly changing social needs. The spatial, cultural and historical inconsistency in the built environment has been a rising problem in contemporary architectural field, interrupting the communication and interaction between the individual and its urban settings. More and more contemporary architects are calling for flexibility in design approaches and philosophies as response to the dynamics of today's society. The relationships between an object and its context, or the connections between architecture and urban design, have continuously been the emphasis in today's architectural experiments and practices.

Under such circumstances, Maki's *Investigations in Collective Form (1964)*, although written half a century ago, still presents notions that are highly relevant, applicable and valuable for today's architectural practice and pedagogy. Firstly, the premise to meet the dynamics of urban life underlies all the discussions and analysis in the book. He advocates loosely defined "master

program" rather than predetermined "master planning," since the former incorporates timely considerations and will allow for future adjustments and developments. Moreover, the three paradigms proposed in the book have been representative of Maki's consistent explorations on the relationships between the parts and the whole and their influences on visible form. According to Maki's understanding of the urban environment, the whole can be forged by numerous individual elements which are connected or grouped with linkages presented in different forms of structures. Through analysis and comparison of the three abstractions of collective form, Maki argues for organic thinking towards social dynamics and growth with respect to contextual, humanistic and timely forces. His investigations aim to address answers to a question that is still studied by contemporary architects with enthusiasm; that is, how to design a place that can fit into the existing context, satisfy human's changing needs, while sustaining its vitality through time. Therefore, since changeability and growth have been global issues for contemporary society, it is worthwhile for architectural and urban practitioners, educators and students to trace back to fifty years ago and rethink about Maki's philosophy behind his analysis and advocacies in *Investigations in Collective Form (1964).*

Research to be Achieved

According to the premise mentioned above, this thesis will focus on the practical and pedagogical implications in Maki's *Investigations in Collective Form (1964).* To get a better understanding of the design philosophy in the book, Chapter Two will introduce the historical context regarding the formation of both the writer himself and the book. It will include major architects and groups and their theories as well as historical events that had contributed to the formation of Maki's cross-cultural background and had inspired his thoughts in the book. These will include, but not limited to, Josep Lluís Sert, Kenzō Tange, Metabolists, CIAM, Team 10, etc. The timely focus of the historical context will be limited to 1950s and 1960s.

Following the introduction of the related historical knowledge, Chapter Three will begin a close-up examination of the book *Investigations in Collective Form (1964),* analyzing the characteristics of the three paradigms and the notion of linkage, using representative projects as demonstrations. Parallel theories or studies among Maki's peer architects with be included and compared to expand the understanding of the collective form theory.

Departing from the design philosophy underlying *Investigations in Collective Form (1964)*, Chapter Four will analyze the past incorporation of such philosophies in educational methodology. The examples will include the earliest urban design studios at School of Architecture at Washington University (WU) and at the Graduate School of Design (GSD) at Harvard. Related discussions on urban design education will be unfolded as well to evoke possible pedagogical approaches inspired by collective form and its comparable theories.

Last but not least, to conclude the thesis, new discussions on collective form will be brought up in Chapter Five. Some recent theories, projects and publications will be laid out to demonstrate what Maki's collective form theory can mean for today and how it is developed by contemporary architects in their practice. These contemporary works will mainly be drawn from *"Redefining Collectivity," The Japan Architect 78 (Summer, 2010)* and from Thom Mayne's *Combinatory Urbanism : the complex behavior of collective form (2011)*. In addition to the analysis of the contemporary design works, the speculations on the contemporary educational implications will put an end to this thesis; however, it should be rather a beginning for further studies and discussions on architectural practice and pedagogy.

Chapter Two. Historical Context (1950s and 1960s)

As an architect who has received both Japanese and American education, Maki's *Investigations in Collective Form (1964)* is also the product of his reaction to diverse Eastern and Western ideas about how modernists can reshape the contemporary cities. As Kenneth Frampton wrote in his essay, "what must surely be acknowledged at the outset, is the unique character of Maki's formation."[9] To further understand Fumihiko Maki's formation and his insights into the collective form, it is important to first unfold what Maki had experienced internationally during his "formative years" (about the 1950s and 1960s).

Maki's Education

Before analyzing Maki's insights into this historical period, first of all, one should be informed about Maki's educational experience. As the first Japanese architect to be deeply shaped by Western influence, Fumihiko Maki began his university training as an architect in the most elite schools in Japan and North America. He received his bachelor's degree at the University of Tokyo, and then attended Cranbrook Academy of Art (1952 - 53), following which he became a student at Graduate School of Design (GSD) at Harvard University. Thereafter, he taught at Washington University in St. Louis between 1956 and

1962, and then at the GSD from 1962 to 1965, during the deanship of Josep Lluís Sert. Maki named this academic period as his "formative years" and referred to living in America as his "journey to the west." During this period, Maki developed his lifelong interest in the relationship between place and architecture.[10] Maki recalled:

> While studying and teaching mainly urban design at Washington and Harvard Universities in the early 1960s, I had a strong interest in the nature of cities, architecture and groups of buildings in a broad sense, that is to say, in the exploration of "place-making" and the nature of real and fictional space….
>
> My other major concern was building-making as opposed to place-making, in other words the exploration of new technologies, materials and forms of expression for the purpose of realizing architecture of a high quality (aesthetically and otherwise). My approach to architectural design is different from, say, Mies, and more holistic; as a result, my forms of expression are diverse.[11]

Thus Maki embraced an approach to architecture that while grounded in formal expression and the craft of buildings, also was also fundamentally concerned with the way architecture shaped an urban environment.

Ever since Maki's academic years, he maintained his contacts with his mentors - Kenzō Tange and Josep Lluís Sert. When he was asked about the strongest influence on him, Maki firstly confirmed the influence of the University of Tokyo and Tange's mentoring. At Tange Lab, Maki is first drawn to the American scene through *L'Architecture d'Aujourd'hui* (a precious magazine in postwar Japan), featuring Walter Gropius's activities at Harvard.[12] Maki then recalled his early years when he was applying "a very rational sort of design method in problem solving, form-making, creating ideas, and in how to make a program," which was indirectly influenced by Gropius.[13] Lastly, Maki recalled his years at Harvard University, when the GSD was shifting from the Bauhaus ethos under Gropius's deanship – integrating art in architecture - to an emphasis on urbanism advocated by Sert. Nevertheless, even though Maki never encountered Eliel Saarinen directly and rarely talked about his education at the Cranbrook Academy of Art, he recalls to have been impressed by the campus designed by Eliel Saarinen as well as his book *The City: Its Growth, Its Decay, Its Future*. One could postulate that the ethos of Cranbrook, shaped by Eliel Saarinen and his book *Search for Form: A Fundamental Approach to Art*, might have indirectly imposed subtle influence on Maki.[14] Eliel Saarinen wrote in his book:

> Accordingly, as the artist proceeds with his creation there simultaneously develops a rationalizing yet unwritten analysis of the work. This analysis is a personal meditation, characteristic of the individual and therefore independent of the thoughts of others. Nevertheless, the nearer the thoughts of the individual approach indispensable fundamentals, the closer will they contact the thoughts of others engaged in the same search.[15]

Being exposed to the education concerning the "indispensable fundamentals" at Cranbrook, Maki's *Investigations in Collective Form* can be considered as a later accomplishment of this "search for form."

Reviewing Maki's education, it is obvious that such experience from the Japanese and American universities was fundamental to the formation of his unique mix of Eastern and Western design philosophies.

Architectural Thinkers

As part of the post-war generation of innovative young modernists, Maki witnessed World War II's impact on the social and physical world, as well as the subsequent efforts from various architectural theorists in reshaping contemporary cities.

Ever since Fumihiko Maki was born in the Yamanote district of Tokyo in 1928, he had a youthful encounter with modernism in Japan. In 1930s, the Japanese architectural world was introduced to the ideas of modernism represented by the Bauhaus and the esprit Nouveau.[16] As a child, Maki was able to experience some representative modernistic buildings directly to understand what was judged as excellence back then. Since 1950s, the period started when the architects were exploring various issues of modernism developed before the World War II. As Maki recalled more than forty years later, this was a time when the validity of the ideas of modern architecture, especially in the context of the city, had started to be questioned, and new investigations were being initiated.[17] Various responses towards modernism had emerged.

Reviewing the theoretical works influencing the architectural world around the 1950s and 1960s, many can be seen as precursors who shared Maki's concerns and explorations. For example, in 1943, Eliel Saarinen proposed his vision of "organic order" and "organic decentralization" as the surgical repair of deteriorated or blighted areas of failing cities.[18] He emphasized that "the fundamental reason for success or failure in all town-building depends on whether or not town formation is based on the architectural principle of

organic order."[19] This call for the imperativeness of the organic order was echoed in Maki's advocacy of group form. Another important figure was György Kepes, who wrote *Language of Vision* in 1944, suggesting the vision, as a "device of orientation" and "a means to measure and organize spatial events" in both physical and human spheres, must be evolved into a language of space that can enable human's sensibility to perceive space-time relationships.[20] He called for contemporary visual representation of dynamic organizations. This task was part of Maki's accomplishment in his book. Moreover, at the World's Design Conference in 1960, Louis I. Kahn presented his lecture "Order and Form" (1955) to the young Metabolists including Maki, in which he rejected the abstraction of "space" in favor of a more phenomenological reading of "place."[21] He also suggested that "design is form-making in order" which could emerge out of growth and support diversity and integration. [22] Kahn's philosophy in order and form was quoted in Maki's book, while Maki's advocacies paralleled Kahn's beliefs.

Beyond these precursors, two groups with Maki's involvement emerged around the 1950s. One was the Metabolism in Japan, whose members proposed gigantic utopian architectural structures based on a faith in technology. The other group was Team 10. When Maki attended their

Bagnols-sur-Ceze conference in the south of France in 1960, the members rejected megastructures by the Metabolists from a humanist and regionalist point of view; meanwhile, they presented their concerns on how to effectively house large number of population.[23] Both these groups had close contact with Maki, and their influence on Maki during his formative years is frequently recalled in Maki's memoirs.

Apparently, Maki not only was aware of the gradual changes happening to modernism philosophies, he also participated in the influential architect groups in both the Eastern and Western world. His collective form theory reflected many parallel ideas shared by other influential architectural thinkers around the 1950s and 1960s.

Collective Form and the Shift Towards Urbanism

Before unfolding the historical events in the United States, Europe and Japan during the 1950s and 1960s, first and foremost, it is necessary to point out how Maki's *Investigations in Collective Form* paralleled the shift in the attitude towards urbanism in the architectural world.

After the World War II, there was an ongoing trend towards an urban focus among architects' discussions. Town planning efforts had been gradually directed towards functionalism as a dominant methodology. However, during the 1950s, there was increasing dissatisfaction towards such compositional design approaches which led to rigid alignment of functional zones. As a result, architects, especially the younger generation of modernists, started to direct their attentions to regional, contextual, and anthropological concerns. From then on, numerous urbanistic explorations emerged internationally to expand the design philosophies and methodologies among the architectural world.

Maki's *Investigations in Collective Form* was one of these efforts at that transitional period. By dividing his book into three sections he sets up a framework in which he contrasts two existing precedents, with his own vision. Among the three paradigms of collective form, Maki connected each form to other architects' proposals and projects. For instance, he sees compositional form as a dominant approach for many CIAM and earlier classical projects, while megaform is best represented by Metabolists' proposals. With concerns and critiques on the previous two forms, Maki advocates group form. He described group form as what had evolved in the historical growth of many vernacular settlements. The initial writing of collective form was warmly

received by Team 10 members, such as Aldo van Eyck and Jacob Bakema, as well as architects and urban designers such as Walter Gropius and Kevin Lynch. It is believed that group form has strong tie to the Team 10's and Lynch's philosophies.

About fifty years after he investigated collective form, Maki recalled his design approaches, confirmed the contextual and humanistic concerns underlying his philosophy:

> When designing a project, I was always interested in how urbanity might be increased around the building if the site happened to be in a city, and how a dialogue might be established between architecture and nature if it was located in the countryside. Among the variety of architectural issues that I have explored in my work, I have maintained a consistent belief that a humanistic environment can only be created by placing importance on the viewpoint and spatial experience of the users and ordinary visitors to buildings.[24]

Maki's advocacy of organic group form with a focus on humanistic experience and contextual connection resonated with other urbanists' philosophies in the

1950s and 1960s, notably those from Team 10 and Metabolists – respectively originated in the West and the East. Maki encountered both these two architect groups around 1960, when he started writing about collective form. Therefore, these two groups should be introduced for their strong linkage to Maki's formation of himself and his collective form theory.

From CIAM to Team 10

While the architectural philosophy was transforming during the early twentieth century, inspired by dramatic technological and social changes, in 1928, the International Congresses of Modern Architecture (CIAM) was founded by a group of avant-garde architects. During the 1930s to 1940s, CIAM remained in the hands of Le Corbusier and Giedion.[25] Strongly influenced by Le Corbusier's theories and design proposals, as well as those of the German, Dutch, Swedish, Italian and English groups, the CIAM members were seeking for comprehensive approaches to human environment, especially on an urbanistic level. In the following decade, after the fourth CIAM meeting on "Functional City" in 1933, CIAM's proposals gradually directed town planning efforts toward a rigid alignment of functional zones in town layouts, separating dwelling, work, recreation, and circulation.[26] The urban planning studies after the Functional City, as well as works from Le Corbusier's Ville

Radieuse (*Radiant City*, 1935), were documented as *The Athens Charter*, developed in 1933 and published by Le Corbusier in 1943. One manifestation of the Functional City is the plan for Brasilia designed by Lucio Costa and Oscar Niemeyer. It was seen as a method of imposing order, progress and stability to Brazil's new capital, establishing a city based upon equality and justice.[27] This project is listed as a representative example for compositional form in Maki's book. Another demonstration would be the Pruitt-Igoe housing in St. Louis. Its initial design scheme was also in accordance with CIAM's ideals for the Functional City. (Though when it was built, other than a school, it lacked the CIAM-type collective facilities.)

After the World War II, the *Athens Charter* had gradually become an internationally influential guidance for city design. In the American academic world, evidence could be traced in GSD design studios led by Walter Gropius and Marcel Breuer, as well as Ludwig Hilberseimer's design studios at Illinois Institute of Technology, where students were encouraged to design mass housing to meet the economic and social needs during the postwar years. The students' design proposals were strongly influenced by CIAM's rigid compositional layout. For instance, in master's studio "Architecture 2d" led by Gropius at GSD, students were encouraged to design mass housing to meet the

economic and social needs during the postwar years. Two-dimensional pattern and visual variety in the composition was emphasized in the studio description.[28] (Gropius had offered such studios since he arrived at GSD in 1937 until his leave in 1952.) Such mechanical design principles were present in many early CIAM projects.

However, during the 1950s, there was increasing dissatisfaction with CIAM's mechanical design principles. The seventh CIAM congress in 1949 was criticized by Bruno Zevi for its weakness, which is "the dominance of the congress by the aging rationalist attitudes: Le Corbusier, Gropius, and Giedion, at the expense of excluding any other modern point of view."[29] Yet it was also the event where Sert began to talk about the heart of the city in CIAM. While the Charter had set rigid functional zones for urban planning, among the younger CIAM members there had been an rising awareness of words such as "neighbourhood', 'cluster' and 'association' that demanded a more organic approach to the image of the city.[30] Architects started to direct their attentions to regional and contextual concerns. In 1953, the ninth CIAM congress saw the beginning of the end of the organization, when Alison and Peter Smithson expressed the view that a "hierarchy of human associations" (house, street, district, city) should replace the functional hierarchy (housing, recreation,

transportation, work) of the *Athens Charter*.[31]

In 1956 at the tenth meeting, the group "Team 10," which was formed under the lead of Peter and Alison Smithson and Aldo van Eyck in 1954, challenged CIAM's modernist approach in urbanism with more empirical patterns of "human association," seeking inspirations in anthropological studies, particularly in East London. Meanwhile, Kenzō Tange presented his concerns with urban design at the conference, which helped to establish urban design as a serious field.[32] The rise of Team 10 ultimately led to the reorganization of CIAM in 1959.[33] From then on, the Team 10 members started various explorations on urbanism theories as well as new formal languages as bases for design, which were illustrated through the publication of *Team 10 Primer* (1962). As is expressed in "The Aim of Team 10," it was a group searching for a new beginning for what they had inherited from modernism; more importantly, it was a group concerning "an understanding and feeling for the patterns, the aspirations, the artifacts, the tools, the modes of transportation and communications of present-day society" and building "towards that society's realization-of-itself."[34] Their emphasis on the small scale and social complexity of the community, as well as the anthropological associations, were introduced to American architecture schools, such as Washington

University, University of Pennsylvania, University of Columbia and Harvard, when members were teaching and lecturing as visitors.

Maki is believed to have been influenced by the Team 10 members and his premise of investigating into collective form echoes the group's objectives in their manifesto. In addition to his participation in the Team 10's meeting in 1960, he became colleagues with Jacob Bakema (1959-61) and Aldo van Eyck (1961-62) at Washington University.[35] (Both Bakema and van Eyck were Dutch members of Structuralism.) Ever since those year, he developed his friendship with many Team 10 members, as he recalled fifty years later: "I was never regarded as a member because, as you know, Team 10 was a very closed family. But Peter Smithson, Bakema, van Eyck, and Giancarlo De Carlo befriended me, particularly in my later years."[36] Although Maki was not considered as a Team 10 member, the linkage between Maki's collective form and the Team 10's advocacies has been stressed in many contemporary scholars' speculations.

Tange and Metabolism

Throughout Maki's life, he has been strongly tied to his inherited Japanese background. The best evidence during his formative years would be his contact with Kenzō Tange and the Metabolism group.

Maki's experience with Tange started when he was a student at Tokyo University (1948-1952). In Japanese universities, upperclassmen and graduate students pursue their studies in groups called *kenkyushitsu* (research laboratories) organized around individual faculty members.[37] At Tokyo University, as Maki recalled later in his life, from the time of his graduation thesis and during the period he spent in Tange's laboratory until his departure for study in the United States in 1953, he was getting "a brief but intense exposure to Tange's way of working on architectural and urban designs."[38] What was unique in Tange's laboratory was the international perspective Tange was pursuing even though the university had limited all the activities to Japan. Maki was impressed by Tange's distinctive ambitions in testing out new ideas and approaches. While working in Tange's *kenkyushitsu*, Maki experienced the dual characters in its atmosphere – both the atelier of an artist and the laboratory of a scientist.[39] Maki interpreted this duality as a paradoxical nature of design in architectural office, which would have an

enormous influence on his own later practice.[40] He believed that it was Tange's influence that revealed to him the necessity for architects to develop their own ideal approach to design. Maki further explained what he had grasped through working in Tange's laboratory:

> The issue is always how to proceed from a blank sheet of paper to realization – that is, how to direct and influence group behavior in a concentrated and unique way toward a certain objective. I hold as my ideal an organizational structure in which the group, while centered around one person and one theme, is in a state of flux, pushed this way and that way by internal contradictions and conflicts of imagination. Decisions are gradually made on the basis of objective reasoning, as is necessary for the creation of something as concrete as architecture.[41]

Interestingly, this "organizational structure" reappeared years later in the urban studios Maki co-taught with Roger Montgomery at Washington University, where the whole class was centered around one theme and the final design decisions were made on the basis of objective reasoning after resolving internal differences.

While in the Western world the CIAM was going through rise and fall, Japan was rebuilding after World War II's devastation. A group of young Japanese architects, centered on Junzō Sakakura and Kenzō Tange, began to explore their own proposals seemingly independent of any other commissions around the 1950s. To reflect the organic nature of their proposals, the group named themselves *shinchintaisha*, which is translated as *metabolism*. In biological sense, it represents the essential exchange of materials and energy between organisms and the exterior world. It also means the replacement of the old with the new, interpreted by the group as a process of continuous renewal and organic growth of the city.[42] In 1958, when Maki went back to Japan temporarily preparing for the next two years' travels as a fellow of the Graham Foundation, he made acquaintance with the Metabolism group, which was formed in the same year.[43] They initiated the World Design Conference (WoDeCo) in Tokyo in 1960 as an opportunity to express their thoughts internationally on new kind of urbanism for Japan. Tange was program director on the preparatory committee but left Takashi Asada in charge while he was in the U.S. As the conference director, Takashi Asada was on close terms with a separate architectural faction centered on the young Japanese Architects Kiyonori Kikutake and Kisho Kurokawa and the critic and editor of *Shinkenchiku* magazine, Noboru Kawazoe.[44] As Rem Koolhaas describes:

> Asada engages politicians, bureaucrats, business leaders, journalists, and academics… he and Kawazoe gather a group of young architects and designers for discussions at Ryugetse restaurant and inn in Ginza. The group initially includes Kurokawa, still a rookie in Tange Lab, and the already well-established Kiyonori Kikutake. Looking for solutions to the urban crises caused by Japan's explosive economic growth and its unstable and scarce land, the group looks to historial Japanese precedents – the cyclical rebuilding of Ise Shrine and the modular growth of Katsura Detached Palace – as inspirations for a new type of changeable architecture.[45]

One month before the WoDeCo (April 1960), Kawazoe announces the foundational idea of Metabolism: artificial ground (*jinko tochi*) – "the unifying concept behind the diverse works the Metabolists are about to present to the world," which is "form of adaptation to the absence of tabula rasa, or even basic stability and available space in Japan; if there is no ground to build on, Metabolism will adapt and build its own ground."[46]

While Kawazoe, Kikutake and Kurokawa were compiling their ideas into

Metabolism 1960 at the International House, Maki and Ōtaka (who was working at Kunio Maekawa's - another Japanese CIAM member - office at the time), the other unit within metabolism, collaborated on a Group Form plan for Shinjuku station in Tokyo, which would also appear in this Metabolists' manifesto. Additionally, Noboru Kawazoe, who was the only one to actually use the word "metabolism," wrote a short paragraph as the introduction to *Metabolism 1960*:

> "Metabolism" is the name of the group, in which each member proposes future designs of our coming world through his concrete designs and illustrations. We regard human society as a vital process – a continuous development from atom to nebula. The reason why we use such a biological word, metabolism, is that, we believe, design and technology should be a denotation of human vitality. We are not going to accept the metabolism as a natural historical process, but we are trying to encourage active metabolic development of our society through our proposals.[47]

At the WoDeCo, Metabolism movement was officially introduced to the international audiences. On May 14, 1960, Kenzō Tange gave a speech on "*Technology and Man*," arguing that "in the same way as life, as organic

beings composed of changeable elements, as the cell, continually renewing its metabolism and still retaining as a whole a stable form – thus we consider our cities."[48] On the same day, Masato Ōtaka lectured on "*Cooperation of Designers*," introducing the notion lying in the Shinjuku Plan proposed together with Maki:

> … The city is composed of countless persons, countless individuals; on the other hand, wealth becomes more and more concentrated, developed, and transformed. With regard to this dynamic modern city I would like to propose a method of Group Form… dividing the city space into two sections: the machine-like sections and the human sections; and also of dividing it into two spaces: the space for speed and the space for people to walk.[49]

As the precursor of the Metabolism group, Kenzō Tange attended the eighth and the CIAM'59 conferences. At the latter one, in 1959, Tange discussed his developing interests in the future city, such as his proposal for expanding Tokyo into a harbor. He also presented two theoretical projects by the architect Kiyonori Kikutake: the Tower-shaped City and Kikutake's own home, the Sky House.[50] This was the first time Metabolist movement was introduced

internationally. Just like Team 10's "human association" notions, Metabolism was also exploring new languages and concepts in urban design.[51] After the CIAM'59 congress, Tange was invited by Massachusetts Institute of Technology (MIT) to be a visiting professor for the fifth year studio in 1959-60. At MIT, "liberated from daily chores," Tange writes, he develops ides on "growth and change" and "integrating urban communications spaces with architecture."[52] During those four months, Metabolists megastructural approach was tentatively tested by students from Kenzō Tange's MIT studio through the project – "a community for 25,000," in which Tange tries to produce architecture that mediates between the human scale and the new, non-human scale of modern urban infrastructure (the design will reemerge a year later in his Plan for Tokyo 1960).[53] It is considered by Maki as a prototype for the Megaform, resonating Maki's premise of concerning organic growth.

This proposal for 25,000 habitats, along with the "Tokyo Bay Plan" (1960), was presented by Tange at the WoDeCo at Tokyo in 1960. This event was well attended by leading architects around the world, such as the Smithsons and Louis Kahn.[54] Through Tange and Sakakura, Maki became a young assistant (interpreter) of the WoDeCo during his temporary visit to Japan. The group's

thoughts and proposals were included in their manifesto *Metabolism: The Proposals for New Urbanism* published at the conference. This manifesto consists of four essays entitled: Ocean City, Space City, Towards Group Form (later included in Maki's book) and Material and Man, as well as a series of utopian design proposals that could be built on megastructures incorporating the notion of organic biological growth.

After Maki's participation in the WoDeCo, he distanced himself from other Metabolism members by concerning with "organic urban growth and linkage" more than "master planning" and with "the outside world" more than "(only) improving the conditions of Japan."[55] This fundamental difference in Maki's advocacies suggested the incoherence in the Metabolism group, which is interpreted by Koolhaas as a suggestion of the group's "fluid", "changeable", and "metabolic" nature.

Both the Japanese Metabolists and Europan Team 10 inspired Maki to rethink the approach to urban design as posited by the CIAM modernist approach, however, ultimately his own approaches were also shaped by the search for forms more fitted to the changing urban context of the post-war American city.

Decline of the American City

As is mentioned earlier, during Maki's "formative years" (from late 1950s to 1965), there had been uprising debates over the modernistic functional design approaches. American urban planners and academies had very little discussion about urban theories prior to this time. Behind all the responses towards modernism, the change in the American cities after the World War II was apparently a major push to critiques of modernism.

While Maki was studying and teaching in American architectural schools from 1952 to 1965, he witnessed the early sign of the decline in American cities owing to a series of external pressures, which had little to do with architecture: the size of the country, the reliance on automobile, the land statutes and the racial and economic divisions. By the end of the 1940s, all-white suburbs emerged increasingly, leaving aging urban centers congested with nonwhites who were not allowed to move to suburbs.[56] Such urban sprawling made many architectural and planning approaches, which was favored in Europe and followed in the America, hardly applicable in American cities. With the support from President Truman concerning both urban real estate values and urban minorities, the Congress passed 1949 Housing Act which made federal funds available for cities to clear and redevelop large central areas with

high-density housing.[57] Besides the vast spreading single-family-house suburban developments, political power-brokers started to build massive public housing urban clearance project, usually with very limited architectural input. The form of the redevelopment of the city centers usually present a CIAM-like or Corbusian appearance, with multiple high-rise towers organized repetitively in rows, occupying giant super blocks merged from many existing city parcels.

One of the most famous examples of such urban renewal efforts was the Pruitt–Igoe urban housing project in downtown St. Louis. It was first occupied in 1954 but soon proved to be a big failure in the following decade. The complex was designed by architect Minoru Yamasaki under supervision and constraints imposed by the federal Public Housing Authority. In 1951, an issue of *Architectural Forum* titled "Slum Surgery in St. Louis" praised Yamasaki's original proposal as "the best high apartment" of the year.[58] Its overall density was set at a moderate level of 50 units per acre and according to the planning principles of Le Corbusier and the CIAM, residents were raised up to 11 floors above ground in order to save the grounds and ground floor space for communal activity.[59] At one point, there were lectures on this project at Washington University and students were visiting this giant block of vertical

neighborhood as a manifesto of modernism. The Pruitt–Igoe homes were believed to be a breakthrough in urban renewal.[60] However, owing to poor building quality and maintenance, racial segregation and many other complex factors, by the end of 1960s Pruitt–Igoe had become nearly abandoned and had deteriorated into a decaying, dangerous, crime-infested neighborhood.[61] In 1968, the federal Department of Housing began encouraging the remaining residents to leave Pruitt–Igoe.[62] In December 1971, state and federal authorities agreed to demolish two of the Pruitt–Igoe buildings, hoping that a gradual reduction in population and building density could improve the situation. In 1972, two test demolitions were carried out with explosions, following which the remainder of the blocks were imploded within the next three years as the government scrapped the rehabilitation plans.[63] By 1976, the whole neighborhood was officially cleared with the demolition of the last block.

The Pruitt–Igoe housing project was one of the first demolitions of modernist architecture; postmodern architectural historian Charles Jencks called its destruction "the day Modern architecture died."[64] Pruitt–Igoe has been often used as an example of modernists' intentions running contrary to real-world social development;[65] meanwhile, other critics argue that location, population

density, cost constraints, and even specific number of floors were imposed by the federal and state authorities and therefore its failure cannot be attributed entirely to architectural factors.[66] The failure of this scheme triggered the architects to search for solutions to urban problems for decades afterward and urban renewal projects had become a significant part of the academic discussions.

Despite the failure of such early urban renewal efforts, it was during the years of Pruitt–Igoe's rising that Sert had become the distinguished precursor who largely promoted urban design discussions at GSD since early 1950s, focusing on the future of the city centers rather than the suburban sprawl. Shortly after GSD, Maki and his colleague Roger Montgomery began to experiment urban renewal designs in the architectural studios at Washington University since 1956. Sert's, Maki's and Montgomery's initial optimism towards the American cities led to the two earliest Urban Design degrees in the U.S. academic world: Sert founded Master of Urban Design (MUD) degree at Harvard GSD in 1960, while Maki and Montgomery established Master of Architecture and Urban Design (MAUD) program at Washington University School of Architecture in 1961. By then, their focus in studio teaching had been and would continue to be explorations in city design with the purpose of testing solutions to realistic

urban renewal projects.

Josep Lluís Sert and History of Urban Design

Maki's intense exposure to Western influence under Sert's deanship at GSD apparently has contributed greatly to what distinguishes Maki from his Japanese architect peers. While studying and working with Sert, Maki witnessed the uprising of urban design in the architectural academic world.

In 1952, Maki left Tange's laboratory and went to the United States for further study in architecture. After studying at Cranbrook Academy for one year (after the death of Eliel Saarinen), Maki went to pursue master's degree at Graduate School of Design at Harvard University in 1953, just when Josep Lluís Sert became the new dean of the school while also assuming duties from Walter Gropius as Chairman of the Architecture Department and director of the Master's Degree design studio.[67] That year was the first time Sert used the term "urban design" to describe a new discipline during a lecture to the A.I.A in Washington D.C.[68] It was a start of Sert's efforts towards officially establishing Urban Design as a degree program seven years later. It was also when Maki started the long-term cherished friendship with Sert.

As an architect with Spanish background, Sert had worked in Le Corbusier's atelier in 1929 and had served as president of CIAM from 1947 (until 1956). During the decade of Sert's deanship at GSD, he managed to bring his international connections into Harvard by inviting visiting architects and scholars, which made the school "a point of contact between foreign (primarily European) architects and American architectural education."[69]

It was under such international atmosphere, Maki became one the sixteen students in Sert's first class. The first design studio was a project for Harvard faculty housing on a site just northeast of Campus, in which Maki produced a scheme that combined a single high-rise slab with low-rise courtyard houses.[70] He was receiving direct instructions from Sert during every Tuesdays' and Fridays' individual desk critiques.[71] As Maki recalled, Sert's studio was set up based on an urbanism that was humane and contextual: "the given problems were always for actual sites, and he placed great importance on key design issues such as adapting buildings to surrounding conditions; exterior spaces created by architecture; clarity of planning; appropriate scale to accommodate the ebb and flow of human movement; sectional development of space and the introduction of natural light; and rhythm and variety in fenestration."[72] In Sert's critiques, sensitivity towards humanistic spatial experience was always

much more valued and stressed rather than the functionalism espoused by Gropius.

Beyond the academic contact with Sert, in 1954 Maki got the chance to work at Sert's office at New York City, where Maki participated in more projects with humanist and urbanist philosophy. He joined the schematic design for the American embassy complex in Baghdad, which would become Sert's first real architectural project since his arrival in America.[73] It was also an urban project involving multiple programs such as ambassador's residence, staff quarters, a chancellery and supplemental facilities, integrating water management strategies on site. Close to the end of Maki's practice in Sert's office, he attended the first Urban Design Conference at Harvard, organized by Sert in 1956 and participated by numerous American practitioners and design educators (including some CIAM members). This conference left Maki a deep impression that "a new movement in urbanism was beginning in the United States" and "something new was about to be born."[74]

This "newborn" would be the establishment of Urban Design as an official discipline in 1960. It was at Harvard GSD in the early 1950s that "urban design" was both introduced to the general public by Sert and Giedion and

then codified, promoted, and used as the basis of a professional educational program there.[75] What was essential in Sert's planning theories was his faith in the urban centers: he believed that architects should take on the challenges of reorganizing the urban centers with improved housing, infrastructural and recreational conditions. (Some of this focus is urban centrality derived from Le Corbusier also.) This faith of revaluing urban centers remained his premise throughout his efforts in advancing "urban design." At the First Havard Urban Design Conference, the central argument was that "after a period of rapid growth and suburban sprawl, the centralized city should remain a key element of American culture."[76] The speakers at the conference, including György Kepes, Lloyd Rodwin, Jane Jacobs, Edward Bacon, Victor Gruen, etc., presented progressive ideas influential on city theories for the following decades (although not all of them were in agreement with each other). All the ideas were codified at GSD and some were incorporated by Sert into studio teaching.

After this conference, the efforts to promote urban design were continued at Harvard. In 1957, a search for definitions of urban design was initiated and the answers received were published in the GSD student journal, *Synthesis*. At the same year, Sert organized the Second Harvard Urban Design Conference,

followed by the third Conference in 1959. Finally, under Sert's deanship, the first Master of Urban Design program in the U.S. was established in 1960. Although by that time, the program had started to shift away from real-world complications and the inability of Sert and other GSD faculty to influence the direction of American urbanization was evident, it was still a high point of Serts contribution to urban design education.[77]

Moreover, it is worth mentioning that Maki encountered György Kepes at the first Harvard Urban Design Conference, when György Kepes presented his Rockefeller Foundation funded research on the "Perceptual Form of the City," conducted with Kevin Lynch at MIT and later published as Lynch's *The Image of the City*.[78] The focus of the study was on the human perception of our relationships to the physical world. This discussion was continued at the second Conference, when György Kepes and Lynch together pointed out that a good urban environment should be "coherent and connected" while it should also be growth-facilitating.[79] This is an idea listed as a critical reference, highly appreciated and well interpreted in Maki's writings on collective form.[80]

Maki's Years at Washington University

Shortly after Sert's founding of MUD degree at Harvard GSD, it was students from the 1950s of GSD, Maki and Roger Montgomery, who co-founded the first Master of Architecture and Urban Design (MAUD) program at Washington University in 1961. Their arrival at Washington University was largely owing to the deanship of Joseph Passonneau.

In September 1955, Buford Pickens, Dean of Washington University School of Architecture, invited Joseph Passonneau to be a visiting professor to teach Fifth Year Design Studio. By September of 1956, Passonneau had been officially tenured as the new Dean of School of Architecture by Chancellor Ethan A.H. Shepley. The first effort of this new dean was to assemble a faculty before the 1956 new school year's start. As a graduate from Harvard GSD 1949, Passonneau received a call from Hideo Sasaki, who was his former classmate and then chairman of landscape architecture in the Harvard GSD, recommending Sasaki's student Fumihiko Maki. Meanwhile, in Spring 1956, Maki was informed by Paul Rudolph that Washington University was searching for new faculty. This was how Maki got an interview with Passonneau and became a new instructor in architecture at Washington University. During a visit to GSD, Passonneau met Roger Montgomery in the

drafting room and offered him a position upon his graduation. In addition, Passonneau invited local architects George Anselevicius to be an assistant professor. (He was a graduate of the Chicago Institute of Design, led by mostly Moholy Nagy until his death in 1946, and then to 1951 by Serge Chermayeff.) Thus, Passonneau, Maki (left in 1962), Montgomery, Anselevicius and Leslie Laskey (who was also a Chicago Institute of Design graduate and was hired by the previous dean), became the heart of the school for more than a decade.[81]

This was a start for Passonneau to reshape the school. The first major shift was in 1957, when an optional four-year undergraduate program was introduced, leading to the Bachelor of Arts in Architecture degree, or with two additional graduate years leading to the degree in Master of Architecture.[82] As the first "4+2" program in the U.S. - now the norm for architectural education – it was introduced at Washington University ten to fifteen years before other U.S. schools. When in 1963 the B.S in Architecture and B.Arch. degrees were eliminated, the undergraduate level of the school had become a department in the College of Arts and Science, where all undergraduate students followed the common studies program and received the B.A. degree, while all the architectural undergraduate courses became open for students outside the

School of Architecture.[83] This six-year program was highly appreciated by the national program of re-evaluating architectural education, financed by the American Institute of Architects, recommending that all schools of architecture adopt the Washington University program.[84]

Another major accomplishment was the founding of Master of Architecture and Urban Design program at Washington University. The 1960s were an era when design studios in architecture schools began to focus on urban issues and solutions, responding to the postwar changes in American cities. As Maki recalled, the relationship between city and architecture had become the emphasis in studios at Washington University: "we gradually began to emphasize the need to approach design from the context of the given site or the surrounding urban condition rather than considering buildings to be autonomous objects."[85] Eventually, with Montgomery's and Maki's efforts in developing curricula and defining a new program, in 1961, the first MAUD class was underway with ten students, most of whom were from countries outside the U.S., such as Denmark, Austria, India, Japan (for information on the students: see Appendix A, Eric Pettersson's and Ralph Insinger's interview responses). The students were encouraged to take on a broader range of reality and ideas to explore various possibilities in the architectural and urban

world.[86] This had been the focus in the fourth-year studio which Montgomery and Maki co-taught, and will continue to underlie their teaching in the following years' studios and other supportive seminars. Meanwhile, with Maki being the director, the first Urban Design Conference at Washington University was held in Janurary, 1962, inviting educators from various schools to share experiences in teaching urban design issues, as well as to discuss and discover new pedagogical objectives and methodology underlie urban design.

The years under Passonneau's deanship was considered as a "golden period" of the School of Architecture at Washington University. (This is confirmed by Robert Vickery, a student in the late 1950s and a faculty in the 1960s, and Cynthia Weese, a student in the early 1960s.) Within the school, he was making sure that the students were aware of the architectural world around the school in St. Louis and beyond. Meanwhile, he was assembling a young, international team of design instructors for the students, inviting visiting critics from all around the world, including Team 10 members, Kenzō Tange, etc.[87] (Passonneau recalled that every year he returned to GSD and spoke with Eduard Sekler about who to invite as visitors, such as the source of van Eyck, et al.) With his leadership, the School of Architecture gradually became known to the rest of the nation as well as the international architectural community.[88]

In conclusion, Maki's formative-year interaction with the influential Eastern and Western architects in Japan, U.S. and Europe had played fundamental roles in shaping his distinctive characteristics in his career. Maki can be considered as the product of the key moment in modern architectural world, when architects challenged early functionalistic design methodology in favor of humanistic associations and explored their role in reshaping cities. With the inspirations from his academic experience, international travels as well as from his Eastern and Western peer architects, Maki eventually concluded his explorations of architectural and urban design into his book *Investigations in Collective Form (1964).*

Chapter Three. Analyzing *Investigations in Collective Form*

With the understanding of Maki's formative-year experiences, the discussion will move on to the analysis of *Investigations in Collective Form*, as well as its analogies to other parallel ideas. The philosophy underlying Maki's collective form theory will be demonstrated by examining his later practices.

Introduction of *Investigations in Collective Form* (1964)

From 1958 to 1960, it was one of the most memorable periods in Maki's life, when he spent two years on the Graham Foundation Fellowship, retracing philosopher Tetsurō Watsuji's (1889-1960) steps recorded in his book *Fudō*. Through his journey, Watsuji observed and compared civilization of three regions, travelling from Japan to Europe and experiencing in succession the monsoon region of Asia, the desert region of the Middle East, and the meadowlands of Europe.[89] Maki was so impressed and inspired by Watsuji's book that he decided to make two long trips in 1959 and 1960 to Southeast Asia, India, the Middle East, and Europe to study cities and their formation in a number of different climates and cultures.[90] He visited not only ancient architecture, but also contemporary buildings, especially those by Le Corbusier at Chandigarh (Maki met Le Corbusier while visiting the site at Chandigarh), as well as vernacular settlements in the Mediterranean region.

The thrill Maki felt for the Middle East and Mediterranean communities eventually anchored his thoughts on group form. In the fall of 1960, when Maki went back to teach at Washington University after the two-year journey, he wrote an essay on three paradigms of collective form based on his notes of travelling, which eventually was developed into the booklet *Investigations in Collective Form*, published by Washington University in 1964 and reissued in 2004.

Three Paradigms

In the first section of the book, Maki presented and illustrated three paradigms, which are compositional from, megaform and group form. (Fig.1,2,3) The definition and examples of compositional form imply its Corbusian (or early-CIAM-project) nature, while those of the megaform represent the Metabolists' design approach. As for the group form, as is mentioned above, it is developed from Maki's impression from the trip. In Maki's vision, these three patterns or modes "are not mutually exclusive but can coexist in one configuration; they define the three basic relationships that always exist between individual elements and the whole."[91]

Compositional Form

Firstly, Maki introduces the compositional form as a "commonly accepted and practiced concept in the past and at present."[92] He indicates that the elements are often individually tailored buildings preconceived and predetermined separately; more importantly, "proper functional, visual, and spatial relationship would be established on a two-dimension plane."[93] Maki is careful at addressing critique on compositional form by "letting it stand on its merit," since it represents many existing projects.[94] Nevertheless, he argues that the act of making a composition can be considered as "a natural extension of the architectural approach" and "has a tendency to complete a formal statement."[95] This tendency of completion comes from the nature behind this approach: it is based on planar arrangements of given components and is a static process. One example of this form would be Brasilia by Oscar Niemeyer and Lucio Costa, designed according to CIAM's *Athens Charter*. Another example would be one of his destinations during his Graham Foundation-sponsored trip - Le Corbusier's design for Chandigarh Government Center. Through examining this plan, one could further understand the characters and possible limitations of compositional form as a design approach.

The Chandigarh's original general plan by Le Corbusier reflects his notion of dividing the functions of urban life through an anthropomorphic approach. (Fig. 2) At the end of the city's main axes – the "arteries," located the "head" of the city, which is "the Capitol" or the Government Center.[96] The original Capitol complex consists of four major buildings as well as some free-standing monuments. Their essential geometrical disposition on the plan is formed under a typical compositional approach, emphasizing the Capitol's prestige and monumentality.[97] In Klaus-Peter Gast's analysis of the buildings' disposition, he suggests that "the parts are not only brought together as a composition that expresses the relations of the individual figures to each other and to the whole, but moreover the individual buildings remain in positions that are clearly isolated and almost independent;" Gast further argues that "self-representation is the aim here, as Le Corbusier wants to rank each building as an independent sculpture, needing to stand freely as an individual."[98] This echoes Maki's critique of compositional form in which "individually tailored buildings are preconceived and predetermined separately" while their relationships are "established on a two-dimension plane."[99]

Francesco Venezia argues for the plan of the Capitol by revealing the “inner order”, which is the rhythm “proportional to the lines and axes” concealed behind the two-dimensional disposition.[100] However, in the Capitol, there is enormous distance between the buildings, leaving wide open space to present each building as “powerful and monumental work of art.”[101] Thus, it is difficult to understand this coherence between solitary buildings on site. Moreover, owing to the fact that some buildings planned by Le Corbusier were never built, his incomplete composition makes the space even emptier, which considerably devastated the overall coherence. That is to say, in the compositional approach, every individual element could play decisive role in achieving what Maki calls the “complete formal statement.”[102] Meanwhile, the exterior space between individual elements is also crucial for achieving the holistic form. This character of compositional form could eventually inhibit the success of its realization.

Nevertheless, the plan of the Capitol is based on an “ordering frame,” which is “a broad, square field, identified by tall, slender obelisks.”[103] Although Le Corbusier suggested his intention to extend the plan by opening the connection on one side of the square, he limits the borders of future extension within a predetermined measurement to maintain the overall proportional and

geometrical order. This notion reflects another limit of compositional form: to maintain the overall coherent form, the future development of its elements will need to obey the criteria prescribed by the initial disposition. Therefore, the autonomy of the elements is highly constrained by the inherent rigidity in compositional approach.

As Maki indicated, compositional form is a historical design approach, which should stand on its own merits. The static nature underlying this form would present contrast to the following two forms which are both based on more organic understanding of growth.

Megastructure (Mega-form)

The second paradigm Maki introduces in *Investigations in Collective Form* is the megastructure. The publication of this book coined the word in 1964. Maki defined it as "a large frame in which all the functions of a city or part of a city are housed," and indicated that it is made possible by technological innovation.[104] This approach's origin can be associated to the World Design Conference held in Tokyo in 1960, which sought to solve the massive urbanization of Japan. As a member of the Metabolism group, Maki drew examples from other Metabolists, such as Kenzō Tange's "A Community for

25,000" with MIT students and "An Agricultural City" by Kisho Kurokawa. Ever since this methodology's emergence in the 1950s, it left significant influence on the urban design world, owing to the demand of massive scale expansion in modern cities. The influence of this methodology can be demonstrated by Reyner Banhan's book *Megastructure: Urban Futures of the Recent Past (1976)*, which presented hundreds of built and unbuilt projects that incorporated this form.

The 1960 World Design Conference was an inspiring event to Maki. During the conference seminars, Louis I. Kahn delivered a speech on "Form and Design," with Maki interpreting. Kahn's speech on "form" and "design" was resonated by Maki in his interpretation of "form" and "system." Maki quotes: "There is need to distinguish 'form' from 'design.' Form implies what a building, be it a church, school, or house, would like to be, whereas the design is the circumstantial act evolving from this basic form, depending on site condition, budget limitation or client's idea, etc."[105] He further explains Kahn's proposition by stating: "As soon as a form is invented, it becomes the property of society… A design, on the other, belongs to its designer."[106] In Maki's interpretation, a form is a collective act while design is an individual activity. Therefore, form becomes an internal order that coordinates the

design.[107] Maki then criticized the invention of geometry, insisting that "geometry is only a tool" and that form should "derive from environmental needs."[108] This statement implies Maki's critical attitude towards a compositional approach.

Also inspiring was Maki's encountering other Metabolists at the Conference, who led to many future implications for Maki's work. One influential concept shared by the Metabolists is the "metabolic cycle," which conceives the urban development as an organic process, accommodating growth in contemporary urban environment.[109] Hence, the Metabolists indicated two kinds of "metabolic cycles" – the ones with long-term and short-term lifespans. Long-term life cycles includes large scale urban infrastructure and projects altering natural topography, such as dams, harbors, and highways; while short-term life cycles involves small-scale constructions, such as houses and shops.[110] This understanding of life cycles in the built environment is often reflected in the Metabolist's projects with a "combination of a megastructure and numerous individual cells."[111] Beyond the recognition of life cycles, this combination also represents the Metabolist's concern about the relationship between the collective and the individual. This proposition is resonated in Maki's interpretation of Kahn's concepts of "form" and "design," viewing it as

a collective act versus an individual one. It is also evident in Maki's proposal for the Shinjuku plan. Around 1960, many prominent architects and politicians were discussing the development of large tracts of land to the west of Shinjuku Station, formerly occupied by a water purification plant.[112] Concurrent with their essay, Maki and Ōtaka made a joint urban design proposal for West Shinjuku as a demonstration of the idea of group form on top of the artificial ground. Maki pointed out that "the deck itself reflected Ōtaka's interests while the group of offices and entertainment facilities rising from that deck reflected my interest."[113] Different from the actual forms of villages seen during Maki's journey, this proposal sought to confirm in more abstract terms the notion of an urban order based on a collection of elements.[114] Maki confirmed the Utopian nature within this proposal, in which elements are built on enormous artificial ground spanning over railroad tracks, serving as a "permanent" platform for small-scale growth, such as commercial, business and entertainment clusters, in the manner of group form. This megastructural plane functions as a long-term basic frame supporting elements with various life cycles.

Another important concept shared by the Metabolists is the "artificial land." This concept first appeared in Le Corbusier's sketches for Rio de Janeiro, São

Paulo, and Montevideo from his travels in South America in 1929.[115] In 1931, he articulated this concept in “Plan Obus,” where a massive multilevel structure would provide artificial lands for 180,000 dwelling units and an interior elevated highway.[116] Within this megastructure, Le Corbusier left enough space for each inhabitant to allow highly personalized individual living space. This proposal later became a direct model for many Metabolist projects. While the Metabolists were seeking a solution for the “conflict between mass production and standardization in modern society, and the social values of freedom and democracy;” their goal was to maximize the freedom of individual creation to avoid homogeneous development.[117] This proposition was often achieved through the concept of “artificial land” to revert the land to its natural state and allow a new relationship between human and nature with more freedom.[118]

Among the Metabolists’ megastructural examples raised by Maki, “artificial land” is explicitly presented in Kurokawa’s Agricultural City, where an enormous concrete lattice, or a network of lines, is elevated over natural terrain serving as the new ground for a whole community. (Fig. 3) Also, the megastructural plane in Maki’s Shinjuki Plan is in the similar form and share almost the same purpose. (Fig. 4) Another representative would be Tange’s

studio project at MIT - “A community for 25,000.” It was a residential super-scale city, planned for 25,000 inhabitants and constructed on the water of Boston Bay.[119] (Fig. 5) While at MIT, Tange “liberated from daily chores” and developed interests in “growth and change” and “integrating urban communications spaces with architecture.”[120] In this studio, Tange expressed a desire to encourage more human-scale connections to super-scale cities, interpreting the natural metabolism in growing trees and applying to social growth in the community. He considered the idea of "major" and "minor" city structure and how this could grow in cycles as the trunk and leaves of a tree. Among the seven projects produced by the students, the scheme by Pillorge, Halady, Niederman, and Solomons was a perfect example of his vision. In this proposal, numerous rapidly changeable functional units are attached to two grandiose major frameworks which are both triangular in section. The concept of “artificial land” is interpreted as “multi-level ground” characterized by multi-level concrete platforms supported by those two gigantic triangulated space frames.[121] Among the units, the platforms would provide sufficient room for public facilities and private space. These spaces were left open functioning as community centers; additionally, at every third level rows of family houses were bridged by pedestrian walkways. Transportation infrastructure was integrated into the two spines: lateral movement was

provided by motorways and monorail, while vertical movement from the parking areas was facilitated by elevators. Tange claimed that this structure could "enable the residents to identify themselves with their location within the over-all system."[122] Moreover, viewing from the concept of "artificial land," what echoes in the Metabolists' projects was the "notion of separating private and public developments and making this separation formally recognizable."[123] For example, in Maki and Ōtaka's proposal for the Shinjuku plan in 1960, this similarity is obvious. The enormous spanning slab is an artificial landscape with public facilities housed underneath and private establishments growing on top. The private developments appear in various architectural forms, indicating the allowance for creation based on individual tastes. These Metabolists' projects were referred by Alison Smithson as the "mat-building," which "can be said to epitomize the anonymous collectives; … based on interconnection, close-knit patterns of association, and possibility for growth, diminution, and change."[124] Such concept of "mat-building" was later reinvestigated in Hashim Sarkis's *Le Corbusier Venice Hospital and the Mat Building Revival* (2002).

Despite megastructural features in Maki's theoretical proposals around 1960, he started to distant himself from other Metabolists soon after the WoDeCo.

While recognizing megastructure's "great promise" for environmental engineering, multi-functional complex and infrastructure, Maki pointed out the "certain static nature" inherent in the megastructural approach.[125] He started debating on megastructure as a planning method, criticizing its rigidity and monumentality, which are also critical in the nature of compositional form. Despite Metabolists' concerns on organic growth, Maki remarked on its deficiency, that is: "even though a megastructure allowed for changeable infill, the main structure itself could become obsolete and lead to the failure of the entire system."[126] Therefore, as a more flexible alternative for the previous two forms, Maki proposed what he believes to be more organic and promising pattern - the group form.

Group Form

Maki's distance from the other Metabolists can be seen in the following interpretation by Koolhaas: "Maki, a fan of Paul Klee, is more interested in lines, spaces, and relations than in defining shapes. Refusing to assert overall control in the mode of the traditional architect, he instead acts as a technical choreographer of movements, elements, and potential…"[127] During the World Design Conference in Tokyo, Maki, co-author with Ōtaka, wrote the essay "Towards Group Form," which was published in the group's founding

manifesto, *Metabolism: The Proposals for New Urbanism (1960)*.[128] In this essay, instead of a static and rigid physical structure, Maki calls for "a more subtle internal order that underlay the natural evolution of cities."[129] He insisted that "a real urban order should accommodate certain degrees of disorder and encourage spontaneity provided an alternative interpretation of 'city as process' to the megastructural approach."[130] This ideal form is "a kind of master form which can move into ever new states of equilibrium and yet maintain visual consistency and a sense of containing order in the long run."[131] This master form is the group form.

As Maki recalled fifty years after proposing collective form, he pointed out two things let to his conception of group form. The first is his impression gathered from his two-year travelling (1958-1960), supported by the Graham fellowship. The second was the decision of writing for Metabolism's manifesto for the WoDeCo in 1960, which allowed Maki to consolidate what he had studied up to that point. Since two years before the WoDeCo, Maki headed west from Japan to Chandigarh, India; Isfahan, Iran; Damascus, Syria; Beirut, Lebanon; Cairo, Egypt; and Istanbul, Turkey. From there, Maki visited Greece and the rest of Europe. He named this experience a veritable "Journey to the West."[132] During the trip Maki encountered "communities of houses

built with walls of sun-dried brick and tiled roofs, of the kind that are scattered along the Mediterranean coast in countless numbers."[133] Also, while travelling he was inspired by a variety of vernacular human settlements and was particularly impressed by their "repetitive patterns and the intricate order" within the grouping of buildings.[134] The image of various traditional villages triggered Maki's proposal of group form. In his writing, Maki cited European medieval cities, Greek island towns, North African villages, and sixteenth-century Dutch towns as examples of group form.[135]

Town of Hydra, Greece

One of such traditional settlements frequently mentioned by Maki is Hydra, Greece. (Fig. 6) Its overall urban form is sustained by the quality of its component parts. In Constantine E. Michaelides' study of Hydra in 1967 (completed when he was teaching as Washington University), he explains:

> The form of the town emerges as the sum of its complementary parts: the structuring armature is informed by the organization of the typical house, the interrelation of clusters of houses, the formation of streets and paths, the generation and containment of public spaces, and the way in which streets are paved, windows framed, stones laid, doors painted, color used, and so on. In other

> words, Hydra is an organic whole none of whose parts could be removed without diminishing the whole.[136]

Michaelides also suggests that the town of Hydra was "evolved within a physical frame of reference well understood by its citizens."[137] Within this "frame of reference," each resident is an individual builder who plays the role of a parameter, intuitively following and fitting into the Aegean traditions. Thus, the sum of these parameters will also respond intuitively to future.

When recalling his visit to Hydra, Maki commented: "it was a dramatic experience to see the entire town made of these solids as 'genetic forms' along the contours of the hills."[138] He also noticed that "the community, the collective form, was composed of quite simple spatial elements such as rooms arranged around a small courtyard," which conveyed "an expression of regional culture."[139] Fifty years after visiting these natural group form, Maki reiterated what had fascinated him in Hydra:

> Surviving for hundreds of years, their ordered, overall images have passed the test of time, both socially and physically. In them, people continue to lead lives that, from a spatial perspective, are rich and vibrant. Individual buildings in a village are not luxurious, but a type exists. For example, the box-shaped

> buildings on the Greek island usually have a corner courtyard, and their main rooms are usually arranged facing hat courtyard. Buildings are ingeniously connected to one another to create a small community, and communities are connected to one another to create a town.[140]

Maki further stated that what he learnt from Hydra was the relationship between parts and the whole. From Maki's observation, this relationship is not a rigid hierarchy but a loose connection, which allows such settlements to survive for hundreds of years. In addition, it is an intriguing system because of the way the whole persists - even when individual houses are destroyed and replaced by other similar houses. Such parts and whole relationship has eventually become essential to what Maki is pursuing in his teaching and practice.

Group Form's Dynamics

Compared to the other two types of collective form, one could argue that group form parallels the structuralist approach of adding dynamic individual elements to create a cluster, in which individual elements can change without altering the overall urban image.[141] The advocacy of group form reflected Maki's respect on the regional culture and natural order. He looked into the

relationship between Japanese vernacular villages and the houses in the villages to reveal the inherent order in each element of the group. Maki called such order “a system of generative elements in space,” emphasizing the key role of individual elements, rather than a major structure.[142] It is important to understand the reciprocal relationship, both in form and in operation, between the individuals and the whole in a group form. The individual units are defined as a prototype, which determines the character of the ensemble at large.[143] Once the link between the elements and the whole is established, each unit will have the freedom to evolve autonomously. But the characteristics of the whole group remain consistent. This inherent dynamics is a unique quality, distinguishing group form from the other two collective forms. Compared to compositional form and megastructure, a rigid dominating overall structure is absent in group form; also, the whole process is more dynamic with high autonomy of the components. This cumulative growth is a non-hierarchical process. Maki restated the significance of group form by insisting that “in an organic form such as a city, an urban order can only be maintained if the autonomy of individual buildings and districts is assured.”[144]

To further distinguish from the other two collective forms, the temporal dynamics was emphasized in group form. Maki indicated that group form “can

move into ever-new states of equilibrium and yet maintain visual consistency and a sense of continuing order in the long run," because its image "derives from a dynamic equilibrium of generative elements, not a composition of stylized and finished object."[145] In a temporal dimension, although the inherent order and its linkage to the whole should maintain its consistency, the form of the each element is allowed to alter to fit into its changing context. The overall group form should be maintained as an open-ended process accompanied by continuous evolution. This notion of "sequential group form" is derived from "ways of thought that embraced the incomplete, the unpredictable and the transient," and it "suggested ways by which the current urban condition, with its demands and complexities, might well be addressed."[146] That is to say, group form could be highly effective in achieving sustainable and flexible social structure, accommodating the unpredictable and rapid changes underlying contemporary society.

Group Form and Humanistic Association

Maki's inspiration from vernacular settlements reflected his humanistic and social concerns, which was paralleled by many Team 10 members. For instance, Aldo van Eyck (also a Dutch Structuralist) studied Dogon dwelling forms in Mali in Africa, seeking to transform such vernacular ordering into

contemporary urbanism. Through the reciprocal relationship between "part and whole, small and large, and house and city," van Eyck developed his theory of a "configurative discipline."[147] Drawing upon the structuralism of Claude Levi-Strauss, which emphasized the universal and unchanging patterns of human thought, van Eyck in the 1950s brought together these disparate influences in subtle, geometrically based designs for playgrounds began in the late 1940 (over 60 in 1950s and reached 750 by 1970) and schools and most famously in his masterful orphanage in Amsterdam (1955-60). This last work is a carefully arranged, open-ended, yet supremely geometric solution to the problem of housing 125 children. The individual play and living areas are broken down into spatially autonomous (shallow domed, inspired by a kava bowl from the Fiji Islands or mosques in North American cities) and small-scale units and speak to his insistence on "place" and "occasion" over and above the failed abstractions of "space" and "time."[148] In this project, van Eyck was also concerned with the part-whole relationship underlying the collection of repetitive elements from a humanistic point of view, as he stated: "I hope that in its final form the architectural reciprocity of unity-diversity and part-whole (closely linked dual phenomena) to some extent cover the human reciprocity of individual-collective."[149] Moreover, echoing Maki's interests in the linkage between the elements as well as between the parts and the whole,

van Eyck promoted the importance of “in-between places” in reconciling the “dual phenomena;” he argued: “I tried to articulate the transition by means of defined in-between places which induce simultaneous awareness of what is significant on either side. An in-between place in this sense provides the common ground where conflicting polarities can again become dual phenomena.”[150]

The work of van Eyck reflected his concern for local anthropology and urban environment, which was also evident in Bakema’s work and design philosophies. For instance, in his studio project (1959-1960) at Washington University *The Humane Core; A Civic Center for St. Louis, Mo* (1961), Bakema stressed heavily on creating humane spaces within urban complexes, promoting easy access for pedestrians in the urban center of St. Louis. In his students’ design proposals, the major traffic connections to the city core were enriched by various human-scaled and pedestrian-friendly transitional spaces. (Fig. 7) Furthermore, Giancarlo de Carlo showed his respect for locale in his design for the college and student dormitories at Urbino (1962-65) and in his master plan for Urbino (1966). In the first case, the large housing block has been divided into smaller components, and its smaller cells are more sensitively and comfortably integrated into the beautiful sloping landscape.

(Fig. 8) In the second case, the historic core of the town has been fully honored and protected.[151] Last but not least, another Team 10 participant, Bernard Rudofsky, exhibited a collection of architecture "Architecture without Architects" at the Museum of Modern Art resulted from “spontaneous construction of individuals sharing a common heritage, culture, and everyday life.”[152]

Beyond the Team 10’s attention in traditional settlements, similar investigations in vernacular architecture were also conducted in Japan. In the early 1960s, a University of Tokyo research team led by Teiji Itō and Arata Isozaki conducted an extensive survey of Japanese traditional towns.[153] The results of their research presented a number of case studies of Japanese traditional village and urban spaces, published in Japanese magazine *Kenchiku bunka* (Architectural Culture) in 1963.[154]

Among all the parallel efforts in investigating vernacular settlements, Maki presented the unprecedented sociological intention behind the advocacy of group form. Maki expressed his attentiveness in “establishing a flexible order that would encourage fluctuation of both spatial and social organization.”[155] Rather than forming a centralized powerful relationship between the parts and

the whole, Maki embraced the long-lasting dynamics and inherent autonomy of group form, revealing the democratic implications in his ideology.

Maki's democratic propositions with evident humanistic concerns could have resulted from his experiences in North America. While engaged in the America academic world between 1953 and 1965, Maki witnessed the rise of community movements against modernist urban renewal projects with his staying at Boston, St. Louis and New York, which were the centers of the new movements.[156] Meanwhile, Maki was exposed to work of the influential urban theorists and educators, such as Jane Jacobs, Kevin Lynch, and Aldo van Eyck, whose ideas resonated in criticizing the Modernist approach towards city planning from a humanistic, populist perspective.[157] This arising awareness might have contributed to Maki's formation of his humanistic philosophy behind his studies on collective form.

Group Form and *The Image of the City*

What worth noticing is Maki's emphasis on the perceptual image of group form rather than a simple visual realization. While explaining the distinctions between "form" and "design," Maki insisted that group form was beyond the limit of geometry. No matter what shape each element maintains, the overall

form will maintain a sustainable image, which carries the character linked to the elements though the process of time, rather than a static two-dimensional patterning of solitaires. This implication resonated György Kepes and Lynch's early study at MIT - the "Perceptual Form of the City" (1954-59) – published as *The Image of the City*.

In *The Image of the City*, Lynch defines the city as "an ever changing being, moving through time with an ebb and flow of people who shape its form."[158] He emphasized his personal theoretical position through insisting that "Like a piece of architecture, the city is a construction in space, but one of vast scale."[159] This likening of the city to single architecture was echoed by Maki's "Linkage in Collective Form," in which he argued "investigation of the collective form is important because it forces us to reexamine the entire theory and vocabulary of architecture, the one of single buildings."[160] Both Lynch and Maki implied the idea of imagining the city or the urbanscape as a total form. Although the physical forms of architectural components differ from those in the urban environment, the perceptual image of the components can be highly coherent.

In addition, Lynch reflected his humanistic standpoint by stating that we are "not simply observers of this spectacle, but are ourselves a part of it, on the stage with other participants."[161] Lynch further stated the necessity of studying "the visual quality of the American city by studying the mental image of the city which is held by its citizens."[162] Echoing Lynch's proposition, Maki questioned "the meaning of the very act of design in our society" and argued for urban design as "the unity of experience" and "a means of ordering observation." He paralleled Lynch's notion by insisting that "Observation is the prime tool of the urban designer. What he can see in the city, he can refer to his own experience. Fact and observer are combined to comprehend new problems, and new three-dimensional solution."[163] In both their statements, urban inhabitants are posited as an active player in the formation of urban space; meanwhile, their perception is affected by the observation of the complete form. Maki further explained the importance of the inhabitants' perception:

> When a plethora of stimuli begins to divert us from receptive consciousness, the city renders us insensible. Then, in our inability to order experience, we suffer the city, and long for some adequate means to comprehend it as a product of men like ourselves... the city dweller [is] frustrated when he cannot find

> human order in his environment…he must feel estranged, and outside.[164]

This kind of failure restated Lynch's advocacy of studying citizens' "mental image of the city." Thus, both Lynch and Maki resonated on the same argument: the study of the inhabitants' mental image – which is the observation or the "perceptual form" of the city - is crucial to the successful realization of urban spaces.

Moreover, while acknowledging "the flexibility and adaptability of human perception," Lynch still advocates the importance of form. He suggests that "outer physical shape has an equally important role. There are environments which invite or reject attention, which facilitate or resist organization or differentiation. This is analogous to the ease or difficulty with which the adaptable human brain can memorize associated or unassociated material."[165] This notion parallels Maki's investigations in form and his adaptation of collective form in practice. In most Maki's design works, diagrams and maps, appears as a collective form, are usually generated as the start of design with a collection of linked "shapes" implying what they are inviting or rejecting and what are associated or unassociated. Then, by further defining the physical meaning of these "shapes" and solidifying their perceptual associations, the

abstract diagrams facilitate to form places and the collective form emerges into an concrete architectural scheme. Therefore, echoing Lynch's advocacy of form, Maki explores, manipulates and utilizes the formal approach in understanding and designing the physical world.

Last but not least, while discussing "imageability" of a physical environment, Lynch argues that "if it is desirable that an environment evoke rich, vivid images, it is also desirable that these images be communicable and adaptable to changing practical needs, and that there can develop new groupings, new meanings, new poetry."[166] This proposition resonates in Maki's philosophy underlying planning for future change or growth, as mentioned earlier. To demonstrate his point, Lynch used the Chinese pseudo science of geomantics as an example, which analyzes landscape influence and "deals with winds of evil that can be controlled by hills, rocks, or trees that visually seem to block dangerous gaps, and with good water spirits that are to be attracted by ponds, courses, and drains."[167] Lynch further explained this example: "the shapes of surrounding features are interpreted as symbolizing various spirits contained therein… possible interpretations are many and complex; it is an endlessly expanding field which experts are exploring in every direction."[168] From this example, Lynch draws two interesting features: "first, that it is an open-ended

analysis of the environment: new meanings, new poetry, further developments are always possible; second, it leads to the use and control of outside forms and their influences: it emphasizes that man's foresight and energy rule the universe and can change it."[169] Although based on different philosophy, interestingly, these two features - the open-ended system and inhabitants' ability to manage future growth - are also resonated and illustrated in Maki's notions of group form. The open-ended analysis of environment is further applied to his study of Boston in *Movement Systems in the City*.

The Linkage

The second section of the *Investigations in Collective Form* was an essay analyzing the linkages within and beyond the collections of elements. Maki interpreted the city as another form of architecture, through perceiving urban elements as architectural elements in a building. These elements include the wall, floor or roof, column, unit, and link. Each element's definition is expanded and enriched in the urban context. Additionally, considering each building as a structural unit of the city with various ages and lifespan, Maki proposed the necessity to have an organic linkage among the elements, as well as between each element and the whole. The city becomes "the sum total of countless events being generated simultaneously," which is "a physical place

and social system depends on the autonomy of individual elements."[170] Thus, the goal underlying the exploration of "linkage" is to address how each individual element (the building) can participate in the whole (the city). That is to say, when architects are introducing something new into the larger context or making additions to the existing, this understanding of organic linkage can ensure the new to be able to fit while respecting the rest of the city. This proposition reflects Maki's social and contextual concerns, which was resonated in Montgomery's "Sequential Theme" and was referred to as an "elemental approach" incorporated into his studio co-taught with Maki.

This approach of defining the elements of a city is again highly parallel in Lynch's *The Image of the City*. Lynch studied public image of the physical, perceptible objects in the city, concluded the contents of the city images by proposing five elements - the paths, edges, landmarks, nodes, and regions and considered them as building blocks in the process of "making firm, differentiated structures at the urban scale."[171] In addition, Lynch suggests the methodology of designing the larger whole from the elements, through giving specific characteristics to each elements (such as giving continuity to the path, differentiating the two sides of an edge, create certain homogeneity of a district, etc.) addressing city's functions and shaping the overall city form.

That is to say, similar to Maki and Montegomery, Lynch could also be considered as an advocator of designing the larger whole from the elements, influencing the whole image of the city through defining elemental characteristics and functions. Following such favor of the elemental approach in shaping the whole, Lynch further summarized the "clues" for designing the elements, which are: "1 singularity or figure-background clarity; 2 form simplicity; 3 continuity; 4 dominance; 5 clarity of joint; 6 directional differentiation; 7 visual scope; 8 motion awareness; 9 time series; 10 names and meanings."[172] This checklist could be adopted as guidance for urban designers while designing the characteristics of the individual elements. Lynch further explained the consistency from elements to the whole:

> The five elements must be considered simply as convenient empirical categories, within and around which it has been possible to group a mass of information… Having mastered their characteristics, he [the designer] will have the task of organizing a whole which will be sensed sequentially, whose parts will be perceived only in context.[173]

Based on such elemental approach, while designing the elements, there should be consistent the awareness of the whole as context, since the meanings of the

elements have all become contextual. This is also an idea proposed by Montgomery and Maki during their collaboration on studio teaching.

Golgi Structure (1968)

As an abstract demonstration of the notion of linkage, Maki proposed the Golgi structure in 1968 as a model for urban growth. (Fig. 9) The name "Golgi structure" is from the Golgi body discovered by the neurologist Camillo Golgi. These Golgi bodies involved multi-polar cells capable of relating to other cells in the system.[174] This structure concerns the encapsulation of exterior public space with biological principles. But instead of focusing on the capsule itself, as his fellow Metabolists do, Maki proposes a structure to mediate between the private space and the public space, both of which inhabitants will still desire. Meanwhile, the in-between, inside-outside spaces of the Golgi structure can facilitate "information transmission" and "allow real experience participated in by many."[175]

This model can be considered as a theoretical exploration on linkages, presenting possibilities of connecting various urban centers. Departing from this structure, Maki continued his focus on the "in-between places" as crucial linkages and began to form the city by designing its voids, that is, "its streets

and squares, then followed with the buildings, which increased in density over time."[176] The exterior spaces become the deciding force for the solids. As Maki wrote in 1967:

> The point to be made is that as volumetric density (of a building or building complex) increases, the influence of the external space on the final form of the building becomes very great… interior development tends to become a consequence of the preset exterior space, and in the process converts this preset exterior space into a kind of interiorized exterior space.[177]

Such notion echoes Sert's primary advocacies in urban centers and evoked many initial discussions brought up at the early GSD Urban Design Conferences. Later in his life, Maki expressed a similar reciprocal connection in his sketchbook, where he wrote, "exterior spaces penetrate the inside, just as exterior spaces extend outside. The boundary of a building is where the two different kinds of spaces quarrel."[178] Maki's continuing interest in designing the "in-between places" in the city had attained its most extensive expression in the Hillside Terraces, in which the housing's permeable volumes would allow high celebrations of the "in-between" spaces.

Practicing Collective Form

As Maki had recalled, the notion of "starting with individual elements to arrive at a whole" subsequently became a basic theme for Maki's architectural aesthetic and logic.[179] He emphasized later in his writing that the three paradigms were never "conceived of as matrices set at odds or mutually exclusive." Instead, they define the basic relationships that always exit between individual elements and the whole; thus they can coexist in one configuration.[180]

Many years after Maki's study on collective form, he added to his early year investigations that he "neglected to consider the existence of space as a medium, in either collective form or in terms of linkage." Through his most famous demonstration of collective form in planning projects, such as the Hillside Terrace complex and the Risshō University Kumagaya Campus, Maki enriched his early year investigations with another layer of thoughts: "collective forms depend on how such exterior spaces are created."[181] When Maki rethought about his proposals on the three forms two decades later, he pointed out an "oversight" in his own observations during his youth: "one premise of my argument was that the elements of compositional form are architecturally more self-sufficient than those of either group form or

megaform, but perhaps I ought to have undertaken a more extended analysis of modes of exterior space and the interstices among elements within the composition. My lack of experience in actually designing buildings may have accounted for this oversight."[182] Maki further remarked that it was through his later practice that he gradually gained experience in designing collective forms and learned that "their coherence depends as much on the creation of exterior spaces as it does on architectural forms."[183]

Additionally, Maki discovered a more subtle technique in designing collective forms, that is: "by emphasizing the autonomy of individual architectural elements and deliberately creating weak linkages between them, one enables those elements to become more distinct indices of time and place. Both opposition and harmony characterize urban relationships on many different levels, and their cumulative effect determines our actual image of the city."[184]

Apparently, after Maki's *Investigations in Collective Form*, he managed to expande his investigations in design philosophies and approaches through intensive practice. After all, Maki's collective form theory was never intended to be an answer for addressing design principles. On the contrary, the implication underlying the collective form was the starting point of his career.

Just as Maki expressed, his *Investigations in Collective Form* "seeks to ask the right questions and to draw out further discussions."[185] All the ideas derived from the collective form theory can be best represented in a series of Maki's actually practical projects, such as the Hillside Terraces, Tokyo Metropolitan Gymnasium, Fujisawa Gymnasium, Sam Fox School campus, Risshō University's Kumagaya Campus, Keio Univesity's Shōnan-Fujisawa campus, and, most recently, Republic Polytechnic campus in Singapore.

Hillside Terraces (1967-98)

Maki's group form is best exemplified by the Hillside Terrace project in Japan, involving spatial, social and temporal dimensions of the concept. (Fig. 10) It is considered by Koolhaas as an example of "slow-growth urbanism" and is named as a "sequential group form" by J. Taylor. "One cursory look at architectural history is sufficient to find that the whole development is characterized by man's immense desire to make buildings grand and perfect,"[186] Maki writes in 1964; Hillside Terraces as his life work, quietly strives for the opposite: well-integrated anonymity.[187] The general ambiance of the complex maintained its consistency although the complex was phased in over a thirty-year period. The inherent order of the elements lies in the relationship between each building and the street, as well as the public spaces

defined by the elements. To be visible from an aerial photo, the project has to be artificially highlighted for identity. Rigidity of axis and hierarchy is not present in the overall layout. Rather, a conceptual openness is evident in the complex, allowing multiple penetrations linking the buildings and the city. In this project, both consistency and diversity are accomplished through orchestrating various forms and spaces independently while obeying a governing structure.[188] The whole project appears an open-ended system, accommodating the uncertainty and ambiguity that emerged through the project's long evolution. Over fourty years after the beginning of this project, Maki recalled:

> Back in 1960, all I had to go on was my own image of something that ran counter to all that over-organized techno-utopia. I thought that an accidental increment could better suggest a kind of new order, which might be good for the immediate, if not distant, future. Perhaps such an image of genetic form may have stayed in my mind over the years.[189]

By accomplishing this project, Maki demonstrated his favor of a cumulative approach based on group form as a new essential character of modern Tokyo.

Kumagaya Campus at Risshō University (1966)

In 1966 Maki commenced a two-stage design for the new Kumagaya Campus at Risshō University. (Fig. 11) With the premises of "group form," Maki organizes the campus into two clusters of buildings, which are loosely related. Also, the buildings are arranged along two primary axes set at 30 degrees to each other, defining major exterior space with several ancillary spaces. The most evident element stabilizing the composition is a long rectangular block that edges the "plaza" and acts as a static and fixed unit against which the remaining free-form buildings are arranged.[190] The whole configuration of the plan centers a spatially dynamic and varying open space surrounded by geometric blocks of loosely linked individual buildings. The aerial view presents an image where "buildings [are] facing a long, beltlike open space in an arrangement of subtle disorder."[191]

Through comparison of the architectural drawing and the initial diagram, it is evident that the elements each have their own characteristics in the diagram. Such characteristics are accomplished in the physical design through defining its program and materials, ranging from site components, buildings to circulation linkages. All parts of the whole are inter-connected, responding to each other cohesively. At Risshō University there is a high level of complexity

and variety among the spatial units, and yet there is a remarkable cohesion, partly due to the uniform treatment of materials and details throughout.[192] Therefore, the various elemental characters are transformed into the quality of the space and their inter-relations, which include, but are not limited to, orientation, enclosure, accessibility, openness, privacy, etc. It demonstrates Maki's design methodology by addressing the elemental characteristics initially through diagrams and eventually incorporating and defining the perceptual image into the realization of the whole architectural scheme.

Nevertheless, it is worth noticing that the design is rationally planned on a nearly vacant site with an exacting, analytical manner using projected geometries. The order and conversation within the project is more stressed over the out-reaching linkages. Such design approach is probably a result from the limited contextual conditions at the site that could be considered for references. Rather than as an infill into an existing order, this campus is designed as an open-ended system, within which the inherited dynamics and flexibility would allow for future reciprocal increments. By introducing such order to a newly exploited environment, the group form can serve as a contextual paradigm at the outset of future growth and eventually direct further development towards an organic and flexible system.

Republic Polytechnic Campus (2002)

Located at the northern end of Singapore, this is an extremely high-density campus accommodating 13,000 students on 20 hectares of land (Keio University Shonan-Fujisawa Campus by contrast has 4,000 students on 30 hectares of land).[193] The scheme of this project, echoing the structure of the Shinjuku Plan, demonstrates a combination of different types of collective forms. (Fig. 12)

With the premise of the group form, the "learning pods" - accommodating desks for all students – are designed into a group of highly flexible independent buildings with a height of five to six stories. These individual elements are arranged on top of an enormous two-story agora space. Within the group of learning pods, the layout can be reconfigured to adapt flexibly to change in departmental organization. In addition, all the learning pods are situated on the enormous plate – called the Agora, which covers and connects the library, cafeteria, laboratories, audio facilities and other facilities. The Agora plane appears to be a megastructural ellipse with a long axis of 240 meters and a short axis of 160 meters. It is penetrated by eight courtyards of various sizes providing the facilities with soft daylight. As for the linkages, the group-formed learning pods and the megastructural Agora are connected along

a vertical axis by a verdant garden called the Lawn on the Agora roof. In this mega-plate, corridors connect the numerous horizontally extended spaces. Transparency and topography evoke a gently rising hill-town – such as Hydra in the Greek islands and enable users to easily comprehend their position at all times.[194] Meanwhile, bridges extending from the megastructural plate provide direct connections to the gymnasium, housing, parking, administrative facilities and cultural facilities on the periphery.

Therefore, the overall framework of the campus is loosely organized by combining the three types of collective form introduced in *Investigations in Collective Form*.[195]

Clustered Group Form

Maki not only applies his collective form theory to large scale projects, such as housing community design or university campus planning, he also addresses his propositions in designing seemingly more independent architecture, such as gymnasium complex, exhibition hall, concert hall, and conference center. Borrowing J. Taylor's categorization of Maki's group form, such schemes are called "the clustered group form."[196]

As Taylor stated, the clustered group form can be found in large urban interventions of the 1980s and 1990s and they tend to be physically delineated as distinct from the city.[197] However, the elemental connections within the grouping of the buildings as well as the contextual linkages beyond the architecture are both evident in such project. For instance, the Tokyo Metropolitan Gymnasium (1990) is located both on and under a clearly defined podium. Yet, what is hidden is the high penetrability across the site and around the grouping. (Fig. 13) Such highly accessible linkages manage to open up the whole grouping by allowing spatial and temporal connections to the surroundings. For similar projects, such as the Fujisawa Gymnasium (1984), Maki first divided the program into separate activities, and then provided the major components with individual spaces, supported by other minor activities. Despite the demand of large single-volume spaces, in such clusters, there is no sense of complete closure. The coherence in these projects is accomplished through the dynamic linkage within the major and minor architectural programs, as well as the extensive and inviting contextual connection beyond the composition. Such dynamics in the balance of open and completeness is fundamental and crucial in achieving clustered group form.

In sum, Maki's initial studies in collective form would serve as a beginning point. His design philosophy underlying collective form can be expanded by linking his thoughts to those of other architects. Meanwhile, for further understanding Maki's collective form theory, it is necessary to examine his design project, since Maki himself has greatly enriched his interpretations of collective form through his extensive practice.

Chapter Four. Collective Form's Past Integration in Teaching

In this chapter, examples of urban design studios will be introduced, including Maki's Urban Design studios at GSD (1963-64), Montgomery's proposal on Urban Renewal studio, as well as the beginner's studio at GSD taught by Albert Szabo.

Movement Systems in the City (1963-64)

The direct incorporation of group form in teaching is most evident in Maki's urban design studio at GSD - a study of Boston, published in *Movement Systems in the City* (1965). (Fig. 14) This study is the outcome ideas and projects developed in the Urban Design studio, Harvard University, during the academic year of 1963-64.[198] As an experimental project, it chose to study the development of an urban movement and joint system. Many of the ideas which had been developed throughout that year could be integrated into a broader context. One could argue that "movement systems" and "joints," which are the key components of the study, can be interpreted as linkages and elements in a city. Thus, this experiment is the further exploration of collective form as a design methodology.

In this study, Maki and his students proposed several important conceptions, which would share and further develop the design philosophy underlying his proposal of collective form.

Firstly, Maki explained the conception of an open-ended system. (Fig. 15)

> The open-ended system is one composed of several subsystems each of which can be expanded or contracted with a minimum of disturbance to the others. In other words, each subsystem within the whole is able to maintain its identity and longevity while it is at the same time engaged in dynamic contract with the others.[199]

Maki then explained the advantage of the open-ended system over the closed system in structuring a complex physical environment; that is, it renders greater flexibility and adaptability to the system itself. In terms of movement, the open-ended system offers multiple choices for one to select a path between given points, while the closed system provides no alternatives. In the illustration and model of the system, Maki further explains:

> …nodes may be interpreted as concentrations or critical points of varying magnitude or importance; they indicate a place of activity. The linear members of the model represent various types of subsystems (communication, mechanical, circulation, etc.)

> and/or their relative magnitudes. Subsystem configurations may be selected and examined independently from each other, but when integrated – as in reality they must be – junctures occur between. It is at these junctures (interchanges, joints) that nodes appear and activity is naturally generated. The open-ended system becomes the structure of integrated systems and their joint nodes.[200]

Departing from this notion, one could argue that no matter in architecture, urban design or planning, multiple systems coexist all the time (habitation patters, institutional organizations, transportation networks, etc.) It is a very three-dimensional way of understanding the different elements in the physical world. Each element has its own systematic organization or configuration, while all the elemental systems are also connected. The nodes where they meet become places for opportunity or for generating potentials. Understanding the characteristics underlying this system can clarify designers' understanding towards the urban living framework and promote more efficient and sustaining design of places.

Following the research in the open-ended system, Maki and his students proposed a point development process, which is highly consistent with the

elemental approach mentioned earlier. This process starts with the general dispersion of a considerable number of specified elements.[201] In a city, the elements may be people, habitations, stores, or else, all of which are recognized with their inherent characteristics. Acknowledging such characters, particular units are either compelled or encouraged to form conglomerates, which corresponds to their needs or functions.[202] Therefore, Maki emphasizes that in the system of a city, it is not a simple desire for "togetherness" that draws similar enterprises or members of a social-economic stratum to a given place. Instead, particular facilities and services are created, developed and utilized only when there are accumulated needs. That is to say, it is the force of concentrated human activities that brings about lively city nodes. Consequently, a city's existing movement systems also reflect the well-established relationships between the nodes. To further support such proposition, Maki borrowed Jane Jacobs's concept that city is a "complex organization," rather than a "simple organization" or a "complex disorganization."[203] Maki believes it is crucial to have understanding of the determining factors which have brought a given city into its present form. Meanwhile, it is necessary to improve city planners' and urban designers' abilities to manipulate the numerous variable of the city's "complex organization."

Accordingly, Maki presented his advocacies towards an effective approach; that is, first investigating the various forces in the shaping of the city, and thereafter designing from elements which can eventually influence the larger whole. He further promoted this design methodology by stating:

> We are learning the hard way that the functional structure of the entire city is a highly integrated and interdependent thing. Planning the city to answer present and, to the extent that we are able, future needs can sensibly only start from understanding individual variables, or subsystems. These subsystems can then be intergrated into an overall conceptual system, which we have made an initial attempt to illuminate with the open-ended system. As earlier pointed out, a fundamental characteristic of this system is that it is the sum of its parts; each part may be individually identified, studies, and finally manipulated, we hope, to the benefit of the overall system.[204]

As for the design thinking process, to addressing the question on how to design the nodes with linkage to the whole, Maki suggests that “we have seen that the node serves as the focus or activity concentration of some larger area. The nature of the node is determined by the characteristics of its larger area

and in turn may serve to define it. The node connectors or paths serve further to accomplish area definition and linkage."[205] This interrelationship between the nodes and the whole should be maintained and incorporated throughout the dynamic survey and design process.

Furthermore, the conceptions of "city room" and "city corridor" are introduced as paradigms of the joints and their linkages. Through researching and exploring design philosophies and urban theories, Maki and his students chose the open-ended systems as an optimal model of understanding the framework, while using point development process as a design tool. Following these analyses, the propositions generated in the studio were applied into practice, which was the surveying of Boston illustrated in a serious of mappings. (Fig. 16)

What worth comparing is Lynch's study of the physical form of the city in *The Image of the City*. In Lynch's experiment, mappings were generated through conducting office verbal interviews, requesting sketch maps of the city, as well as taking interviewees to have a trip around the studied area. The goal was to understand the public image of the city's elements through comparison of imagined maps generated from verbal communication and from the field

analysis. The maps from Lynch's study appear high coherence to the mappings generated by Maki's studio. Both cases demonstrated the significance of elements and their linkages (or the joints and the movement systems). Such conceptions are extracted from user's perceptions in Lynch's maps, while derived from designers' proposals in Maki's case. Hence, the overlapping proposition from both studies presented strong advocacy towards an elemental approach, which is designing from the elements/nodes/joints with a contextual awareness and eventually forming a coherent whole that can further influence the elements.

Lastly, a comparison between Maki's study of Boston and Tange's studio of "A Community for 25,000," would further demonstrate Maki's distinctive teaching approach. As one of the important contrasts: order was hidden in Maki's study, while it was visually characterized by gigantic A-frame megastructues in Tange's proposal.[206] Maki's proposal was "strategic in intention" without necessarily suggesting a concrete composition.[207] In this study, Maki pointed out that the word "chaos" should not refer to "the lack of structure, but to the difficulty of perceiving it, and the problem is not one of restructuring but of making understanding easier." He continued: "A person moving through a city must be given visual clues and explanations of where

he is and where he is going, of what these places are, and how they are related to each other."[208] Therefore, the organization of the plan was based on sophisticated study of Boston's communication networks, rather than on any imposed geometrical or physical form, as it is in Tange's scheme. Such idea underlying Maki's Boston proposal restated his argument that form should derive from environmental needs and designers' unity of experience through observation.[209]

All in all, in Maki's *Movement Systems in the City*, the visual form of design is giving its way to the urban understanding of parts and the whole. Only through significant amount of research and assessment of the physical environment can the students develop their proposals.

***Intercity* (1962-64)**

Another series of Urban Design studio projects that Maki was involved at GSD was publish as *Intercity* (1962) and *Intercity II* (1965). These series of studies and design proposals are based on urban settings including city extensions, suburbs or new towns. The cities studies include Le Mirail in France, Kozoji in Japan, Philadelphia and Washington, D.C in the U.S. These proposals experiment ideas that could be adaptable for future growth of

urbanization, especially for intercity development. The final products from thesis studies are conceptual and diagrammatic, representing the concepts and theories in general. Compared with *Movement Systems in the City,* such theoretical and schematic pedagogical approach seems to be consistent in the early GSD Urban Design studios.

All the projects in *Intercity* and *Intercity II* begin their vision from a demographic point of view. The objectives are to design for a potential great number of populations, facilitating their live, work and recreation. The proposals in *Intercity* heavily focus on new town planning. The mappings from these projects are featured by various zoning patterns, defining residential, commercial, industrial, open spaces, and other community facilities. Additionally, large infrastructural transportation systems, such as highways and main roads are highlighted as connections, interweaving and tying different functional zones together. Consequently, the projects in *Intercity* (from the 1961-1962 Urban Design studio) are presented to be highly conceptual and addresses larger scale issues in a city or region. (Fig. 17)

In comparison, the projects from *Intercity II* (the ones from the 1963-64 Urban Design studio) start to define their vision in a more close-up district or cluster,

with a vision of its connections to the regional context. The schemes appear to be more architectural in scale, with considerations of both inside and outside spaces at different levels of an urban complex; meanwhile, the circulation design is directed more towards human scales, illustrated by drawings with staircases, pedestrian paths, driveways and parking lots. As a result, the schemes in this series of projects present an integrated and open-ended image of various elements with underlying linkages, connecting within the complex and extending to the beyond.

Such concept is highly consistent with Maki's notion of joints and movement systems in *Movement Systems in the City*. One of the best demonstrations of this series of projects is the Urban Settlement designed by Ho Man Chung, Vladimir Music and Koichi Nagashima. (Fig. 18) Futhermore, the setting of new town development is comparable to the design of Risshō University Kumagaya Campus, which shares the premise of developing from an open-ended cluster.

Discussion on Urban Education at Washington University (1962)

The next two examples were introduced at the same time, in January 1962, when the first urban design conference at Washington University (WU) was

held a few months after the initial urban design class. The emphasis was on the discussion and exchange of experiences in urban education.

Fumihiko Maki was assigned as the conference director, giving the opening speech. All the faculty and visitors from Washington University attended this event, including Roger Montgomery, Dean Joseph R. Passonneau, Aldo van Eyck, Robert Dannenbrink, etc. Also, a number of professors were invited from other schools, such as Columbia University, Cornell University, Harvard Graduate School of Design, University of Washington, University of Pennsylvania, etc. Besides educators, practitioners from planning institutions were welcomed to the conference as well, including David A. Crane, a director of comprehensive planning at Boston Redevelopment Authority, and Morton Hoppenfeld, an urban designer at National Capital Planning Commission. At the introduction, Maki indicated that the conference sought to "sort out techniques applicable to the work of urban design" and to "discover a system of values under which the techniques might be applied."[210] In addition, Maki pointed out that both the practice and the teaching in urban design should be dynamic processes. Moreover, Passonneau also advocated urban understanding at the opening by addressing its importance in shaping both the city and the university. During the three days' lectures and discussions, the

speakers shared their experiences as teachers or practitioners and brought up their speculations on the future of urban design education.

Many thoughts raised during the conference resonated Maki's premise in advocating group form. For instance, in the speech "Some Significant Aspects of the Practice and Teaching of Urban Design" by Morton Hoppenfeld, he remarked that one can be considered as an urban designer only when he is affecting not only the physical form but also the quality of the city.[211] He embraced the notion of "correlating" in city by indicating that "all elements are related with a degree of significance to all other elements." He perceived the city as "a natural, constantly changing, constantly growing organism," and argued that "all individual acts of creation either as additions to or changes of the organism must correlate to the immediate environs and to the organism as a whole."[212] This notion echoes Maki's analysis on the organic linkage between the elements and the whole. Moreover, Hoppenfeld further argued that "no single element, be it building or place, is complete within itself."[213] He believed that urban designers and architects were always dealing with fragments within a larger fragment. The design process should always be open-ended to facilitate growth and continual change. Therefore, what Hoppenfeld valued in a good design was its apparent "complete" at all stages

or phases, while still maintaining the ability to grow, change and mesh with the rest, without losing its quality during the process.[214] Such belief was also resonated in Maki's later teaching at GSD, as well as in his practice. Furthermore, as for programming, Hoppenfeld held a dynamic understanding towards the urban design process. He argued for designing towards the evolution of a program with humanistic formal objectives which could eventually influence people's lifestyle, rather than having given programs to be shaped into certain arbitrary forms.[215] His opposition to the static design process is another proposition shared with Maki.

Urban Design in the Formative Education

Among all the studio teaching examples presented at the Conference, one example worth mentioning would be Albert Szabo's beginning studio at Harvard GSD, presented in his speech "Urban Design in the Formative Stage of Architectural Education."[216] As Szabo's argued, urban design is a connecting field between architecture, planning, and landscape. Szabo strongly advocated urban awareness in the formative stage of architectural education, considering it as an imperative attitude within the nature of designers. This idea was first stated by Dean Joseph Hudnut and is the basis of

the "G.S.D." Thus, the beginner's studio at GSD was organized around urban design issues.

According to Szabo's introduction, the beginner program is divided into two general areas of study: "I. the problem of the human habitat within its larger context which culminates in plans for a specific site development and II. The continuation of the human habitat studies concentrating on study in greater detail of smaller elements of the environment: the dwelling unit itself and its immediate context."[217] Such multiple scale urban studies were also evident in Maki's and Montgomery's studios at WU.

The formative stage of education, as Szabo concluded in his speech, "must help the student progress from the discovery of the anatomy of the urban environment to the study of the forces that give it shape and content."[218] From the exercises in the beginner's studios, students learn to measure and evaluate what is perceived in the physical world and eventually respond to the reality with responsible design solutions. Such advocacy echoes Lynch's study of perceptions in *The Image of the City.* The urban education in the beginning stage of architectural education was favored by Montgomery and it is a pedagogical approach still worth experimenting today.

Education for Urban Renewal at WU

At the WU Conference, as Maki's collaborator of studio teaching, Roger Montgomery presented his advocacy for exploring urban renewal in studios, which he was co-teaching with Maki. The studio's structure and objectives incorporated the elemental understanding of the city, shared by Montgomery and Maki. As Montgomery pointed out at the beginning of his speech, "in education, one of the crucial points is to establish the relationship between the elemental building and the overall plan."[219] This was considered by Montgomery as the key to a coherent and manageable urban renewal design. He emphasized that his advocacies were made clearer through incorporate Maki's study of Group Form and Dave Crane's Dynamic City into his own theory of Sequential Theme.

In Montgomery's studio teaching, two approaches were developed to understand the spatially and temporally incremental process of city's growth. The first depends on the analysis of the existing structure of the project area. In the survey phase of work the various studies of land division, building (plan and volumetric) typology, and circumstances of historic development provide clear data on the relation between elemental building and overall plan. To support this approach, Montgomery proposed that in the history of urban

design courses, heavy emphasis should be placed on vernacular building and what Kevin Lynch calls “the grain of the city.” He believes that more emphasis on vernacular building and less concern with monumental architecture would be a real help with students’ understanding of the physical world.

The second approach was based on the nature of the students’ classroom experience in actually trying to solve sector design problems. After the whole class’s survey and analysis work, as well as a general plan design, each student would be asked to propose a design for a more zoomed-in area. According to Montgomery’s observation, at this stage, some students immediately started pattern-making based on personal visual preference; while some others would need a functional starting point to produce visual order. Without an idea of programs, most students would have difficulty in further developing their scheme.

As a solution to this difficulty, Montgomery recommended the elemental approach, “in which a new start is made on a more modest and manageable scale beginning with the building system, the land development scheme, the circulation web at its varying levels, etc.”[220] He believes, a sound general plan can only emerge through “gradually filling out the sector, letting the elements

modify and permutate as required by the existent situation."[221] In contrast to the students' personal, visual, abstract and pattern-making approach, the elemental approach would be more concrete in reasoning and the final holistic plan would unfold through a more dynamic process of decision making. Instead of falling into a decorative or artistic category, Montgomery believes that such design process is closer to how the practical world works.

Montgomery/Maki Studio at WU (1957-58)

As examples for how the elemental approach could be realized in studio teaching, Montgomery first introduced his housing design studio at WU, co-taught with Maki.

This studio was set up for the fourth year students, focusing on the concept of "cluster." The studio project dealt with the design of a small housing group in an existing urban context, addressing the relationship between the elemental build and the overall plan. As for the studio program, this housing cluster was clearly set up: "six to twenty family dwelling units at a net density of ten to thirty to the acre are programmed for a small spot clearance site in a strong pre-existing environment."[222] The students in the program were seniors, who were in their second year of design and could cope with internal circulation,

house construction and the composition of a single dwelling. The challenge to the students would be the extension of the element into the urban design scale.

The studio setting was grounded by Team 10's philosophy of humanistic association. At this level, the client was not specified to allow various design implications taken on by the students. To reflect humanistic considerations, firstly, within the cluster, the variations of each unit were encouraged for a choice range implied by anonymous clients. Meanwhile, what was equally important was design of the spaces between the units, including street space, yards, as well as communal places for neighboring and playing. Last but not least, the cluster's composition should incorporate and adapt to both the pedestrian and automobile movement systems within and beyond.

What was equally important as the humanistic compositional determinants would be the condition of working within a pre-existing urban context. That is, designing with contextual considerations. The site was defined by existing structures, main circulation patterns were already established, and an identifiable social organization was present. Thus, cluster composition, planning and construction were also evoked by context. All sorts of critical questions were added to the students' vocabulary: "mundane issues of garbage

removal and sewer location; challenging questions of expressive regard for social reality; new formal problems of streetscape and open-space structure."[223]

Therefore, with the humanistic and contextual considerations underlying the housing cluster design, Montgomery reemphasized that studying cluster was absolutely crucial to the understanding of larger urban scale issues, preventing the students from falling into purely abstract pattern making.

Additionally, Montgomery expressed his concern with the missing of social aspect in urban design education and advocated real settings for studio problems. One example was the students' lack of knowledge or contact with the African American population in urban renewal projects. He suggested this fact could prevent the students from reaching meaningful proposals. Thus, in his studio, while surveying the contextual conditions, students were asked to go into the African American neighborhood and get in touch with the residents there. The students were encouraged to observe the visual perceptions of the site, categorize the typologies of the buildings and map the information they gathered from the site visiting. Hence, survey and analysis became an important approach for design preparation through better understanding of the

users and their life. Such study could sharpen the students' perception and enhance their response to real environmental situations. Additionally, Montgomery indicated another value of real settings; that is the opportunity to bring the students into contact with official operating agencies and their personnel. Thus, Montgomery favored and valued contacts with real agencies as a means to prevent the students from learning about urban design while isolated from the reality.

Furthermore, as for the studio's program formulation, Montgomery promoted the notion that programs should unfold and evolve through the design process. Thus, he argues that "a valid process of program formulation should develop out of comparative evaluation of project designs evolved from alternative approaches to the elemental building."[224] Based on such proposition, the students were first asked to have a series of alternative proposals, which were then evaluated in terms of costs, benefits and aesthetics, both economically and socially. Thereafter, a single proposal, usually incorporating elements from several students' alternative designs, was put together to become the overall renewal plan for the whole class. Based on this general scheme, the students then separated into individuals or pairs to work on alternative designs for specific elements in this scheme. In this process, each student was asked to

respect the overall scheme while designing the elements of the whole project; meanwhile, they ought to be clear about the notion that the whole project was merely an element in the even larger city context. What was important, students working on adjacent elements formed collaborative teams to share the responsibility of designing the spaces between elements. Hence, this elemental thinking was adopted with flexibility - comprehensive considerations emerged from various scale of context, including the project's range, the larger city, as well as other studio member's design proposals. According to Montgomery's past experience, this process was highly effective in avoiding purely aesthetic, personal, and arbitrary solutions. For the evaluation and selection of the alternative proposals, Montgomery and Maki were sharing responsibilities most of the time, with occasional outside critics involved.

Consequently, with such pedagogical methodology, the whole design activity becomes a larger network and social process, requiring the students to be outreaching rather than individually isolated, avoiding each student from making their judgments or decisions based on their personal taste. This is how in reality architects and urban designers could really make changes to the physical world and eventually contribute to the evolution of the social environment.

After a thorough introduction of his studio proposals at the WU conference, Montgomery reassured the influence from Team 10, Louis Kahn, David Crane, and Maki, especially in the formal and aesthetic aspects of the design. In Montgomery's design philosophy, he denies the static nature of compositional completeness where nothing can be added or subtracted without loss. He sought to experiment his "Sequential Theme" in the studio setting to achieve an "open-ended" and "composition-through-process" methodology. Such advocacies were largely resonated in Maki's beliefs in teaching and practice.

Accordingly, the fourth year studio co-taught by Montgomery and Maki could be considered as one of the best examples for how to incorporate Maki's thinking of collective form into a studio's pedagogical process. Its objectives and pedagogical methodology can still be valuable in today's design studios, applicable to both architectural and urban projects with various scales and diverse programs.

The Earliest Urban Design Studio at WU (1961-63)

After Maki and Montgomery co-founded the MAUD program at WU in 1961, Maki, together with Robert Dannenbrink, coordinated the first official Urban

Design studio (fall semester in 1962) – “the Metro Corridor or Civic Spine of St. Louis” - in consultation with Passonneau. The next year, when Maki was leaving WU to teach urban design at Harvard GSD, Montgomery, then the Director of MUD, co-taught the Urban Design studio with Dannenbrink (from fall semester in 1963 to spring semester in 1964). The setting of these earliest Urban Design studios (see Appendix B and C) seemed to be highly comparable to the Montgomery/Maki senior-year studio, reflected the advocacy of urban renewal education proposed by Montgomery at the WU Conference.

According to the descriptions of the first MUD studio (the Maki/Dannenbrink studio), the studio’s focus was the linear, spine-like corridor, starting from the Arch at downtown St. Louis, crossing the Forest Park and extending nearly 10 miles towards the west. It was believed that this area contained the city’s most important institutions and was the axis of the urban expansion. Thus, the studio’s site was considered as the core of the expanding metropolis. Such focus on the urban center development echoes the Bakema’s 1959 studio at WU published as *The Humane Core; A Civic Center for St. Louis, Mo* (1961).

In the studio objectives, the dynamics of city development was stress in order to achieve design solutions adaptive to future changes. The studio was started with a two-week real-site survey, with students split up into group investigating various topics such as landmarks, important districts, boundaries, land use, transportation, historical development, demographics, etc. The results of the survey were presented in a series of analytical drawing. In the following two weeks, more close-up investigations would be conducted on four major districts, or sub-centers, along the spine. These four districts were considered as important elements from the whole project, which would potentially contribute to the strategy for the overall project. During the following four weeks, the students were dedicated to designing the “master program” and “master program” for the whole spine-like area, with considerations of public transport system, automobile transportation, pedestrian system, as well as activity system. In this phase, each student was asked to work on some proto-element or group of the whole project, incorporating various programs within the element or grouping and design its movement systems as the linkage within and beyond the element. Finally, all the elemental designs were combined into the overall project, presented in one large site model. According to Dannenbrink, the students were encouraged to achieve flexible dynamic design schemes through the exploration of

non-hierarchical, non-compositional form. In general, the structure and design process of this studio, which was based on real-life settings and incorporated jumping-scale surveys and elemental design approaches, bore high similarity to the earlier Montgomery/Maki senior-year studio.

In the next year's Urban Design program, Montgomery and Dannenbrink made a continuous plan for the subsequent two semesters - from fall semester in 1963 to spring semester in 1964. The fall semester included designing "cluster" and "sector," while the following spring's focuses were "monumentality" and "settlement patterns." As is explained in the studio descriptions, such structure follows an order in scale – from smallest to largest, that is cluster, sector, settlement and region. The site selection overlapped that of the previous year's urban design studio, focusing on one of the four sub-centers chosen by Maki. According to Montgomery's report on student work (see Appendix C), the notions of jumping-scale surveys, elemental approach and real-life setting were again evident in this studio setting. The key words in his report, such as clusters, elements, aggregation, linkages, pedestrians, time, development, growth, etc., were consistent with his other studio settings at WU. Additionally, these concerns, as well as the design proposals from this studio, were highly parallel to works from the GSD's

1963-64 Urban Design studio, which Maki was one of the instructors and was introduced in *Intercity II*.

Although collective form was not the central idea in most of the above-mentioned studios, Maki's design philosophies derived from collective form theory, such as "open-ended system," "city room and corridor," "nodes and movement systems," etc., were highly consistent with the ideas underlying these studios' settings, especially the elemental design approach, the jump-scale understanding of parts and whole, as well as the contextual, humanistic and temporal considerations. Such set of mind in urban design education is still essential for today's practitioners to achieve meaningful strategies. Thus, acknowledging its pedagogical value, the design philosophies and teaching methodologies derived from these early urban design studios could still be valid and applicable for today's urban design education.

Chapter Five. Maki's Collective Form and Its Implications for Today

Fifty years after Maki's *Investigations in Collective Form (1964),* one must speculate on what collective form can mean for today's design world. The responses to this question could be various. Nevertheless, its applications in contemporary design field can be well demonstrated by two recent publidations: one is the collection of "collective form" design in a series of Japanese projects, published in *"Redefining Collectivity," The Japan Architect 78 (Summer, 2010)*; the other can be considered as a development from collective form theory explained and illustrated in Thom Mayne's book: *Combinatory Urbanism: The Complex Behavior of Collective Form*. Additionally, collective form's potential implications for contemporary architectural education will be drawn from the previous examinations of the early urban design studios.

"Redefining Collectivity," The Japan Architect 78 (Summer, 2010)

It is commonly acknowledged that the city can be perceived as an assemblage of a multitude of elements. Nowadays, this understanding has been expanded: it is not limited to man-made cities, but applies to the formation of natural landscapes or those consisting of both natural and artificial elements. Architecture can also be considered an assemblage of various requirements.

As such, it should be seen as an actualization of collective forms in a similar vein.[225] When looking at the city as an assemblage of architectural entities, there seems to be a latent potential towards a shift in the relationship between architecture and the city, where perhaps architecture itself can be assumed as a collective entity comprised of dispersed spaces and components, for this perception should add at least one extra stratum between architecture and the city. This opens the possibility of architecture to contribute profoundly toward the formation of more diverse and fertile urban environments.

When interviewed fifty years after his initial proposal on collective form, Maki addresses his notion in such a way:

> I believe … that as relationships of social phenomena in contemporary cities become more complex, a structure (in which a loose connection exists between the whole and the parts) that can adapt to various conditions, including the passing of time, seems more realistic than a structure in which the relationship between the whole and the parts is clearly hierarchical. … Now, however, people no longer stay in the same place. In other words, the condition of the parts is also changing. Nevertheless, a loose connection still seems to me a better form of relationship

> between the parts and the whole. The contemporary urban image is one in which the parts or types that make up a group changing; at the same time, the wholes that tie those parts together are also changing into more viable arrangements.[226]

Moreover, Maki believes that the three types of collective form can be further expanded and enriched by other new types defined by contemporary human activities. In all likelihood, the investigations in collective form concluded in Maki's book will be continued naturally in the future.

As examples of other architects' explorations of collective form, this special issue included a series of projects designed by major contemporary Japanese architects, featured with new form of "collectivity." For instance, SANAA (Kazuyo Sejima and Ryue Nishizawa)'s project of The Louvre-Lens Museum at Lens in France presented small volumes with different programs, scattered round the site, creating continuous relationships between building interiors and outdoor spaces, or between landscape and architecture. Kazuyo Sejima's Inujima Art House Project has converted the village on the island into an open museum. Jun Aoki's Omiyamae Sports Facility at Suginami demonstrated the approaches of how to arrange volumes of sports facilities as well as existing elements such as big trees; all the elements and linkages are designed with a

contextual consideration to reach a final composition of the whole project. Moreover, in the plan of an “urbanization-restricted area” at Yokosuka-shi, Kanagawa, by ON DESIGN (Osamu Nishida and Erika Nakagawa), the architect started design from positioning small architectural units, each of which will be characterized by its program; the in-between spaces of the field are carefully designed to allow loosely defined itinerary. All the maps for this project present strong collective form structure, elements with linkages, while allowing flexibility, alternatives in linkages. Last but not least, Sou Fujimoto’s Tokyo Apartment is developed from traditional-house-shaped elements, stacked and linked vertical, presenting a form of collective agglomeration of architecture and resembles a village in the vertical dimension. (Fig. 20) All these projects appear in the form of collective image of elements with various forms of linkages.

Thom Mayne’s *Combinatory Urbanism : the complex behavior of collective form* (2011)

Resonating the premise presented in Maki’s introduction to *Investigations in Collective Form (1964)*, Thom Mayne’s book started with the same concerns over the dramatical change in the contemporary society. Mayne readdressed Maki’s proposal of master form by rejecting urban planning as a means of

controlling the growth of cities, since the future has become far from what can be predicted. He argues:

> …never static, the contemporary city is dynamic, unstable, and increasingly difficult to trace as a linear process… Mirroring biological evolution, which produces increasingly complex life forms over time, the city is a field of permanent genesis; the constant flux of its systems is the means by which its social structural evolves with ever-greater complexity. Systems never get simpler.[227]

Under such understanding of the social dynamics shared by Maki from fifty years ago, Mayne further stated: "(today) The true territory for innovation in urban architecture is not in the production of platonic solids, but rather in the design of operational strategies that deal with the multiple and overlapping forces of a highly complex and entirely uncertain "collective form."[228] His *Combinatory Urbanism* aims to offer an alternative method of urban production that designs flexible frameworks of relational systems within which activities, events, and programs can organically play themselves out. Thus, it is a continuous and organic process, similar to group form, providing a new alternative to any static form.

As Thom Mayne encountered Maki's writing about eight years ago, he found parallel ideas that he had been interested in for decades. The first idea is the dynamic field of interrelated forces. To Mayne, architecture is a response to force fields and environments that are producing dynamic organizations that came out of the sun, wind, water. In this very abstract exercise, design was based on forces and analysis of those forces. Architecture is not a sum of static solutions; rather, it comes from solutions that worked over time. In Mayne's language, the interrelated forces are combinatory. Architecture should be the outcome of combinatory behaviors, made up of multiple forces.

Another idea is developed from Maki's term "quasi-building." Mayne interprets it as infrastructure. Cities rely on infrastructure at different levels to facilitate various elements. This notion can also be applied to the architectural scale. From fifteen years ago, Mayne had started to explore the notion that architecture should be infrastructural and is a sum of the embodiment of "things," which all come from forces that are part of the site conditions.

Moreover, Maki's notion on the dynamic process of growth in group form was translated by Mayne as a cycle of feedback and adaptation, or in another word

- “re-iteration.” The urbanistic, landscape, tectonic or functional terms could be the basis for the reiterative approach. While challenging the nature of problems, designers respond to that condition and then challenge what has been produced. It is a continuous process of building up feedback system of information. The design solutions as temporary outcome would be designers’ responses and attempts to adapt to the various conditions and should be constantly challenged. In other words, design activities should be a dynamic and process-driven process.

To further understand Thom Mayne’s acceptance and development from Maki’s philosophy, a few aspects needs to be further explained. Firstly, in Mayne’s design philosophy, architects should operate between scales, from architectural to urban. It leads to an ambiguous territory of urban architecture.[229] Over time, projects increased in scale and scope, allowing us to continue these investigations into an architecture/urban hybrid. Secondly, as for his perspective on architectural education, Mayne rejects the separation of architecture and urban planning as mutually exclusive fields. He believes these fields cannot even be differentiated by scales. Thus, architecture and urbanism, these two interweaving field of knowledge, should be introduced to architects at the same time to educate designers who can handle the hybrid design.

Moreover, Mayne reemphasized the contextual and humanistic concerns underlying his design philosophy. As a result, he advocates for designing the space/voids rather than the solids. Through such approach, the forms are created organically in relationship to the complex human behaviors, as well as to the conditions of site and time. Last but not least, Mayne further extended the hybrid thinking by arguing for the ambiguous boundary of urban architecture and landscape. Architecture and landscape are both elements of the whole, rather than separate entities. This ambiguity could be an opportunity for design, allowing for design approaches that can "incorporate an ecologically balanced, systemic strategy" and will "seek new and hybrid forms of exchange between the designed and the natural."[230]

Viewing from Thom Mayne's *Combinatory Urbanism*, the meaning of Maki's collective form has been expanded beyond merely a formal exploration of urban design languages. It not only is a way of perceiving the physical world, it also reflects the dynamic nature of design as a mental activity. It has become a mindset that is essential and applicable to architecture, landscape and planning at various scales. The flexibility inherited in collective form is further stated by Mayne with hybrid thinking relevant to today's dynamics. The

ambiguous definition of contemporary collective form would allow more opportunities in future design.

Pedagogical Implications for Today

Thinking about the pedagogical merit of the design philosophies inherited in Maki's collective form theory, one could argue that the earliest urban design studios at WU and GSD bear valid approaches that are still applicable for today's education. For example, the studies carried out in *Movement Systems in the City* and the surveys conducted in Montgomery's and Maki's urban design studios have been naturally succeeded until today. Numerous studios are started with similar site analysis to address the contextual, humanistic and temporal concerns as the basis for future design development. The understanding of dynamic part-whole relationships at various scales is even more fundamental for today's fast-changing society. The call for open-ended design to facilitate various changes is more urgent than ever. Through such methodology students can be effectively distanced from making highly personal and arbitrary, purely form-based design decisions. Therefore, the elemental approach derived from collective form is certainly significant for today's architectural and urban design pedagogy. Accordingly, contemporary

studios can be structured upon the elemental design process, using Montgomery's original proposal as a reference for studio setting.

Additionally, the philosophy underlying "elements and linkages" or "joints and movement systems" is essential to two kinds of projects. Firstly, what resonates in the *Intercity* projects and Risshō University's Kumagaya Campus design is the question of how to commence development at a newly exploited site, such as today's new town developments. In such cases, designing an open-ended cluster with meaningful inner order will eventually influence or facilitate the subsequent expansions and changes, contributing to the larger whole. Thus, the design philosophies underlying collective form should still be respected and valued when initiating new developments, especially in the sprawling cities. On the contrary, the elemental understanding is also valuable when designing an infill or an addition project in a formerly defined area, such as the Hillside Terraces. Also, as another example, in *Movement Systems in the City*, when dealing with a highly urbanized city, such as Boston, each design can be considered as an individual node or linkage, or a cluster of nodes with linkages, within a larger open-ended system. Consequently, the infill or addition design has to keep its coherence with the larger system. Each node will bear inherited contextual characteristics that need to be addressed

essentially in any alternative plans. Only with such approach can the design of an infill or addition project be meaningful.

Moreover, as for the programs, the collective form design approach can be applied to a series of contemporary projects, various in scale and lifespan. For example, the following types of projects usually contain multi-purposed programs, thus they can be considered as development of collective form out of heterogeneous elements, such as: housing cluster, residential community, university campus design, marketplace, shopping center, recreational center, transit-oriented development, etc. In addition, considering a cluster design as an urban infill or an addition to the existing, collective form theory should also be incorporated into the following types of projects, such as community center, gymnasium complex, exhibition hall, concert hall, conference center, etc. Such list of projects is only suggestive of how collective form can be applied in practice. It is an incomplete list, open to more innovative speculations.

Last but not least, the meaning of elements and linkages in collective form has been expanded to bear a hybrid field of knowledge. Thus, one pedagogical speculation could be the hybrid of disciplines in the studio setting. That is to say, a collaborative studio participated by interdisciplinary students can be

structured based on collective form. For instance, the design of elements, linkages, the in-between places, as well as the speculations on growth over time can be carried out respectively by architecture, urban, landscape and planning students. Each team or individual will need to respect knowledge from other fellows or other disciplines for decision-making. The overall project for the studio is hence resulted from a collective effort and a synthesis of understanding. Such hybrid quality with multi-disciplinary considerations would potentially contribute to the accomplishment of more sound and feasible plan for today's dynamic social life.

Conclusion

In conclusion, reinvestigating Maki's collective form theory, it is evident that it still presents strong relevance to today's practice and education. The long term frames as well as the unpredictability of market decisions, trends, uses, etc. all call for more flexibility in urban design proposals which are non-hierarchial and non-compositional, facilitating components with various lifespan. Such demands reassured Maki's meaningful advocacy towards open-ended systems with dynamics in part-whole relationships, allowing elemental autonomy throughout the dimension of time. Thus, we as designers have the obligation to learn to plan for growth with an open-ended and flexible vision. Moreover, incorporated by today's design philosophy, the contextual, humanistic and temporal concerns should be further expanded and integrated into a hybrid field of urban architecture and landscape, blurring the boundaries of the disciplines. Hopefully, the flexibility and dynamics inherited in collective form can be further carried on by contemporary explorations, and will welcome more innovative developments in design philosophy, leading to greater influence on the future generation of practitioners and educators.

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[174] Ross writes, "The Golgi body was named for Camillo Golgi, a nineteenth-century Italian physiologist noted for his basic research in neurology. In 1883 his studies of the central nervous system revealed multi-polar cells which had the ability to establish connections with other nerve cells. This research eventually led another scientist to discover the neuron." Michael Franklin Ross, Beyond Metabolism: The New Japanese Architecture, New York, Architectural Record: A McGraw-Hill Publication, 1978, P. 30.

[175] Rem Koolhaas, Hans Ulrich Obrist; editors, Kayoko Ota with James Westcott; *Project Japan : metabolism talks*; Köln: Taschen, 2011, 312.

[176] Jennifer Taylor with James Conner, The architecture of Fumihiko Maki : space, city, order and making; Basel, Boston: Birkhauser, 2003, 48.

[177] Fumihiko Maki, "Four studies in collective form – A summary," unpublished Maki and Associates document, August 1967, p. 1.

[178] Fumihiko Maki, *Fragmentary Figures: The Collected Architectural Drawings,* Tokyo, Kyuryudo Art Publishing, 1989 (no pagination).

[179] Fumihiko Maki, *Fumihiko Maki,* London: Phaidon, 2009, 6.

[180] Fumihiko Maki, "Exploration of Urban Design Language," *Fumihiko Maki,* London: Phaidon, 2009, 16.

[181] Ibid.

[182] Fumihiko Maki, *Investigations In Collective Form*, Washington University In St.

Louis, 1964, 41.

[183] Ibid.

[184] Ibid.

[185] Ibid, 28.

[186] Fumihiko Maki, "Theory of Group Form," *The Japan Architect,* February 1970.

[187] Rem Koolhaas, Hans Ulrich Obrist;editors, Kayoko Ota with James Westcott; *Project Japan : metabolism talks;* Köln: Taschen, 2011, 308.

[188] Jennifer Taylor with James Conner, *The Architecture of Fumihiko Maki: Space, City, Order and Making,* 2003, Boston: Birkhauser, 26.

[189] Rem Koolhaas, Hans Ulrich Obrist;editors, Kayoko Ota with James Westcott; *Project Japan : metabolism talks;* Köln: Taschen, 2011, 308.

[190] Jennifer Taylor with James Conner, *The architecture of Fumihiko Maki : space, city, order and making;* Basel, Boston: Birkhauser, 2003, 45.

[191] Masataka Ogawa, "Fumihiko Maki – Frontiers of contemporary Japanese art," The Japan Architect, 48, 3 (195), March 1973, 82.

[192] Jennifer Taylor with James Conner, *The architecture of Fumihiko Maki : space, city, order and making;* Basel, Boston: Birkhauser, 2003, 45.

[193] Redefining Collectivity, *The Japan Architect 78*, Summer, 2010, 8.

[194] Ibid.

[195] Ibid.

[196] Jennifer Taylor with James Conner, *The architecture of Fumihiko Maki : space, city, order and making;* Basel, Boston: Birkhauser, 2003, 26.

[197] Ibid.

[198] Harvard University. Graduate School of Design; *Movement systems in the city;* Cambridge, Mass., Harvard University, Graduate School of Design, 1965, 1.

[199] Ibid, 3.

[200] Ibid, 4.

[201] Ibid, 6.

[202] Ibid, 6.

[203] Ibid.

[204] Ibid.

[205] Ibid.

[206] Jennifer Taylor with James Conner, *The Architecture of Fumihiko Maki: Space, City, Order and Making,* Basel; Boston: Birkhauser, 2003, 43.

[207] Ibid.

[208] Harvard University. Graduate School of Design; *Movement systems in the city;* Cambridge, Mass., Harvard University, Graduate School of Design, 1965, 11.

[209] Fumihiko Maki, *Investigations In Collective Form*, Washington University In St. Louis, 1964, 28.

[210] Editors: Jerry Goldberg, Roger Montgomery, William Weismantel; *Education for urban design: proceedings of a conference held at Washington University School of Architecture,* January 8, 9, 10, 1962.

[211] Morton Hoppenfeld; "Some Significant Aspects of the Practice and Teaching of Urban Design;" in Editors: Jerry Goldberg, Roger Montgomery, William Weismantel; *Education for urban design: proceedings of a conference held at Washington University School of Architecture*, January 8, 9, 10, 1962. 79.

[212] Ibid, 81.

[213] Ibid.

[214] Ibid.

[215] Ibid.

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[217] Ibid, 94.

[218] Ibid.

[219] Roger Montgomery, "Education For Urban Renewal," in Editors: Jerry Goldberg, Roger Montgomery, William Weismantel; *Education for urban design: proceedings of a conference held at Washington University School of Architecture,* January 8, 9, 10, 1962, 140.

[220] Ibid, 144.

[221] Ibid.

[222] Ibid.

[223] Ibid.

[224] Ibid, 150.

[225] "Redefining Collectivity," *The Japan Architect 78* (Summer, 2010), 2.

[226] Ibid, 4.

[227] Thom Mayne, *Combinatory Urbanism : the complex behavior of collective form*, Culver City: Stray Dog Café, 2011.27-28.

[228] Ibid, 29.

[229] Ibid, 10.

[230] Ibid, 16.

Appendix A: Interviews

List of Interviewees:

Interviewee:

Fumihiko Maki

Founder and Principal of Maki and Associates

Questionnaire:

1) Did Mr. Maki apply his Collective Form theory in his teaching, either at WashU, GSD or back to Japan? Can Mr. Maki think of good examples on how Collective Form influenced his teaching?

2) I went to the University Archives last semester, but couldn't find too much studio information during that period. Is it possible that Mr. Maki still has some related documents on that period, especially on his teaching, such as syllabus on studio programs or student projects that involve the thoughts of Collective Form? I found two books on studio projects taught by Mr. Maki at GSD: "Movement Systems in the City" and "Intercity II". Are there other documents that I could use as references for how to apply Collective From on teaching design?

3) What are Mr. Maki's thoughts on Collective Form influencing the

contemporary architecture and urban design field? How does Mr. Maki see its potential impact on future teaching of design?

4) Could you think of examples by other architects that applied Collective Form or similar ideas, including real projects and design studio projects, from historical to contemporary?

Response:

February, 2013

Please find noted below my response to the question noted at the end of your e-mail. I hope that my response will assist you in further refining and finalizing your thesis.

1) For your information, I have never applied the ideas generated from Collective Form in my teaching at Washington University, Harvard Graduate School of Design, and Tokyo University. The reason being, as I would explain later, is that I was more interested in the broader aspects of urban design, and its application to the formation of a city fabric and culture in my

teaching.

2) At this time, I am unable to provide any additional related documents or teaching materials which may be useful for your research. However, might I suggest you reach out to Constantino Michaelides (former Dean), who might be able to inform you more about the MUD program and teaching during this time. Another person whom you might want to speak with is Cynthia Weese (former Dean).

3) I am not interested in tracing the influence of Collective Form on contemporary architecture and urban design. As I previously stated in an attached Introductory Chapter of the JA Magazine (Winter issue #16 1994-4-Fumihiko Maki) (refer to attached document), I have become more interested in the development of Collective Form out of heterogeneous elements (refer to my essay *Linkage in Collective Form*), which I encounter often in reality of practice.

4) Please consider Collective Form as a paradigm out of which people can develop their own ideas freely. Then, I believe you will able find numerous and countless examples for your research. I will be sending to you a project

pamphlet of the Republic Polytechnic Campus in Singapore as a good example that applies the ideas of Collective Form. Many spatial elements are organized within a mega-plate – called the Agora – which could be considered a group form, returning back to the metaphor of houses along a hillside.

I have been and still am very much interested in developing a whole out of a collection of individual elements, rather than the other way around.

Please be informed that the *Investigations in Collective Form* has been recently translated into French and German, as well as Japanese in special issue of *Shinkenchiku* (Japanese architecture magazine), which confirm an ongoing interest in the ideas generated back in 1960s even today.

Interviewee:

Thom Mayne, AIA.

Founder and Design Director of Morphosis Architects,

Co-founder of the Southern California Institute of Architecture,

Professor at School of Arts and Architecture, University of California, Los Angeles

Questionnaire:

(As part of a series of events celebrating the 50th anniversary of the Master of Urban Design program in the Graduate School of Architecture & Urban Design at Washington University in St. Louis, Thom Mayne delivered the keynote lecture for the symposium *URBANISM(S): Sustainable Cities for One Planet.* His speech included work from his recently published book *Combinatory Urbanism: The Complex Behavior of Collective Form*. The interview was conducted right before his lecture.)

1) When and how did you encounter Maki's writing on Collective Form? What was striking to you at that time? What made you come back to this idea more than 40 years after its publication?

2) Could you explain a bit more on how your book of Combinatory Urbanism picks up Maki's investigation on Collective Form? What is different or new in your take on Maki's theory? Regarding Stan Allen's comparison between Maki's theory and yours, do you think he gets it right?

3) How do you imagine Maki's theory and approach of design influence architectural and urban education? Do you address similar ideas in your teaching? If so, could you explain how it is carried out? What does it do for you in structuring studio projects? Can you give some examples? Do you know others who is practicing or teaching in approaches similar to Maki?

Response:

November 9, 2012

Q: How do you imagine Maki's theory and approach of design influence architectural design and urban design education? Do you address similar idea in your studio, do you have any example how it helps?

A: I'm gonna make it more specific. Which of the ideas are you interested in the book? Because I was only interested in two. And how do you extract the ideas? It's a treatise right? And how do you take it down to the key points. Because I did that just before I came here, knowing that you were going to ask me this question.

So, when I reread Investigations of Collective Form—7-8 years ago—and was given me by somebody as a Xerox (actually I think it was at Cornell); somebody gave it to me. Read it and it head three ideas that I was interested in that really paralleled ideas that I've been interested in for at least a decade or two decades.

One was this idea of a dynamic field of interrelated forces, and that was interesting because it's high-trade architecture. Because I mentioned earlier with Ralph Knowles, we understood architecture as a response to force fields and environments that are producing dynamic organizations that came out of the sun, wind, water in this very abstract exercise that was based on forces and the analysis of those forces. It wasn't static solutions; it was solutions that worked over time.

Well, it was interesting because the interrelated forces, in my language, would be combinatory. …the combinatory behavior of something, it's made up of multiple forces, and it's what I've done in the beginning. Very early on, early 80s, I started becoming interested more from an urban approach (I wouldn't have used these words) that buildings are made out of multiple typologies—and it wasn't morphologies: it was typologies. And it was a weird interpretation of Frampton (maybe, in some weird way) but it was coming from an urban position. But it was seeing something [not as a] singular building, these were tiny little buildings, but as multiple things that were put together as a response to the urban environment, and it was combinatory.

He [Maki] uses a quote, "Quazi-Building", and he's alluding to infrastructural. And he's responding to an architecture that's not quite architecture; is it architecture or is it infrastructure? And again, for me it's the infrastructure. Ten—fifteen years ago in our discussions we were including architecture, which was infrastructural and was moving toward the infrastructural, and was becoming less and less seen as architecture than the embodiment of the thing—as a describable thing. And I'll talk about that today in a project that's in Cincinnati, the original building is now just left as a field of things, that's definitely infrastructural, that's all coming from forces that are [part of the]

site condition.

He talks about the process of feedback and adaptation… several things. For me it would be the process of re-iteration, which has been the basis of my work from just about the beginning. You produce something, you critique it, you challenge it, and you produce something else, and then you do the same. And as you challenge it, you challenge it under different terms; urbanistic terms, in terms of its landscape, in terms of tectonics, in terms of certain functionalities. And it comes out of that reiterative approach and it is process driven. And it is constantly involved in this feedback system of information and challenging the nature of the problem and your response to that problem as part of that feedback information. And it's constantly attempting to adapt to the various conditions, to the various forces that you are putting in front of it.

And then I'm going to add to that… something that looks at our problems as information landscapes. And by landscape, it's again moving towards the infrastructural a network condition versus the thing itself and its more and more about its inner connections and it's starting to really affect your notion of organizational ideas and what architecture is. And it starts as methods of coherences; ideas of organizing complicated problems. And organized

complicated problems have autonomous systems.

Ah, I missed! The first one is a field of interrelated forces. Hmm, I never asked him… something that I was very acquainted with and [so were] the Smithsons in the middle 40s. If I remember right, it was 1944—because that's my birthday—that he wrote this. And I became aware of that years ago from multiple sources, because what happened is he articulated that architecture came from multiple forces, and each of those forces had their own autonomous characteristics. And that was hugely [powerful for me]; connected me all the way back to my education, and quickly became part of our architectural thinking. So I suspect that I'm looking for the origins of Maki's own article; there seem to be some clear places. And then, the information landscapes which we're moving in towards small networks. And then the one that I added to that would be the ecological understanding, which is going to be the extention to any number of characters that it's based [and I'm not sure which]. But it's going to be parallel to his interest in fluidity, adaptability, complexity. And it's going to be focused on integrative behavior, because that's what finally I'm interested in. And I think, when you translate, he uses those exact words, but he's interested in integral behavior. And it's interesting because it seems to be more of his writing and less of his work, because once I

read the piece I immediately went back and looked at the work again. Because I was affected by the work [in] completely different direction. So very early on, just before working in Japan… I was traveling to Japan, we had two big project in 87, and a lot of people my generation were just starting and were really active in Tokyo in the late 80s, the middle 80s. And weekly met Hasagawa, and Ito, and Ando, and it was a very active environment. And Maki, I remember going to his office because we had a show there and he introduced us. Later we were competing against them in a competition that he won and I was startled. It was just amazing building. So I knew him much more through his architecture. And I'd say, it wasn't organizational, it wasn't a wider space in a particular way. It was a tectonic project. Closer to a Rogers or a Foster, just about. But it still had this very Japanese sensibility.

When I read his *Investigations in Collective Form* it was another side of him I wasn't really aware of. And I went back and looked at the work. I don't think that's uncommon. All of it is connected. Our words and our work—they don't always connect. They come from experience. And so for me, I find the words very evocative and useful because I can interpret them and they help produce an argument.

And going back to the education; I would think that there is that clarity of argument, and I'm trying to interpret it into my own translation, that's completely relevant. And it's probably going to make it. It's quite enduring with these, it's pretty durable, let's say, because it seems to be quire relevant today. But it would be the next question (I'm trying to fill in the blanks) you'd ask me: what do I think about Maki? I'm taking particular lines, words, etc. I think that's what would have to take place; you'd have to meet with him and interrogate him and decide which of these sayings are still relevant. Again, we're talking about half a century. The shelf life of ideas today is 15 minutes or whatever. So it's fair to say that you really want to interrogate him to decide what aspects of this still somehow stimulate discourse, conversation, argument that is the basis of continuing dialog. And in this case it would be interesting to make a link to CIAM, Team 10 that ties very literally to Maki in Japan. And it's going to be a linkage, which in itself should be very interesting.

There's not a huge discourse in the urban area. And there is no belief in a world that is looking for those solutions, the bigger ones. Because they couldn't have done that without in some way, naïve or not, believing that they were solving real problems. And to put that amount of energy, that huge amount of effort that went into that, collectively. And I want to go back and

ask you a question now, your generation: is there even the basis of a belief to be interested in these problems, given the nature of your society? And I'm going go back and answer my own question: "Well, you would have to somehow then see the problematic within our urban infrastructural situation." It would say: "Well, Society's not there yet, but yes the problem exists and it would have to be solved on maybe just economic terms, or tectonic terms, or urbanistic transportation terms, or wherever you want to go." And so it won't matter if the public cares or not. If you looked at the economic aggregate in the country—you could take Los Angeles, Boston, New York, a little piece of Texas—you would have 60%-70% of the economic aggregate. Thus, you could make the whole country disappear, doesn't matter.

But we're doing studies with the institute in UCLA, studying LA as an urban aggregate. It's 17.5 million people! It's the size of Holland. And then we could say, Pasadena is the Huge and downtown LA is Rotterdam. And at the time of writing this, 8 years ago, it was the 9th largest economy, right ahead of Korea. And then we were looking at the political structure and we share two senators. The city is as large as the eight smallest states and they have 16 senators. And you go: "Oh, I get it. There's a structural problem in this country." And guess what, look at where we are in senate and in congress. The proportional thing

has gotten to where no one could have anticipated the rapid urbanization of the second half of the twentieth century. Not to the level of China, but still this continue urbanization, which is of course continuing further, is challenging our own political makeup at a structural level.

And if you study urban aggregates it's going to leave you with something really interesting. It's going to move the investigation more and more to the background as is the global connectivity, which forces to see things within global terms to be relevant. Forget the provincial, you can't even talk about the national, you have to talk about within global terms, that's how the world is interconnected commercially and politically. And at that level, it's going to require somebody who is very optimistic or very insightful of these problems and there will probably be payoff someday.

There are reasons that an urban study course is located in the reality of its context. What did Marx say? "The conditions of change happen prior to invention. And that's why you get simultaneity." So when Maki [wrote about collective form] and I was interested 15 years earlier in reading it, it's not that the connection is just obvious; there's numbers of people that are thinking about the problems and are responding to the conditions as they are reading

about them. And right now, the issue is, there doesn't seem to be an environment that is producing the conditions for change that demands a response, and an adventure, and an interpretation of solutions of the problem. And it seems that that will have to happen.

In today's world, can you come out from all directions? Can you invent something that is not connected to those conditions that somehow changes the force field? I'm not sure. Again, you'd have to be immensely optimistic. You'd be back in early modernism.

Interviewee:

Cynthia Weese, FAIA

Principal and a founding partner of Weese Langley Weese

Dean of the School of Architecture at Washington University from 1993-2005

Benjamin Horace Weese, FAIA.

Principal and a founding partner of Weese Langley Weese

A member of the Chicago Seven.

Questionnaire:

1) Could you introduce the history of how the Urban Design program was founded? What was Mr. Maki's effort in this?

2) Did Mr. Maki apply his Collective Form theory in his teaching, either at WashU, GSD or back to Japan? Can you think of good examples on how Collective Form influenced Mr. Maki's teaching?

3) I went to the University Archives last semester, but couldn't find too much studio information during that period. Is it possible that you still have some

related documents on that period, especially on his teaching, such as syllabus on studio programs or student projects that involve the thoughts of Collective Form? I found two books on studio projects taught by Mr. Maki at GSD: "Movement Systems in the City" and "Intercity II". Are there other documents that I could use as references for how to apply Collective From on teaching design?

4) What is your perspective on Collective Form influencing the contemporary architecture and urban design field? How do you see its potential impact on future teaching of design?

5) Could you think of examples by other architects that applied Collective Form or similar ideas, including real projects and design studio projects, from historical to contemporary?

Response:

March, 2013

Ms. Weese:

In 1967, Maki was visiting professor at University of California, Berkeley. Mary Comerio at Berkeley should be familiar with Roger Montgomery and she might be able to offer some useful information. Also, Jerry Goldberg, who is an architect and urban designer at SOM, San Francisco, worked with Maki on his essay in *Investigations in Collective From* when he was at Washington University. He should know a lot about Maki.

Maki might have started the project. During those years, Maki and Montgomery might also be the critics for thesis. (I am not sure though.) In 1961, I had Maki as the professor for the fourth year studio. It was the redevelopment of Delmar loop. The projects in most studios had the trend to become larger and larger in scale. The next year, urban design program was opened.

Mr. Weese:

I was close friend with Maki. Through Graham foundation, he met all kinds of people, such as principals, designers, etc. He seems to have an inquisitive nature, interested in working with the "culture and environment." He is a great observer, with curiosity towards the built environment. Also, he is a great learner of culture, language and architecture.

During those years (around 1960s), the urban renewal was ongoing effort in American cities such as St. Louis: many high-rise housing projects were built, sponsored by the city. The most important example was Pruitt-Igoe. The architect was lecturing in St. Louis. As for studio projects, I remember one of them was a “Forest Park Community College.” Most studios were focusing on housing and educational projects, with modern-looking design proposals.

Interviewee:

Robert L. Vickery, Jr.

Professor Emeritus at University of Virginia

Co-founder of VMDO Architects

Questionnaire:

1) Could you introduce some of the history when you were working at WashU and working with Mr. Maki, especially on the founding of Urban Design program and on Mr. Maki's writings?

2) Did Mr. Maki apply his Collective Form theory in his teaching, either at WashU, GSD or back to Japan? Can you think of good examples on how Collective Form influenced Mr. Maki's teaching?

3) I went to the University Archives last semester, but couldn't find too much studio information during that period. Is it possible that you still have some related documents on that period, especially on his teaching, such as syllabus on studio programs or student projects that involve the thoughts of Collective Form? I found two books on studio projects taught by Mr. Maki at GSD: "Movement Systems in the City" and "Intercity II". Are there other documents

that I could use as references for how to apply Collective From on teaching design?

4) What is your perspective on Collective Form influencing the contemporary architecture and urban design field? How do you see its potential impact on future teaching of design?

5) Could you think of examples by other architects that applied Collective Form or similar ideas, including real projects and design studio projects, from historical to contemporary?

Response:

I have read your questions. I will talk about what is on my mind regarding Maki and his collective form. I graduated in 1960, got married in 1962 and won Steedman fellowship in the same year. I travelled around the world until 1964, during which I met Chico in Japan. From 1964 to 67, I was involved in campus planning. I designed Mallinckrodt Center. I founded VMDO Architects with some friends. It is a firm mainly working on educational projects and is very much into LEED.

I attended the five-year program and I was excused for the first year. Maki was my first teacher in 1956. Bill Bondille, who graduated together with me in 1961, was then in MAUD program at WU. I believe Roger Montgomery did the most planning for this program. Also, Viceman, brought in by the Dean from law school to teach at architecture school, had important influence back then. Maki, as a teacher and a designer, preferred the program to be very clearly articulated. He definitely cared about how form-making could solve human problems.

Some interesting words related to Maki would be: fragmentation, collective form, group form, linkage, and transparency. I am reading the book "*Fumihiko Maki : an aesthetic of fragmentation*." I would prefer it to be called "collective form" rather than "fragmentation." As for the Hillside project, why is Maki so fond of talking about it? Or why is everywhere fond of talking about this project? It would be interesting to ask Maki's opinion. Also, it is necessary to read the book "*Team 10 Primer*." My speculation is the Hillside project is influenced by Team 10. Maybe you can find more information on the Team 10 meeting that Maki participated. Under Passonneau's deanship, he invited amazing architects. In "*Team 10 Primer*," there is a list on page two. I believe

a few of them came to teach at WU. Bakema taught in the fall of 1959, when I was in his studio. Van Eyck taught in the fall of 1958. Shad Woods taught at WU later. You can ask Maki how he thinks about their influences. I believe Van Eyck had most influences on Maki. You can look at van Eyck's projects, such as the children's home in Amsterdam and the housing for elderly, at Zwolle, Holland. The common things would be the structural elements. Van Eyck and Maki, both were interested in small elements coming together.

Another large influence on Maki would be Tange, who was interested in larger scale elements. The 1964 Tokyo Olympic project would be one example of larger scale connections. But vernacular designs were not so much in Maki's projects, although he talked about its influence a lot. He was interested in small elements and their linkages. I wonder why he did not design many vernacular projects. He did not like gigantic scale projects, such as the Tokyo train station. To Maki, experiencing architecture – the key is the human beings. Maki's group form can be applied to small scale more easily, obviously, such as vernacular village. How can it influence larger scale thinking?

As for Maki's *Investigations in Collective Form,* Passonneau asked me to edit the book. Jerry Goldberg worked together with Maki on the second essay. He

is a person worth talking to.

Maki's Steinberg hall, there are limited books talking about it. It is a project not that frequently mentioned or analyzed. Also, he didn't do that many similar projects later. I wonder if there is a reason.

In "*Team 10 Primer*," on page seventy-four, there is a project - the "Housing for Morocco" by Shad Woods. It is a project about grouping of dwellings. I believe Woods influenced Maki too. It is the repetitive forms Maki was interested in. Maki also cares about space between buildings, which is talked about in his collective form book. This is similar to the "in-between places" talked about by van Eyck. Also, Maki has been concerned about the existing site conditions and left-over space. You can ask Maki why he has never done high-rise housing. Also, ask Maki about the influence from Team10, Metabolism and Lynch.

As for linkage, Maki is interested in circulations holding things together. Linkages can be buildings, bridges, can be many things; how linkages connect the larger whole is something Maki is concerned with. Such as in Brasilia, listed as an example in Maki's book, all the elements are tied together by a

larger circulation network. Maki is also concerned about environment in his projects. But in some of his projects, the environment only has blank or empty lands. Maki is always realistic in interpretation – realism. Also, Maki's concept of linkages and framework can be architectural and urban at the same time.

Talking about Washington University's history, 1956-65 is a golden period. Dean Passonneau, knew every student; he brought famous architects from all over the world. When I was a student, Tange came and gave a sketch problem. The university was changing from a streetcar school to a more comprehensive university.

When I was teaching at Washington University (1963-1970), I helped a student with a thesis. He studied the city hall, the court house, and then the connecting avenues as the linkage. I asked the student to read Maki's collective form, get ideas from it, and then apply to his design. It is hard to find a copy of his project. But this way worked well.

As for how the curriculum was run. As one example, at University of Virginia (UVa), architecture and landscape students are combined into a large studio.

They travel abroad, have a local place for studio, and do joint/collaborative survey on a big site for a big project. After six months, the students will come back to UVa. Each student works on one project or one location or one aspect; otherwise, students can pair up. The six-week survey is about understanding the context and designing an overall scheme. After that the studio will move on into individual smaller scale elements. Collective efforts make a collaborative studio.

To apply the collective forms and linkage concepts into design, we should expand the words Maki has used and develop a broader selection of vocabulary, which can be applied to both buildings and urban spaces.

Incorporating the concepts of collective form in teaching, you can first develop a reading list for students. Travelling can be included in the content. You should think of how to get the ideas in the reading to the students. Maybe you can start with lectures on Maki's collective form. And then ask the students to investigate into his ideas, find examples/precedents. For examples, you can give a few words to students for study, such as linkage, framework, fragmentation, group, element, etc. Let the students explore what these words can mean in a physical form. Then ask the students to find projects as

examples, in both old projects and new projects. After the investigations, you can give specific programs to the students, such as housing, student center or campus design. They should try to apply the concept they have studied into the design. You can compare students' final proposals and see if all the words end up to be similar/different interpretations in their design.

Interviewee:

Robert F. Dannenbrink Jr., FAICP, AIA;

Principal of Dannenbrink Architectural/Urban Design & Planning

Instructor of the first MAUD class at Washington University

Questionnaire:

1) Could you explain when you were working at WashU and working with Mr. Maki, what were his major efforts on the founding of Urban Design program and on the first MUD studio?

2) Did Mr. Maki apply his Collective Form theory in his teaching, either at WashU, GSD or back to Japan? Can you think of good examples on how Collective Form influenced Mr. Maki's teaching? Is any of your materials showing some relevance to the idea of Collective Form?

3) What is your perspective on Collective Form influencing the contemporary architecture and urban design field? How do you see its potential impact on future teaching of design?

4) Could you think of examples by other architects that applied Collective

Form or similar ideas, including real projects and design studio projects, from historical to contemporary?

Response:

January, 2013

I will try to provide you with whatever information I can on Maki's teaching history at Washington University.

I had Maki for my 3rd year architecture design studio professor when I was in my Bachelor of Architecture program at WU. Later after obtaining my Master of Architecture and Master of City Planning from Penn Design (Univ. Pennsylvania) I returned to WU School of Architecture at, then, Dean Passonneau's invitation to join the faculty and assist Prof. Maki in the first Masters Urban Design Studio (MUD) 1962 as well as other professors in the undergraduate design studios.

I compiled the first "inaugural" studio program myself in consultation with Passonneau. Maki was working in Japan that summer and didn't arrive on

campus until shortly before the start of the Fall Semester.

I could send you copies of those early (MUD) studio programs. Maki left after the first year of the program to join the faculty at Harvard GSD under, then, Dean Sert to direct the Masters Urban Design Program there. The (late) Prof. Roger Montgomery returned after a year leave of absence to take over as Director of the MUD Program and I worked with Roger (who I also had for courses while I was a student) for the two following years.

My 3rd year architecture studio, I was a student with Prof. Maki. I have no material from this studio since it was from more than 50 years ago. In fact I'm trying to remember the project—it was either a school or a library, I think. I have no record of my work on this project.

Here's a list of what I could mail to you (hard copy).:

1. Two programs from the 1st MUD studio (Maki,Dannenbrink 1962)
2. Several photos of the scale massing model the students built from the 1st studio. It was very large—4'x12' in two sections.
3. Two programs from the 2nd year MUD studio (Montgomery, Dannenbrink 1963)

4. A report on student work prepared by the students of a 2nd year MUD studio (Montgomery, Dannenbrink 1963)

(Note: copies of the materials listed above will be available in the WU University Archives.)*

As for the answer to your questions:

1) As I pointed out in my previous responses, Maki was only the Director of the MUD Program one year (the founding year 1962-63) before leaving to head the Urban Design Program at Harvard GSD. Mr. Maki, himself, would be the best source of what his major aspirations, objectives, were for the MUD Program. Trying to remember 50 years ago! I would say some major objectives of the 1st studio project were to :

a. Reconcile relationship between functional form/organization and resulting visual form perception.

b. Examine interrelationship between public regulatory controls (ie. General plan zoning, development codes, etc.) and private development actions.

c. Establishing the public infrastructure systems (ie. Roads, utilities, public support facilities-schools, parks,etc.) as a “framework” for private investment decisions.

d. Explore non-hierarchical, non-compositional form: re: flexible dynamic design plans.

2) I can only reflect on his teaching at WU. As a student (my 3rd year Arch. Design studio with Maki-which was his first year on Faculty) I don’t recall much discussion of Group Form on our project. It was a small single site program for, I believe, a library. So, issues of complex multi-structure/multiple developers was not an issue to my recollection.

For the 1st MUD Studio 1962 (about 5 years later) he did expound on some of his notions about collective form—ie. Development of large portions of cities involving multiple developers, multiple ownerships over long time periods, unpredictable changes in private market decisions, etc.. I believe his own ideas were still evolving. He was part of a group of young architect/planners in Japan called “The Metabolist Group” who collaborated and shared common interests in a new philosophy about architecture and urban design. Looking at the photos of the model the MUD students produced for the 1st studio (the

Metro Corridor or Civic Spine of St. Louis) I see some evidence of Group Form thinking-particularly on—Eastside riverfront,Midtown area (Mill Creek Redevelopment), along northside of Forest Park and in the Clayton Business Center at western end of the corridor. However, I'm looking at a large scale model overall 4'x12' (I think 1"=500'). Unfortunately, I don't have any record of the student's more detailed studies of specific sub-centers (1"=200' maybe) which would reveal more about built form influence in their proposals.

3) I believe some of the basic ideas of "Collective Form" theory have relevance in teaching and practicing urban design and large scale architecture today. Long time frames and the unpredictability of market decisions,trends,uses call for more flexibility in urban design proposals—non-hierarchical,non-compositional (I believe Maki used those terms in his writing). Too many architects and urban designers assume there will only be one designer, one developer, one program over the lifetime of large districts and large sites. That's how it appears in renderings or models of their designs/plans.

The essence of urban design is to create the framework, as a sequential "armature" which can be flexible to change or be altered with implementation

by many designers, developers,changes in public authority personnel and elected officials over long time spans yet achieve successful results at any one time in history. Many compositional, semetrical designs are dependent upon total completion as originally designed for success. It is a challenge to deal with dynamic determinants but conceiving static, compositional, end-state designs are destined for failure and soon lose their value for direction or guidance. We live in a world of fast change (although economies fluxuate) and adaptability and flexibility are necessary ingredients of successful urban design and large scale architecture. It's an on-going process not a static "end state". Designers don't like to think about other designers revising or adding to their work in the long range future. Developers also have that "self ego" mindset.

4) Perhaps, some of Maki's former colleagues in the Metabolism Group have used Collective Form ideas in their executed work?

Also, there was a group of architects/planners in Europe called Team 10 which also exhibited similar thinking about mass form as Maki's Collective Form advocacy. (Publicatrion info attached-Team 10 Primer—should be in Arch Library. Some were visitors to WU School of Architecture.)

Interviewee:

Donald Brandenburger, AIA

(He is one of Robert F. Dannenbrink's fellow classmates from the Bachelor's Architecture Class at WU, who was also one of the graduate students in the Maki MAUD studio.)

Questionnaire:

1) What was your architectural background prior to arriving at WashU? What attracted you to the MUD program at WashU? What were your expectations from this new program?

2) What was your impression on Mr. Maki's or other faculty member's teaching methods during the first MUD studio? What was your impression on the studio structure and program? Could you recall what the project and the studio objective was and how the studio was structured?

3) Did you find the projects challenging and effective? Why or why not? Did the projects impact your career beyond your education? If so, how? What were the biggest lessons which you took away from this program?

4) What supplemental elements (reading assignments, intermediate assignments, personal research, etc.) helped you develop your projects?

5) Who were the critics (professors) during reviews or desk critiques? How did the critics (professors) help shape the development of your projects? What was the level and type of engagement?

6) Was Mr. Maki's Collective Form theory applied in his teaching or some students' design theme? Can you think of any examples on how Collective Form influenced Mr. Maki's teaching or students' learning?

7) What is your perspective on Collective Form influencing the contemporary architecture and urban design field? How do you see its potential impact on future teaching of design?

8) Could you think of examples by other architects that applied Collective Form or similar ideas, including real projects and design studio projects, from historical to contemporary?

9) If you have been in touch with some of your other classmates, would it be possible for you to introduce them to me?

Response:

January, 2013

I am afraid that I cannot assist, I have no records. I suggest contacting Fumihiko Maki, or as we called him; "Chico". He may have some record of the original MAUD classes, and he is a very kind man. Good luck.

Interviewee:

Eric Pettersson, R.

Arkitekt, professor emeritus

Protektor H.K.H. Kronprinsen

Landsformand for Plant Et Tree

Questionnaire:

1) Could you introduce how you were involved in WashU around 1950s or 60s? Did you work with Mr. Maki? How did Maki or someone else proposed the founding of Urban Design program? (I suppose the part might be in the notes that you are offering?)

2) Did Mr. Maki apply his Collective Form theory in his teaching, either at WashU, GSD or back to Japan? Can you think of good examples on how Collective Form influenced Mr. Maki's teaching? Or do you know anyone who were Maki's students back then? Or the students in the first Urban Design studio at WashU?

3) What is your perspective on Collective Form influencing the contemporary

architecture and urban design field? How do you see its potential impact on future teaching of design?

4) Could you think of examples by other architects that applied Collective Form or similar ideas, including real projects and design studio projects, from historical to contemporary?

Response:

January, 2013

It is wonderful to hear that your "old school" still calls for you. But your questions certainly makes me feel a part of "old history", since we are way back unto 1962.

Sure I can help you with some notes on the subject. Since Prof. Maki and others did prepared some written material for a conference prior to the opening of the MAUD program I attended in 1962.

Some of Maki's notes and thoughts later became a little booklet on Group

Form.

Unfortunately I don't have this small booklet any more. But I do have the original notes for the conference he prepared. I think that they will answer both your questions- namely the one on the Group Form Theory and the planning of the MAUD program.

I would like to donate these two books to your department, but in doing so, I need a name and formal address to mail it to. The two books with all the notes are around 150 pages together- but I am willing to mail it to the school as soon as I get an address. If you and the School are interested.

(Note: These materials are available in the WU University Archives (since March, 2013) as Eric Pettersson's donation, titled "City Theory, 63" and "Urban Design – St. Louis Conference, 63.")*

Feburay, 2013

Some personal notes on my experience in participating at the Masters program on Architecture and Urban Design at Washington University year 1962-1963.

Answers to questions by miss Xi Qiu.

1) I became a master student under prof. Maki 1962-63. I had in May 62 just completed my Danish Master program on Architecture and Urban Planning.
In the spring 62 I had applied for, and got a Fullbright scholarship for the Masters program at Wash. U. on Architecture and Urban design. It was my professional idea to get further “down” unto city planning and design, and prof. Marki´s theory presented in the program later became an important part of this interest.
However I had not previous heard about it at that time. I had only seen some reports and articles on Team 10 and C.I.A.M, and I think I had just seen some of Kenzo Tanges designs? – Maybe heard and not fully understood the name: “Metabolism”.

2) I do not recall any specific “teaching” in Group Form by prof. Maki- It was more a lot of talks and thinking, readings and reflections when he was teaching and some discussions among us students.
The only other professor I recall - who then taught on a similar subject connected to Makis thoughts - was Kevin Lynch in his lectures on experiencing cities, or The Image of the City as his book was called.

Some of us then felt that “Group Form” also had to do with getting hold of “what people experience” when building and living in cities. I then felt that Group Form always must be based on similar registrations like the ones Kevin Lynch taught us -.

But otherwise our education program seems to have some strange gab within the thinking in the group of teachers. The program introduced a whole group of “famous” people brought in during our semesters. But they were all apparently very much interested in most different subjects than prof. Maki. They were people, like Roger Montgomery, (even tough he had been working with Maki), Seckler from Austria, Chermaeyeff and Baker from Philadelphia. All gave us projects or lectures, where the conclusions or expected results were more over in “Megastructures”. Prof. Baker had just published his book on Design of Cities. And in the presentation of his theory behind it, he tried to “sell” it, as the only one, worth while pursuing. And it had nothing to do with Makis thoughts – I can tell you.

But I did come home with a lot of worthwhile notes and reflections on “how real urban planning in my opinion ought to be” and how many roads could lead to it.

There is no doubt in my mind, that these thoughts have formed my later work at offices both in New Orleans and Washington D.C. and my 35 years of

lecturing and teaching as a professor and head of the department in Urban Design at The School of Architecture in Aarhus Denmark, but also as guest professor at Wash. U. in 1975-76, and at University of Oregon, Eugene in 1986-87 and at The Technion in Israel.

Group Form is a very good teaching tool, for students to understand what Urban Design ought to be based on. It makes them thing on local culture-social networks, and traditions and therefore future limitations for a “free” (personal) planning and design.

Students tend to thing that “the world is there – but only for them and no body else”. This thinking later made me write a booklet on.”How to become a none-famous architect” – or “the anonymous architect”. I do think actually you will find a copy of it in your library.

3) The theories in Urban Designs after the introduction of Group Form- has developed further into theories on the important of understanding the “context” in which you are working- and then unto making your designs as “infill’s” - instead of individual pieces of “my architecture”. It has developed on the lines of perception rather than of math. In my opinion – lead by people like K. Lynch, G. Cullen, P. Thiel and later C. Alexander with his book on Pattern Language.

4) Personal, I still think that these theories have been very important for any understanding of building and development of cities than the previous on "Mega forms" as planning solutions. Unfortunately it no longer seems to be the case for any of the resent designers of cities, at least at our Design schools in Denmark. It is once again – Megastructures – there have to save the world apparently? I myself however feel have been formed by the thinking which was started by prof. Maki and his Group Form – He was among the first who reduced Metabolism to a scale more human and realistic. And I found it my great fortune –to have been at the right place at the right time.

February, 2013

I have now, send all your questions to the rest of the Old MAUD group from 1962. So you might soon receive their comments or re-calls of our studies at Wash U. It was at great time, with some of the best teachers in the country at that time- Kevin Lynch, Roger Montgomery, and others

We have since we left WU met one another here and there in the World- but since our 40 year reunion in St. Louis in 2003 also been gathering- on other occasions. Latest, we met this summer in San Francisco for our 50 year

anniversary. It is not just a social gathering- but also “shop talk”.

We are located as you can see below, around the world.

The Americans: Ralph, Don and Bill are now retired from their own architectural offices.

Gunduz has been teaching at the school of architecture in Chicago

Shigeyuki and my selves have like Gunduz been teaching most of the time: Shige in Japan, in Kyoto. And by the way apparently still has contact with professor Maki. I myself met Maki in Denmark in 2003 when he lectured at my department.

Ian Campbell and Herbert have also worked in their own offices in Scotland and Vienna.

USA

Boston: Ralph Insinger <rhinsinger@comcast.net>

Chicago: Gunduz Dagdalen <astndagdelen@earthlink.net>

San Francisco: Don Brandenburger <don.ba@comcast.net>

San Francisco: Bill Bonville <bomguard@comcast.net>;

Japan

Shigeyuki Okazaki <okazakis@theia.ocn.ne.jp>

Scotland

Iain Campbell <mail@cparchitects.net> (write: Attention: Iain Campbell Senior. There are two of the same name at this address)

Denmark

Eric Pettersson <eric.pettersson@mail.dk>

Austria

Herbert Loidolt, Anastasius Grun Gasse 41/14, 1180 Vienna, Austria

Interviewee:

Ralph Insinger

Student from the first MAUD class at Washington University

Questionare:

1) What was your architectural background prior to arriving at WashU? What attracted you to the MUD program at WashU? What were your expectations from this new program?

2) What was your impression on Mr. Maki's or other faculty member's teaching methods during the first MUD studio? What was your impression on the studio structure and program? Could you recall what the project and the studio objective was and how the studio was structured?

3) Did you find the projects challenging and effective? Why or why not? Did the projects impact your career beyond your education? If so, how? What were the biggest lessons which you took away from this program?

4) What supplemental elements (reading assignments, intermediate assignments, personal research, etc.) helped you develop your projects?

5) Who were the critics (professors) during reviews or desk critiques? How did the critics (professors) help shape the development of your projects? What was the level and type of engagement?

6) Was Mr. Maki's Collective Form theory applied in his teaching or some students' design theme? Can you think of any examples on how Collective Form influenced Mr. Maki's teaching or students' learning?

7) Do you still have some material from that program, such as the copies of studio descriptions, design proposals, or pictures of models and classmates, etc.? Would it be possible for me to look at the digital copy?

8) What is your perspective on Collective Form influencing the contemporary architecture and urban design field? How do you see its potential impact on future teaching of design?

9) Could you think of examples by other architects that applied Collective Form or similar ideas, including real projects and design studio projects, from historical to contemporary?

10) If you have been in touch with some of your other classmates, would it be possible for you to introduce them to me?

Response:

February, 2013

I believe the post-World War II years may have aroused fresh interest in urban design and urban form, most actively in European countries that experienced severe destruction by the time the war ended. England and Japan likewise had suffered a lot of damage, and comprehensive redevelopment was an opportunity to organize and build coherent centers. Urban design concepts were applied more abroad than in the United States, where it seems to me post war urban issues were more about planning and zoning, not visual and functional aspects of three dimensional group form.

Probably the greatest design challenge to Collective Form (Mega-Form and Group Form) is respecting human scale and human use patterns. Traffic control, pedestrian/vehicle separation, building services access, tranquil people

zones, security concerns, etc. These issues have already been confronted in some cities that have transformed dense center-city districts into pedestrian-only zones. Such conversion succeeded by restricting service access to limited specified hours, pedestrians and vehicles managed through the use of paving texture and pattern, and the use of bollards and elevated barriers to block traffic in selected areas.

Moving on to your list of questions:

1) Prior to entering the MAUD program, I graduated from Washington U. in 1958 with a Bachelor of Architecture degree. During previous summers I had worked in architectural offices. One summer I worked in the campus planning office with Fumihiko Maki, which was the period when he was conceptualizing Steinberg Hall. Another summer I worked for Roger Montgomery, assisting him with some design research about housing and transportation. (Between 1958 and 1962 I served in the U.S. Army, and after was employed in architecture.)

My attraction to Washington U. for the MAUD program was my trust and admiration for Joseph Passonneau, then Dean of the School of Architecture, who offered me an invitation and a scholarship to attend. He also informed me

that Maki and Montgomery would give seminars about urban issues, and that appealed to me. Another motivation was Passonneau's assurance that more than half the class would be from abroad (Austria, China, Denmark, Japan, Scotland, and Turkey), and such an opportunity for cultural exchange motivated me.

My expectation from the program was (even superficially) to gain a deeper understanding of the active forces controlling urban environment, and the collaboration necessary with government, services, logistics, private investment, etc. to generate solutions for wide area development. The knowledge gained would also give me better architectural judgment when designing any singular building in dense urban centers.

2) It's my belief that our MAUD class was a "guinea pig" with which to experiment. And I don't say that disparagingly. No one knew the ideal curriculum, there was not a body of specialists available to teach some of the courses that were deemed important for the program, it was uncertain how courses vital to the class members from the States, would fare with the foreign students, and the distribution of hours for the various courses was untested. So why not let the proposed studio format proceed, see how the individuals

interacted, and let everyone put in their "2 cents worth". Then critique the outcome.

The studio structure was simplistic. There was a large drafting room and a conference room adjacent. Faculty members used the conference room to lecture, distribute syllabuses, discuss project objectives, and set dates for progress sessions, reviews and critiques. In the interim, class members set their own study hours, using the drafting room to draw, read, share ideas, etc. There was a lot of "churn" as our class members argued about how loose or tight the project requirements could be interpreted. There was also a lot of laughter.

From my memory, faculty members didn't have a very distinctive teaching style. Seminars were a lecture format, there were slide shows to illustrate topical material, chalkboard and easels were utilized for sketches, diagrams, and outline lists, and Q&A sessions were encouraged. There was none of the hi-tech equipment common to academia today.

3) To my mind the projects were challenging and effective primarily because they were inserted into actual St. Louis urban circumstances...sites that related

to specific land form, building form, monuments, arterial roads, etc. Easy access to local government for pertinent documents, quick trips to inspect site conditions, simplicity of shooting photos for contextual reference, all contributed to the project results.

A couple lessons learned from the urban design process are, 1) that super-size developments (collective form, group form, megastructure, whatever you want to call them) are dependent on a multi-talented team, each of which has an interest to protect. Working toward a solution involves a lot of politics, polemic, negotiation, collaboration, and compromise; and 2) the realization of large scale development doesn't occur overnight. It can take years for all the issues to get settled and construction to proceed.

There were developer projects later in my career that passed review by the authorities, had been documented in great detail, only to be stopped and put into job-file storage. Then, two or three years later we were summoned to meet, given updated information, and directed to get the development going again. The timeline with such work is seldom certain.

4) Personal research, and subsequent exchange of such information with other

team members was most useful. Aside from the program coursework, we had elective choices. Moreover, I believe my personal experiences, gained from domestic travel and significant travel abroad before entering the MAUD program, were quite supportive for studio projects.

5) Our program didn't have a full-time professor. The individual most accessible for our studio group was perhaps Dean Passonneau, shepherding our class, and no doubt subconsciously evaluating the activities and results as each part of the program was accomplished. We had seminars with professors or lecturers such as Edmund Bacon, Serge Chermayeff, Earnest Connally, Fumihiko Maki, Roger Montgomery, Eduard Sekler, William Weismantel, and Joseph Passonneau.

6) Quite possibly Maki integrated his Collective Form theory into his teaching, but I cannot recall it. Admittedly that may be a matter of my poor memory. The class did a high density housing project in the area of 12th Street and Market Street in downtown St. Louis, and a large scale commercial center/transportation hub in central University City near the Delmar Loop, and as a critic during the design of those projects Maki's theory could have been introduced.

7) Regrettably, I no longer have any materials produced during the MAUD program. Over the past 50 years my family has moved multiple times and along the way I purged a lot of material that I had kept for years. I'm sorry that I have nothing to pass on to you in that regard. Perhaps Eric Pettersson gave you a list of names of the members of our Class of '63. One of the class members is Mr. Herbert Loidolt, and he has the tendency to "save everything". He is perhaps your best source of studio descriptions, design proposals, and pictures. Herbert takes many, many pictures, of which you may be able to get copies. Of course, the main thing is whether he can find those items in his vast collection.

8) In the United States, development is primarily the realm of private investors, and unless government authorities in control of certain zones of new development demand collaborative efforts, and hence collective form, I'm not expecting much progress here. Group form won't be planned, it will just evolve. People-use patterns force environments to adapt through change.

Collective form may gain more proponents by means of teaching design. After all, both are grounded in theory that attempts to break down long established

standards that tend to stifle fresh applications in function and material use. Academia is the place to sow the seeds that in time will grow into a stronger force within the development field.

9) Some samples that might apply are the SONY-DB complex at Potsdamer Platz in Berlin, and another the Frankfurt Airport complex, both are vast people centers, relatively new in Germany. An older example of mega-structure would be Hook New Town, a development designed in 1961 for Hook, in Hampshire UK, that never received the support expected, and was never built.

I think you will want to examine Fumihiko Maki's body of built work, to see how well his theoretic principles of Collective Form have found expression in his work.

Presumably you have attempted to contact Jerry Goldberg, Maki's co-author of Linkage in Collective Form, for more up-to-date evidence of applications of Collective Form in contemporary built projects.

10) Here is a list of my MAUD classmates, and their email addresses. You

may already have these from Eric Pettersson.

USA Bill Bonville.....bomguard@comcast.net

USA Don Brandenburger.....don.ba@comcast.net

Scotland Iain Campbell.....Iain Campbell (MAUD)

<mail@cparchitects.net>

Turkey Gunduz Dagdelen.....astndagdelen@earthlink.net

Japan Shigeyuki Okazaki.....okazakis@theia.ocn.ne.jp

Denmark Eric Pettersson.....eric.pettersson@mail.dk

Austria Herbert Loidolt.....No Email Address.....Postal Address:

Anastasius Grün Gasse 41/14, 1180 Vienna, Austria

USA Robert Thompson (deceased)

Attached is a MAUD '63 group picture, taken last year at our 50 year reunion.

The persons in the photo are identified from left to right.

1st row (kneeling).....Iain Campbell, Jean Brandenburger (Don's wife), Bruno

Ast (Gunduz's husband)

2nd row (3 women).....Patty Thompson (Bob's wife), Gunduz Dagdelen,

Ginger Bonville (Bill's wife)

3rd row.....Ralph Insinger, Herbert Loidolt, Bill Bonville, Eric

Pettersson, Elisabeth Pettersson (Eric's wife)

Shigeyuki Okazaki did not attend the reunion. Don Brandenburger is not shown because he was taking the picture.

I hope this response will provide some substantive material, perhaps in conjunction with information sent from others in our group. It will be quite interesting when all the responses come in, to see how consistent we individuals are concerning what we remember.

Appendix B: Maki/Dannenbrink Studio (1962-63)

the 1st MUD Studio ! Dannenbrink

Urban Design Studio. Arch. 711-712 Washington University
General Semester Program. Fall 1962 (Sept.) School of Architecture

Coordinators: Professor Maki and Mr. Dannenbrink.
Consultants: Dean Passonneau, Professor Weismantel, Professor Roberts, and Mr. Vickery.

of WMRT

INTRODUCTION

Today, some of our great problems are found in the World's expanding urban places. For the urban university, the surrounding environment provides a laboratory for the study of these problems, especially those of the man-made physical environment.

This semester the Master's Studio will focus attention on a particular part of the St. Louis Area. The subject is an evolving linear development, nearly 10 miles in extent, of varied activities performing important area-wide functions. This spine-like axis, in the center of the expanding urban area, contains the area's most important institutions. Present here are the seeds for the development of a great "civic place" where aspirations of its citizenry may be fulfilled.

OBJECTIVES OF THE STUDY

The major concerns and objectives of the study will be:

To develop new form concepts for the core of an expanding metropolis, and search for a new theoretical structure in urban design.

To explore the meaning of design on a metropolitan scale including the temporal factor of movement.

To investigate the phenomena of constant change in today's dynamic city and to pose physical solutions that recognize change.

To develop more positive means to guide the myriad individual actions, that build cities, toward desired environmental objectives.

Some useful by-products of the study may be to demonstrate the wholeness of the local community, split by factional interests and artificial boundaries, and the civic potentials of the area treated as a single functioning unit. Ideas and concepts, produced by the study may influence planning thought in the St. Louis Area.

If the completed project is of good quality it may be a major exhibit at the 1964 American Institute of Architects National Convention, and the 1965 American Institute of Planners National Convention, both to be held in St. Louis.

HISTORICAL BACKGROUND

St. Louis was founded in 1764 by French fur traders from New Orleans. The site chosen was a strategic location on a flood-free bluff on the west side of the Mississippi River a few miles downstream from the confluence of the Missouri and Mississippi Rivers. The city was originally under Spanish control and later under the French flag. It became part of theUnited States of America through the Louisiana Purchase during President Thomas Jefferson's administration. Due to its location at the heads of the Missouri, Ohio, and Mississippi riverways, the city was in a position to tap a great trade area reaching to the Rocky Mountains and into Canada. Thus, it became the hub of commerce, transportation, culture, and the gateway to the west beyond.

St. Louis was a booming river port for both passenger and freight traffic until the Civil War (1861-1865) and its blockades. Railroads, the newly evolving means of continental transport, changed the main trade route from north and south by water to east and west by rail.

Delay in bridging the Mississippi River at St. Louis, along with other factors, aided her fast-growing neighbor to the north, Chicago, to cut-off a large part of St. Louis' trade area and eventually Chicago replaced St. Louis as capital of the mid-continent.

St. Louis, however, continued growing and highly diversified manufacturing flourished. Labor to man the growing industries came from the eastern United States and later from the South. Foreign born were added to the labor force as immigrants came, during the last quarter of the 19th century, from Germany, Ireland, and Italy. In the early 1900's migrating negroes, from the South, and Jewish refugees, from central and eastern Europe, were added to the labor force.

St. Louis grew rapidly before the Civil War and continued growing after the War although at a slower rate. In 1876 the City divorced itself from its rural County and the present City boundary was set.

The City continued growing moderately, after the turn of the century, while the area outside the City was changing rapidly from rural to urban as centripetal movement of population took place. Since 1950 the City's population has declined while the suburbs have boomed. The County area is politically subdivided to an extreme degree. There are about 100 independent municipalities in the County, thus, area-wide policy and development is practically impossible. The Mississippi River, spliting the metropolitan area, forms a state boundary and presents further political complications.

The area grew concentrically outward from the initial river bank settlement and now, decay and obsolescence are progressing outward in the same manner. Urban renewal has become necessary to restore these areas to productive use again.

Despite many problems, the metropolitan area as a whole continues to prosper and according to the 1960 census numbers 2,060,103. The area is an important industrial center of the nation with diversified manufacturing activities. Transportation and geographic location are still very important factors in the area's economic status since it is the nation's second largest railroad and trucking center and the largest inland river port.

DESCRIPTION OF THE STUDY AREA

The study area embraces a linear strip, or sector, extending some 9 miles westward from the Mississippi River. Within this sector are contained most of the community's services that are Metropolitan in scope. These include the major financial institutions, office centers, hotels, multi-story apartments, major retail stores, entertainment centers, cultural facilities, two universities and other educational and social institutions, recreational lands, medical centers, transportation terminals, and governmental headquarters.

This linear or spine-like development occurs principally along, or nearby, the Olive Street-Lindell Boulevard-Forsyth Boulevard axis. Anchoring this development at the riverfront is the Jefferson National Expansion Memorial currently in process of construction. The design, chosen by nationwide competition, was executed by the late architect Eero Saarinen. Its principal feature is a 630 foot high stainless steel arch, set in a landscaped park, symbolizing the City's role as the "Gateway to the West". This riverfront site is the location of the original city.

Flanking the riverfront park on the west is the "so-called" central business district or "downtown." This is the location of major financial institutions, office buildings, major retail and wholesale establishments, hotels, entertainment and cultural facilities, subsidiary business services, multi-story apartments, a railroad and bus terminal, and the headquarters of the City government. This district is currently in a phase of redevelopment, including more residential accommodations in multi-story apartments, a new sports stadium with accompanying hotel and commercial facilities, new office buildings, more public open space and automobile parking garages.

Abutting the western edge of the downtown district is a 465 acre urban renewal project known as the Mill Creek Valley. This area is bounded on the north by Olive Street and extends west to Grand Boulevard, a major north-south artery. The redevelopment of the Mill Creek Area calls for new residential accommodations in the form of row house and multi-story apartments. Also included in the plans are light industrial and commercial establishments and expansion of Saint Louis University which lies adjacent to the area on its western edge.

The intersection of Olive Street-Lindell Boulevard and Grand Boulevard is the locus of a secondary node of office buildings, retail establishments, medical facilities, entertainment places, social institutions and the University. This node occurs approximately 3 miles west from the River.

The next segment of the axis extends further west, approximately 1 1/2 miles, to the eastern edge of Forest Park. The axis, here, is called Lindell Boulevard. This segment is currently undergoing a metamorphosis. Here, change is taking place by operations of the normal real estate market in contrast to the change occuring by government intervention in the Mill Creek renewal area. Office buildings, institutions, multi-story apartments, hotels, and entertainment establishments are replacing large old residences formerly occupied by people of substantial wealth. Many of these residences had earlier been converted to multi-family apartment and rooming houses. Most of the offices and institutions in this sector are headquarters for local establishments and local headquarters for national firms. One of the metropolitan area's major entertainment centers lies 4 blocks north of the Lindell axis about the mid-point of this segment. This is "Gaslight Square" - a linear development of night clubs, sidewalk cafes, coffee house, and playhouses.

The next segment of the Lindell Boulevard axis continues west, some 2 miles, and is culminated visually and physically by the buildings and campus of Washington University. The north side of this segment is lined with large mansions along the entire 2 mile extent. Just north of this segment lie some hotels, apartments, and another entertainment center. This part of the axis also forms the northern boundary of Forest Park, one of the largest city parks in the nation.

Within Forest Park are some of the metropolitan area's major cultural and recreational facilities including: the City Art Museum, Zoological Gardens, the Municipal (outdoor) Opera, the Jefferson Memorial (a museum devoted to local and regional social and cultural history), the Planetarium, the Jewel Box (horticultural displays), an ice skating rink, golf courses, and other sports facilities. A large indoor sports arena and an amusement park are adjacent to the Park on the south. Most of the east edge of the Park is lined with multi-story hotels and apartment houses and the Washington University-Barnes Medical Center. New multi-story apartments are appearing along the west edge of the park.

As mentioned previously, the campus of Washington University interrupts the continuous axis, slightly, and it continues onto Forsyth Boulevard which forms the southern boundary of the University's academic campus. This last segment, along Forsyth Boulevard, extends another 2 miles from the west end of Forest Park to Clayton, the metropolitan area's second largest business center. A short distance from the Park the axis passes across the City boundary into St. Louis County. Between the University and the Clayton business district the axis is entirely lined by residences and some institutions.

Clayton is the location of the St. Louis County governmental headquarters. In a little more than a decade this district has changed from essentially providing local services to a center for metropolitan services. Nearly one million square feet of office space has been constructed here since 1946. The district contains office buildings (many local headquarters for national firms), some financial institutions, a hotel, multi-story apartments, retail establishments, recreational land and a nearby medical center. Additional office, hotel, and apartment structures are in planning stages.

New highway facilities, in planning stages and under construction within the east-west sector, will affect accessibility, enable new interactions and provide new paths for experiencing this linear spine development. A new expressway and bridge across the Mississippi at the south end of the riverfront park will more closely link East St. Louis, Illinois with the development on the Missouri side. Also, plans to locate the National Museum of Transportation on the east bank, across the river from the Memorial, suggest that this area be included in the study.

STUDY PROGRAM

PHASE I Sept. 24 - Nov. 21

1st week: Sept. 24-30 — Sept. 24 - The first class meeting, discussion of the project, survey assignments, preliminary survey.

2nd week: Oct. 1-6 — Survey work continued, presentation work.

Review Oct. 8.

The first two weeks will be spent on extensive reconnaissance of the St. Louis area to enable the students to understand the basic organization of various urban activities and their relation to the study area. Survey work will be divided into several teams (3 or 4 members each).

Survey work:

A. Visual survey of the study area

Pettersson
campbell
vandenburgen
onville

The major objective of this survey is to describe the essential visual character of the spine in terms of photographs, sketches, and two dimensional graphic symbolic notations. Particular attention should be focused on sequences of visual impressions, vistas from within the spine as well as from key approaches to the spine, significant landmarks, activity concentrations, distinct districts and natural boundaries, and also point out problems and opportunities. Make a visual analysis and portray, graphically, movement and parking patterns. Analyze the proposed new transportation channels with respect to possible new visual experiences. Make an abstract graphic characterization of architectural and open-space rhythms and sequences along the spine. Point out particular recurring prototypes. Use diagramatic cross sections to illustrate scale of spaces. Consider the influence of plant life and man-made street furniture on spaces.

B. Physical survey

thompson
vidolt
wsinger
kazaki
zgdelen

This survey should portray the relationship between the spine and the rest of the metropolitan area. The survey should include:

1. Present land use and transportation system. 2000'
2. Proposed land use and transportation system.
3. Abstraction of present pattern of activities along the spine and their relation to the total area. (Emphasis on specific activities rather than broad use classifications.) 500'
4. Graphic presentation of historical development of the spine (1764-1962). 2000'
5. Abstract characterization of the natural land form (topography) and an analysis of its relation to man-made structure (streets, buildings... 2000' 500'
6. Describe micro-climatic variations along the spine at different times of the day and infer possible effects on human beings at different seasons of the year. Consider spaces, light, shadow, trees, and building masses.

C. Social survey

This survey will furnish data with which to better understand existing social conditions and also to hypothesize future conditions. Particular studies will be:

1. Future patterns of urban society as a place for living, working and recreation.
2. Relationships between physical environment and human organization.
3. Characteristics of St. Louis as a human society - past, present, and future.

D. Preparation of basemap and base model. To include:

1. Three base maps at scales of 1" = 500', and 1" = 2000' showing streets, building, topography, and proposed building and highway projects. 1"=200' 1"=50' ? prototypes
2. A base model at scale of 1" = 200' showing contours, streets, and buildings, and large areas of trees. 500'

3rd week: Oct. 8-13
4th week: Oct. 15-20
Review: Oct. 22

Oct. 8 - Assignments given. Area studies throughout 2 week period.

These two weeks will be spent for more detailed investigation (surveys, need study, programing) of several important areas lying along the spine. The class will be divided into groups for the study.

Area I Washington University and Clayton Business District.

Area II Area north of Forest Park between Washington University and east end of the Park (Kingshighway Blvd.)

Area III Lindell Boulevard (and contigious areas on north and south) between east end of Forest Park and the Grand-Lindell activity node, to include the future development of Washington University - Barnes Medical Center and Saint Louis University.

Area IV The area north of Olive Street between Grand Boulevard and the proposed North - South Distributor expressway at the west edge of the downtown district.

Present development plans of the Mill Creek Valley and downtown district will be reviewed and, if found questionable in part or entirety, will be revised.

The main objective of these investigations is to establish more specific background material for further projection of facility needs in these areas and the development of overall strategy for the spine study. An economic consultant will aid the development of the class project by supplying the following material:

1. Survey on present economic situation and real estate trends.
2. Investigation of possible public and private development programs.
3. A cost study upon completion of the studio proposal.

5th week: Oct. 22-28
6th week: Oct. 29-Nov. 3
7th week: Nov. 5-10
8th week: Nov. 12-18

Oct. 22 Assignments given. Preparation of of Master Program, Master Form, investigation of development control methods, throughout 4 week period.

First Jury No. 20 Outside people will be invited
Class review Nov. 21.
Thanksgiving Holiday Nov. 22-25.

This is the most important phase of the study and will require rigorous and conscientious effort. The main objectives of this four week period will be to develop: 1. The Master Program, 2. The Master Form of the spine, and 3. An optimum control system.

The optimum control mechanism consists of several interdependent systems:

A. Transportation system -
   1. Public transit and terminals.
   2. Expressway, parking terminals and local street system.
   3. Service system.

B. Pedestrian system

C. System of total physical form

D. Establishment of physical medients

E. The system between constant elements and changeable elements.

F. The system between control elements (public structure) and free elements (private structure)

G. Activity system.

PHASE II Nov. 26 - Jan. 19.

10th week: Nov. 26-Dec. 1
11th week: Dec. 3-8
12th week: Dec. 10-15

Nov. 26 Assignments given. Development of pro.to-elements and group system throughout 3 week period.

Review I Dec. ~~10~~ 17
Christmas vacation Dec. 20- Jan. 2
Review II Jan. 3

During this period each individual, or group of individuals, will investigate, in more detail, the physical form of some element or group in the spine development.

As examples: 1. Design of constant and control elements-
   Transportation terminal
   Garage system
   Gateway
   Monument
   Public utilities, etc.
2. Physical system of grouping-
   Offices
   Shopping facilities
   Amusement facilities
   Living quarters, etc.

Mass construction systems and connection to city service equipment, etc., will be studied with relation to the total physical system.

Jan. 4-16	Presentation period.
Jan. 16	Presentation material due.
Jan. 18	Final Jury - outside critics will be invited.
Jan. 19	Review for the public. Important civic and business leaders of St. Louis will be invited.

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Maki/Dannenbrink Studio Dannenbrink

Urban Design Studio. Arch. 711-712 Washington University
Supplementary Program Phase II Oct. 22--Nov. 21 School of Architecture

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OBJECTIVES

There are two major objectives of this study period:

I. The development of a master program and master form for the overall study area and also, the investigation and development of control methods.

II. The preparation of programs and designs for specific study areas.

The class will be divided into teams and each team will develop an overall parti plus, develop in more detail, a specific part in the overall area. Both I and II will be carried on concurrently although initial effort should be focused on the overall master program and form.

TEAMS AND SPECIAL AREA ASSIGNMENTS

Group 1: Brandenburger, Okazaki, Pettersson.
Special study area- Clayton to Kingshighway including Washington University and the area north of Forest Park.

Group 2: Bonville, Dagdelen, Loidolt.
Special study area- Kingshighway to north-south distributor expressway including the hotel-apartment district, Washington University-Barnes medical center, gaslight square, Saint Louis University-midtown core, Mill Creek redevelopment and area north of Olive between Grand and north-south distributor expressway.

Group 3: Campbell, Insinger, Thompson.
Special study area- north-south distributor expressway to East St. Louis including downtown St. Louis.

Each team is responsible for putting important buildings from their area on the 1"=500' base map.

MASTER PROGRAM AND MASTER FORM

Development of overall program, form and control system including: ~~2000'~~ 500' scale

1. Overall land-use pattern.
2. Overall activity distribution.
3. Basic design structure.
4. Movement control system.

   a. Vehicular channels- differentiate hierarchies (expressway, major artery, collector, local etc.) and parking terminals.

   b. Public transit system and terminals.

   c. Service system- movement and delivery of goods and city utilities.

5. Investigation of the relationship between functional structure and visual structure.

6. Relation of the control structure (essentially public) to the private structure.

7. Open space system.

   a. Pedestrian movement channels.

   b. Relation of open space to the total design structure, and examination of the role of natural landscaping in urban design.

8. Architectural control methods.

Review October 29 of overall design structure.

SPECIAL AREA STUDIES

Programming and designs for significant areas in the overall structure including: (500' scale ?)

1. Preparation of base map at 1" = 200', for cores, showing existing streets, proposed highways, significant buildings, open space, and topography.

2. Analysis of existing activities.

   a. Business
   b. Retailing (consumer services)
   c. Wholesaling
   d. Amusement
   e. Cultural (public facilities and private institutions)
   f. Hotels
   g. Automobile garages + parking
   h. Transportation terminals
   i. Manufacturing
   j. Residential

3. Visual survey.

4. Diagramatic site sections through significant areas at scale of 1" = 200'.

5. Description, verbal and graphic, of present and future problems and opportunities within the special areas.

6. Development of a basic program and design structure for the area.

Review November 5 of special area program and design.

First Jury	November 20
Class review	November 21
Thanksgiving holiday	November 22-25

Maki / Dannenbrink

Dannenbrink

Urban Design Studio Arch. 711-712
Supplementary Program Phase II
Special Area Study Nov. 5-12
Review Nov. 13

Washington University
School of Architecture

PRESENTATION REQUIREMENTS FOR SPECIAL AREA STUDY

GRAPHIC MATERIAL:

At scale 1" = 500':

1. Visual analysis
2. Activity analysis
   a. existing patterns
   b. proposed patterns
3. Movement diagram
   a. existing pattern
   b. proposed pattern
4. Proposed circulation system for people and goods
   Differentiate hierarchies
   a. expressway
   b. special parkways
   c. major thoroughfares
   d. local distributors
   e. pedestrian paths
5. Relationship of proposed functional and visual structure
6. Diagrammatic site sections, along key axis and abstraction of the land form
7. Diagrammatic indication of major forces, trends, problems and opportunities in the area.
8. Proposed control structure (or public structure)
   a. streets, parking terminals and garages
   b. public open space system
   c. public facilities - schools, libraries, community centers, etc.

At scale 1" = 200':

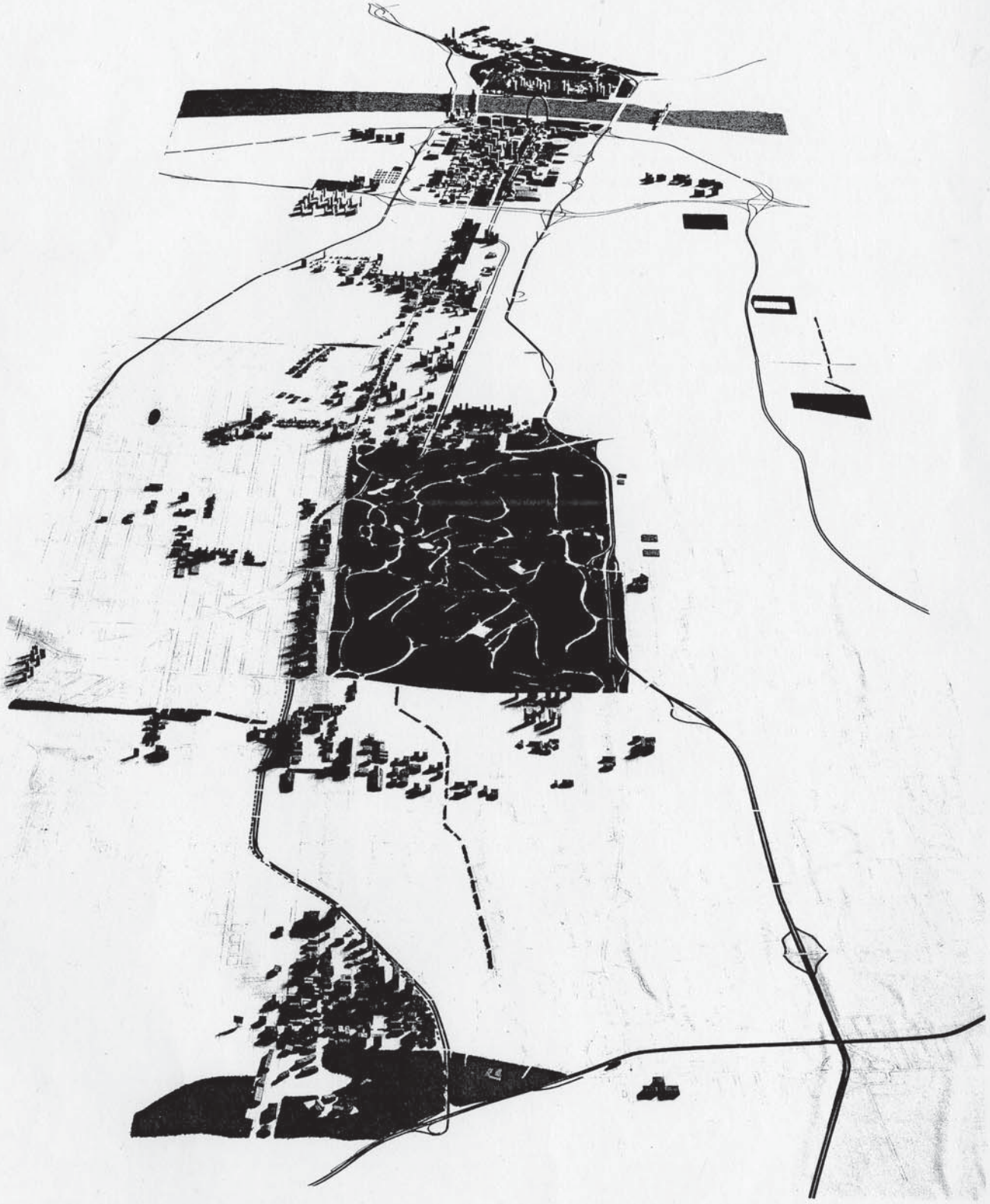
A base map of important activity centers showing existing streets, proposed new highways, significant buildings, proposed new buildings, and topography.

VERBAL MATERIAL:

Each team will prepare a written program stating basic objectives in the development of the area. This program should include a compilation of projected physical growth (space needs) for various activities in the area. Projection should be made to the year 1980. Growth beyond this date should be treated in general principles and directions rather than specific conditions.

All graphic material should be on a medium grade white tracing paper with a fixed vertical dimension of 36" and a flexible horizontal dimension depending on specific requirements of each area.

The written report should be typed on standard 8 1/2" x 11" paper, and double spaced. The report should be brief and to the point. Reasoning behind decisions should be clearly defined.



ST. LOUIS METRO CORRIDOR
SCALE MODEL
LOOKING EAST TOWARD
DOWNTOWN & RIVER

Appendix C: Montgomery/Dannenbrink Studio (1963-64)

*(*Montgomery's Report on Student Work will be available in the University Archives.)*

2nd year MUD/Montgomery now Director Dannenbrink

SCHOOL OF ARCHITECTURE, WASHINGTON UNIVERSITY, ST. LOUIS

Course: Arch. 711 - 712, Urban Design Studio

Instructor: Mr. Montgomery, Mr. Dannenbrink

Date: September 1963

SYLLABUS

Architecture 711-712, Urban Design Studio, provides the core of case study design work for the Graduate Program in Urban Design at Washington University. At least one half of the student's total effort and time will be devoted to the work in this course. Graduation from the program depends upon successful completion of all assigned projects in the Urban Design Studio.

Each term there will be two main projects. The general subject and purpose of these projects is as follows:

Fall term:

Project I: the cluster.

This project introduces the task of urban design as the composite product of the separate units or clusters by which the city is built. Problems of aggregates of clusters and planning increm ental, time-extensive urban development stem from consideration of the cluster.

Project II: the sector

This project focuses attention on a bigger scale of urban development, the sector. Sector can be defined as a relatively large identifiable district within the urban area. (Neighborhood, community, etc. are loaded words which may occasionally denote the same concept.)

The sector is studied as an area of important development decisions in both private and public arenas. Urban renewal and the largest suburban subdivisions characterize sector problems.

Spring term:

Project III: monumentality.

Throughout history constructing focal buildings and civic spaces has given the most stirring opportunities for urban design. Today's pluralistic city somewhat diminishes the importance of monumentality. Yet it remains a central challenge worthy of careful study in this project.

Project IV: settlement patterns.

On the metropolitan scale settlement patterns emerge out of the dynamics of total life. Design occurs most often after the fact. Yet speculative investigations and imaginative proposals have influenced urban form since the beginning. This project will attempt a thrust in this direction.

Maki/Dannenbrink Studio Dannenbrink

Urban Design Studio. Arch. 711-712 Washington University
Supplementary Program Phase II Oct. 22--Nov. 21 School of Architecture

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Mr. Dannenbrink

Course: Architecture 711, Urban Design Studio, Fall term 1963-64

Instructors: Mr. Montgomery and Mr. Dannenbrink

Project II: The Sector

KINGSBURY NEIGHBORHOOD DEVELOPMENT PLAN

Introduction

Plans and development programs for sectors, or parts of cities, constitute one of the major responsibilities for urban designers.

The term "sector" is chosen rather than the more familiar "neighborhood" or "community" because these other words are so freighted with social and ideological overtones. The word "sector" implies clearly a physical, not social, entity. Occasionally a sector of a city may coincide with a defined social group, but such occurrence is probably rare indeed.

In conventional usage, boundaries define a sector. These boundaries are commonly arterial streets, rivers, railroad tracks, sharp grade changes, radical changes in land use.[1] Often these boundaries are taken to agree with U.S. Census tract areas. Neo-functionalist usage adds activity centers, regularities in development pattern, and explicit social usage to a simple emphasis on boundaries.

Sector then has a multiple nature being at once legibly bounded, focused on identifiable activities and activities patterns, coterminous with specific arrangements of building and lot, and somehow recognized as an entity in the public mind. It is also a neutral, unloaded word for a convenient planning unit.[2]

Sector is used in urban design work at Washington University to distinguish one of the scales of action which, ranged from smallest to largest, are cluster, sector, settlement and region.

Use of the Sector Unit

The Sector is the module of the city. In planning it ordinarily forms the unit for programing, analysis and action. Hypothetical speculations have been cast in the form of ideal neighborhood units. The most practical public works programs allocate expenditures on the basis of planning

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1. See City Plan Commission, St. Louis, Comprehensive City Plan, 1947 plate 14, and City Planning Commission. Youngstown, Ohio, Neighborhood Analysis, CPC Report 63-2, April 1963, p. 17 where factors for delineating neighborhood, or planning districts are defined.

2. J.L. Sert uses the word for this reason as do many English speaking CIAM types.

districts. Urban renewal, highway aid, and other Federal assistance are predicated on the existence of a "Workable Program" for community development which must include "neighborhood analyses".[3]

Where town planners and architects have had an opportunity to build new towns and make important extensions of old ones, they nearly always have built up the whole settlement pattern from identifiable sectors. Many of these are familiar models: The Perry-Stein-Wright-Mayer line in U.S. planning, the "Levittowns", the British New Towns, Chandigarh and the Le Corbusier line, the extension of Stockholm, the hierarchical formulations of Doxiades' Ekistics, and many, many others.[4] These ideals for the

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3. op. cit. 1. City Planning Commission, Youngstown, Ohio, see particularly p. 17-20 on characteristics and proposals.

4. Useful background references on some of these theories include:
Perry, Stein, Wright, Mayer line:
a) C.A. Perry, "The Neighborhood Unit; A Scheme of Arrangement for the Family-Life Community". In Neighborhood and Community Planning, vol. 7, The Regional Survey of New York and Its Environs, 1929.
b) C.S. Stein, Toward New Towns for America. New York, 1957.
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c) Urban Land Institute. Community Builders Handbook. Washington, 1960.
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the British New Towns:
f) E. Howard. Garden Cities of Tomorrow. London, 1951.
g) F. Gibberd. Town Design. New York, 1960.
h) P. Kriesis. "A New Town Pattern is Born". In Architect's Year/Book 6. London, 1955.
Chandigarh and Le Corbusier:
i) Le Corbusier. Oeuvre Complete 1952-57. New York, 1957.
j) Le Corbusier. Concerning Town Planning. New Haven, 1948.
k) J. L. Sert. Plan Piloto de la Habana, (New York, 1959).
Stockholm extension:
l) G. Gentili, "Le Citta Satelliti di Stoccolma". In Urbanistic 24-25. 133-147.
Doxiades:
m) Architectoniki. No. 13, January-February 1959. Special issue devoted to Doxiades.

other:

n) H.B. Reichow. Die Autogerechte Stadt. Ravensbury, 1959.

c) P. & A. Smithson contribution to CIAM '59, in O. Newman, CIAM 1959 in Ottlerloo, New York, 1961, p. 68-79.

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urbanization of open land exert a powerful bias on our view of built-up areas. We tend to see these as potentially emergent ideal sectors in line with those theoretical formulations we choose to accept.

Behind this central role of sector in practice and speculation, lie at least two important phenomena: 1) historically towns have had distinguishable parts; and 2) distinct social groupings tend to inhabit district areas within cities. Examination of these two aspects has produced the conventional images of city form[5]. Views of the city as a single organism rather than a grouping of parts have continually lost favor since they were formally stated by Max Weber, the German political-economist and father of sociology.[6]

But in the wide acceptance of sector theories a formidable trap is laid for the planner and the designer. Too easily the physically identifiable sector merges in his mind with the social unit--or the economic or political unit. In the urban areas of the United States this seldom occurs in reality. This is the reason for abandoning the term "neighborhood". That charged word can refer only to a problematical ideal where built form and social group are isomorphic.

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5. F.S. Chapin, Jr. Urban Land Use Planning, New York, 1957. Part I reviews the important American contributions to understanding the city as a system of parts. L. Wirth, "Urbanism as a Way of Life". In American Journal of Sociology 44, 1-24 formulates the classic statement in American sociology regarding the city as a dense, permanent settlement of unlike social group. (This article widely reprinted.)

6. D. Martindale, "Prefatory Remarks: The Theory of the City". In M. Weber, The City (translated by D. Martindale and G. Neuwirth) New York, 1958.

Goals for Sector Design

Moral and esthetic judgements in city sector design grow out of two philosophical streams. The first has to do with efficiency, economy, realization of technical possibilities, sound resource management, and a craftsmanlike approach to human action. At one pole, this stream of values finds expression in economics: the allocation of scarce resources among competing users. At the other pole it leads to such esthetic goals as organic order (integration of part to whole) and functionalism.

The second philosophical stream contains the welfare goals perhaps best expressed (though in platitudinous form) by the preamble to the United States Housing Act which sets the goal of "a better living environment for every American family." Lewis Mumford articulates this goal, "If there are favorable habitats and favorable forms of association for animals and plants, as ecology demonstrates, why not for men."[7]

7. L. Mumford. The Culture of Cities. New York, 1938, p. 302. See also similar statements in L. Mumford. The City in History. New York, 1961 and L. Mumford "Planning for the Phases of Life" in The Town Planning Review, April 1949.

More specifically this objective defined in terms of mental health demands an environment permiting the full and free expression of all the individual's native and acquired potentialities in harmony with one another.[8] Sector

8. P. Kriesis "On Aesthetics and Mental Health" in Paralipomena in Town Planning, Athens, 1951.

design goals, then, measure the degree plans open opportunities for human personalities and human associations to unfold freely.

Better environment, mental health and open opportunity have many ramifications in practice. No list could be exhaustive. A random one might include: 1) safety, for death and injury surely close opportunity; and injury surely close opportunity; 2) widest possible choice of housing type and neighboring patterns; 3) free, multiple choice in access from home to work, to school, play, shop, and worship; 4) flexibility to meet the unpredicted since, in fact, we cannot predict. The familiar old planning qualities such as density and coverage are not goals but statistics about designs and constructions.

Grossly over simplifying, these goals might be called social goals in sector design and the other set, the economic-craftsmanship group, called technological goals. Both sets overlap at many points. Safety and efficiency are related. Flexibility is a technological necessity as well as a social imperative.

In some cases, they overlap and separate at the same time. Sector homogeneity pays technical dividends by permitting an economical repetition of structural and land development patterns. It also appears to square with certain social demands for 1) enough consensus between neighbors to prevent conflict; 2) positive although not necessarity intensive relationships between neighbors with respect to common needs and obligations; 3) the possibility for some mutual visiting and friendship formation for those who want it in the immediate facility.[9] Evidence seems to suggest that the heterogeneous, "balanced community" widely advocated[10] should, in detail, consist of homogeneous enclaves. How big should these be?

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9. H. J. Gans, "The Balanced Community : Homogeneity or Heterogeneity in Residential Areas" in American Institute of Planners Journal, vol. XXVII, number 3. This paper and a preceding one, H. J. Gans, "Planning and Social Life" in AIP Journal vol. XXVII, number 2 provide an important overview of social research on the question of diversity.

10. C. Bauer "Social Questions in Housing and Community Planning", in Journal of Social Issues, vol. 7, p. 23 and L. Mumford "The Neighborhood and the Heighborhood Unit" in Town Planning Review, vol. 24, p. 267-268.

Technological and social goals may join on esthetic matters. Irving Rosow writes of the social effects of design, "There is little conclusive evidence of more than ephemeral changes in social patterns through the medium of planned commuities."[11] When designers shift from attempts to modify

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11. I. Rosow "Social Effects of Physical Environment" in AIP Journal, vol. XXVII, No. 2.

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behavior Rosow says "....their assumptions of psychological effects of aesthetic atmospheres may be on much firmer ground."

Aesthetic goals, since the start of the Modern Movement, cannnt be disentangled from social ones, nor can they be separated from technologcal goals. The pronouncements of CIAM testify to this.[12]

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12. For instance the early essays of W. Gropius such as "Sociological Premises for the Minimum Dwelling of Urban Industrial Populations" (1929) and "Houses, Walk-ups or High-rise Apartment Blocks?" (1931) reprinted in W. Gropius, The Scope of Total Architecture, New York, 1962.

Recent European reformulations of the precepts of the Modern Movement reinforce these connections. Speaking very specifically at the Tenth Meeting of CIAM, A. and P. Smithson enunciated a set of "Criteria for Mass Housing". These were set forth under three headings: "The House", "The Cluster" and "The Appreciated Unit" (CIAMese for sector), as a series of questions to be asked about any design.

" The Appreciated Unit

" 1. Is the scale of the unit related to the size of the parent community?
2. Is the work-pattern of the community understood, with all its implications for the unit? (A work-pattern of all-family travelling to widely separated places is typical of cities and towns and often also of villages.)
3. Is communication to serve the total living-pattern made easy?
4. Does the unit fit the site with its climatic and physical peculiarities, its existing built and human structure, and accept their ecological implications, bearing in mind that we are concerned with renewal?
5. Does the development offer protection and shelter of the same order as the parent community?
6. Where do the 5-12 year-olds go? And what do they have to do?
7. Can November 5th be celebrated (or Bastille Day or 4th July)?
8. Can the unit support shops? And where are the natural 'pressure points' for such facilities?
9. Are the community facilities a social mirage or are they 'real'?
10. Is the unit really generated by an objective study of the situation or are we just saying that it is?"[13]

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13. A. & P. Smithson "The Theme of CIAM 10" in Architects' Year Book 7, London, 1956.

Narrower goals, which deal more concretely with sector form, understandably achieve less consensus that these generalized social and technical values. Yet, there exists wide spread agreement with Smithson's last criteria which requires the sector to be generated from the actual situation. This notion has received much attention in American thought.[14] An articulating design structure[15] produces a legible image.[16]. Intensifying and vivifying

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14. S. W. Jacobs and B. G. Jomes, CITY DESIGN THROUGH CONSERVATION: METHODS FOR THE EVALUATION AND UTILIZATION OF AESTHETIC AND CULTURAL RESOURCES. Berkeley, 1960. This monumental compendium for once and all establishes the values and methods for building urban form out of an existing context.
Philadelphia City Planning Commission (L.I. Kahn, consultant) Mill Creek Redevelopment Area Plan, Philadelphia, 1954, shows this approach in practice in the hands of a master.

15. W. von Moltke and E. N. Bacon, "In Pursuit of Urbanity" in The Annals of the American Academy of Political and Social Science, vol. 314, November 1957, first defined what Bacon has later called design structure. It is the system which transforms "neighborhood undifferentiated" into "neighborhood articulate" the goal of sector scale urban design. The principle was used in the von Moltke-Bacon design for the Washington Square East urban renewal project.

16. K. Lynch, The Image of the City, Cambridge, 1960 defines "image" as a design goal in the most influential recent U.S. contribution to urban design.

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the perceived city, to make it easier and more rewarding to use, has become an important goal in planning and design. Kevin Lynch argues that such rewards are based on an image which explains, gives visual clues, locates and relates the inhabitant.

Articulation has other values as well. It underlies the "city symbolic" called for by David Crane.[17] It makes possible Serge Chermayeff's and Christopher Alexander's community of privacy.[18] When sector design articulates continuity, it may achieve Fumihiko Maki's "group form".[19]

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17. D. Crane "The City Symbolic", American Institute of Planners Journal, vol. XXVI, No. 4, p. 280-292.

18. _____ Community and Privacy, New York, 1963.

19. _____ "Group Form: Some Notes on Collective Form, St. Louis, 1959.

The Sector Development Plan

A plan may refer to anything from a blueprint for a cottage to a set of coordinated proposals covering all aspects of the economic development of a great nation like the U.S.S.R. For this reason, it is necessary to use the term sector development plan to refer to a set of proposals governing physical development in an urban sector. Such a plan is a guide to change--at once, projection and, regulation--and a policy outline of development proposals. The guide function tends to be associated with the private market side, t he outline side with the public action.

Sector development plans have evolved parallel with city planning, particularly its landscape architecture--architecture wing.[20]

This approach appeared as part of the "City Beautiful" movement and, at the sector scale, has outlasted it.[21]

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20. City Plan Commission, St. Louis, op. cit. 1, plate 17, p. 34.

21. The Eastwick area in Philadelphia provides a clear case in point. City agencies and developers have been able to conceive of development plans only in terms of rendered site plans.

In many parts of the world, valid sector plans are detailed site plans. This follows since political power (power to enforce a decision) can make a prediction come true. Where planning effectively and directly controls development decisions, projections of need and available resources can be made by fiat and embodied in a detailed design. But, where, as in the U.S.'s market economy, planning cannot guarantee investment, prediction is uncertain. Extremely sophisticated methods produce only problematical predictions about economic and housing choices. The situation can be visualized in terms of a potential trade-off between power and prediction. The greater the power behind the plan the less certain may be prediction. As power resources diminish planning depends more and more upon prediction. Some theorists hold that the second situation has the better possibilities for broad human development. In any case U.S. style planning often becomes projection.

Despite the dependance upon trends, certain restrictive powers such as zoning and subdivision regulation encourage a species of generalized master planning on the metropolitan and political corporation (legal city) scale. In the generation or two since the city beautiful movement this type of

planning has developed an established content and process.[22] Such a

22. A most up-to-date expression of this conventional wisdom appears in Urban Renewal Administration, Urban Planning Program Guide: Policies and Procedures for Federal Assistance Under the Urban Planning Program, Washington, August 1963, section 2-3.

general plan (master plan, comprehensive plan) includes abstract (and usually wishful) statements of 1) goals, accompanied by maps of 2) land use, 3) highways and transit routes, and 4) locations for community facilities (public works). This "planning process" consists of 1) goal formulation, 2) survey (research, data collection), 3) analysis, 4) synthesis, 5) design and 6) effectuation (a particularly nice planners' word). These procedures often degenerate into quick analysis (windshield survey), quick prescription and no responsibility for enactment (chiefly because of the dissociation of planning from city building). David Crane stated the case:

> "Master planning has in general become too abstract. In its concerns with overall and long-range community goals, the master planning function has too seldom related to physical, demonstrable events. There is no recognition that tangible development-redevelopment undertaken on an experimental basis and systematically reviewed under real-life conditions can furnish important knowledge for the master-planning process. The planning profession gives lip-service to the unending, continuous nature of city planning: yet plans and community goals are still pegged for a fixed future year with very little indication of exactly how and how rapidly the required physical changes will be made. No one is planning for a continuous process of physical change; no one predicts or guides the rate and spatial distribution of urban constructions beyond the 6-year limit of capital budgeting for municipally-owned facilities. While on one hand abstract master planning does very little to lay down a time process for physical change, redevelopment authorities proceed with projects which are only "projects": poorly related to what is around them in space or what is ahead of them in time."[23]

23. D. Crane, The Fairmount Area: A Study in Townbuilding, Philadelphia, 1958. One of the program statements used in Crane's brilliant, fertile urban design studio 1957-1961.

See the provocative piece by Nathan Glazer "Why City Planning is Obsolete", Architectural Forum July 1958, p. 160.

Theoretical difficulties with comprehensive plan are recognized on many sides; e.g.: the important article by A.O. Hirschman and C.E. Lindblom, "Economic Development, Research and Development, Policy Making:

Some Convergent Views," in Behavioral Science, vol. 7, p. 215-16. Lindblom identifies the four aspects of standard planning as 1) clarification of objectives and values, 2) survey of alternative means of reaching objectives, 3) identification of consequences--costs and benefits--of each alternative, and 4) chosing a policy or plan by evaluating the consequences in light of the objectives. He finds such comprehensive attempts founder on social conflict, inadequate or prohibitively expensive information, and complexity too great for human capacities. Lindblom recommends a policy of "disjointed incrementalism" with the following components.

"A. Attempt at understanding is limited to policies that differ only incrementally from existing policy.
B. Instead of simply adjusting means to ends, ends are chosen that are appropriate to available or nearly available means.
C. A relatively small number of means (alternative possible policies) is considered, as follows from A.
D. Instead of comparing alternative means or policies in the light of postulated ends or objectives, alternative ends or objectives are also compared in the light of postulated means or policies and their consequences.
E. Ends and means are chosen simultaneously; the choice of means does not follow the choice of ends.
F. Ends are indefinitely explored, reconsidered, discovered, rather than relatively fixed.
G. At any given analytical point ("point" refers to any one individual, group, agency, or institution), analysis and policy making are serial or successive; that is, problems are not "solved" but are repeatedly attacked.
H. Analysis and policy making are remedial; they move away from ills rather than toward known objectives.
I. At any one analytical point, the analysis of consequences is quite incomplete.
J. Analysis and policy making are socially fragmented; they go on at a very large number of separate points simultaneously.

Standard practice in making sector development plans draws both method and objective from comprehensive planning. The result is predictable: abstract, rigid plans, unrelated to time processes and the circularity of ends and means.

The sector development plan must refelct the power-prediction situation in distinctly different types of proposals for next year (1965), the next decade (1975) and the dimly foreseeable maximum run. Paul Krieses provides at

least a partial schema for such planning in Approach to Town Planning.[24] He distinguishes three categories of planning data: class I data are pure fact findings; class II data are sociological trends; and class III data are prevailing and emergent philosophies, values and morals. In the immediate

24. Essay 6 "A New Approach in P. Kriesis, Approach to Wown Planning, Athens, 1952.

situation, class I dominates; in the middle run, class II; and the long run class III. Since the reliability of the data varies from strong in I to weak in III the plans must vary coordinately. It only remains to work out a practical system encompassing a site plan for tomorrow's construction, a mid-range policy plan and a glint-in the-eye of long range hope.

Actually city planning practice has begun to work out the policy plan idea.[25] It remains to explore its possibilities at the sector scale.

25. H. Fagin, "Organizing and Carrying Out Planning Activities within Urban Government" American Institute of Planners Journal vol. XXV, No. 3, p. 114, and F.S. Chapin, Jr. "Taking Stock of Techniques for Shaping Urban Growth, AIP Journal, vol. XXIX, No. 2, p. 80-81.

Of forces shaping the sector development plan, the open and circular relationship between ends and means, between intention and result, seems most foreign to conventional planning. Yet, it is just this force which roots the plan in reality, and plants in it the seeds of its own fulfillment.

The Kingsbury Neighborhood

Following standard professional practice, St. Louis city planning efforts have subdivided the predominantly residential areas of the city into neighborhoods (actually "planning districts" in more up-to-date lingo). One of these, called the Kingsbury Neighborhood, has been selected as the site for this project. Three factors commend this choice.

1) Close at hand, already familiar area, related to last project; 2) Imminent, radical social change provides excellent case study opportunity for considering interactions of environment and behavior; 3) Variety and typicalness make possible extrapolation to other areas.

It could be argued that the definition of a sector, that is establishing its boundaries, is a basic first step in approaching the sector development plan. This thesis would argue against use of boundaries set by some outside agency; one that perhaps acts arbitrarily. There are several reasons for not considering sector boundaries. 1) Since all boundaries are arbitrary and seldom coincide (e.g. school, parish, housing types, and social class) the question is not as important as if the sector where a clean-cut entity, differentiated in all aspects. 2) Boundaries may be less important than centers; centers of action (function) are more important and more easily recognized than edges and the boundaries of spheres of influence. 3) Practically speaking, designers are called on to produce development plans for arbitrarily chosen districts; our projects should resemble reality. 4) Maybe all definitions of sector boundaries are arbitrary.

A few facts on the Kingsbury Neighborhood should be set down.

1. Boundaries: North, Delmar Blvd; East, Kingshighway Blvd.; South, Lindell Blvd.; West, Skinker Blvd. (for obvious reasons the west boundary varies from that established by the City Plan Commission).

2. Area: 450 acres.

3. Development history: Until the great World's Fair of 1904 this area was largely open, agricultural land. Following the Fair in the two decades, 1905 to 1925, it was built up by speculators as it now stands. Excepting the automobile facilities along Delmar, and the Forest Park Highway, little physical change has occurred since 1925.

4. Population: about 12,500 in 1960.

5. Present major functions:
   - housing for low middle to upper middle class whites
   - some transient housing (white)
   - scattered supporting facilities, stores, churches
   - traffic and public transit channel between Clayton-University City, and midtown-downtown St. Louis
   - specialized entertainment
   - specialized car-oriented retail sales
   - bisecting mainline railroad

6. Special physical characteristics:
   clear gridiron on flat land
   strong E-W vs. N-S orientation of functions, structures, and paths
   sharply differentiated sub-areas

7. Trends:
   middle class white population leaving
   auto, railroad, and entertainment facilities stagnant or shrinking

To deal with this sector, a few assumptions should be made about the future of the metropolitan area.

1. Population will continue to grow at a moderate rate. The growth will appear at fringe locations.

2. Population, employment, recreation, and other functions will continue to disperse. Areal growth will far exceed population or employment growth.

3. Negroes will begin to achieve higher socio-economic status and live in more integrated patterns. In a generation housing segregation will disappear, but Negroes will still fall somewhat short of full economic and social parity.

4. A larger and larger share of transportation of people and goods will go to automobiles. In twenty years, working and middle class families will ordinarily have two cars.

5. Demands for recreation facilities will rise steeply, provision of them will lag.

6. Investment in the public sector will rise at an increasing rate as the cold war wanes. Urban renewal funds will become available as a recurring yearly allotment allowing St. Louis to begin renewal at a rate of 200 acres per year by 1970.

7. Building technology and transportation technology will not change radically.

8. The railroads will pass through a period of desperation before selling out to nationalized ownership in 1985.

Project Organization

Study of the sector and working out a development plan for the Kingsbury Neighborhood should focus on four objectives:

A. General understanding of the urban sector.

B. Introduction to the planning process (methodology).

C. Design for large-scale, time-extensive, open-ended situation.

D. Experience at certain tasks, such as visual survey, ordinarily in the designer's province.

No short and academic exercise can cover this ground completely. Only a useful overview is possible, plus some practical and intensive consideration of selected aspects.

Phase I: Reconnaissance

a. physical environment/visual survey (see supplementary program statement #1).

b. institutional environment/identification of the decision making centers (see supplementary program statement #2).

Task:

Each class member will prepare a complete visual survey.
Each one will prepare a survey of a single institutional category.

Schedule:

November 18 - 25

Phase II: Programming

a. projections

b. goal formation

Task:

Only segments of the complete programming task can be considered. Each class member will undertake a projection of demographic and housing data for a sub-area of the sector. Projections will indicate ranges of data based on alternative development histories, class make-up, etc. Projections will cover 1970 and 1980.

Class will make trial use of interview techniques to obtain data and information, and to consider the limitations and value of these procedures.

Goal formation will focus on two areas only: 1) class discussion of the social opportunities in, and restraints on, sector development; and 2) investigation of selected theories of sector planning and design. Among the theories to be examined are: The Neighborhood Unit, British New Towns, Le Corbusier's proposals, the standards promulgated by official American planning agencies.

Schedule:

November 25 - December 9
Sub-area projections reviewed with Professor Walker, December 6, collated and tabulated for whole sector by December 9.

Phase III: Development Alternatives.

a. alternative projected histories

b. alternative designs

Task:

Sector will be sub-divided by probable development areas (e.g.: Delmar frontage, private street area) and by functional elements (e.g.: circulation system, transient housing area). Each member of the class will prepare a set of alternative project histories for an area or element and a set of appropriate alternative sketch designs, time-phased into 1965, 1975, and more distant components.

Schedules

December 5 - 13.

Phase IV: Policy Plan

a. analysis of alternative designs

b. evolution of a policy plan

Task:

In class discussion the designs will be analyzed and a sector policy plan for guiding development will be generated.
Visiting lecturer Kastritsky, Visiting Professor Woods, Professor Walker, and Professor Weismantel will join the class for these discussions.

Schedule:

December 13 (extend over next day if necessary).

Phase V: Development Plan

a. preparation of time-phased development designs (see supplementary program statement #3).

b. preparation of statement on general aspects of plan (see supplementary program statement #4).

Task:

Each member of the class will undertake a time-phased design proposal for one of the development opportunities established in the policy plan (IV b.). Each design will be delineated by appropriate models, drawings, and text.

Class will jointly prepare a general graphic and verbal statement of the overall development plan.

Schedule:

Individual designs: December 16 - January 20

General aspects due and jury: exam week, January 20-27 at time to be arranged.

[January 28: off to Chicago!]

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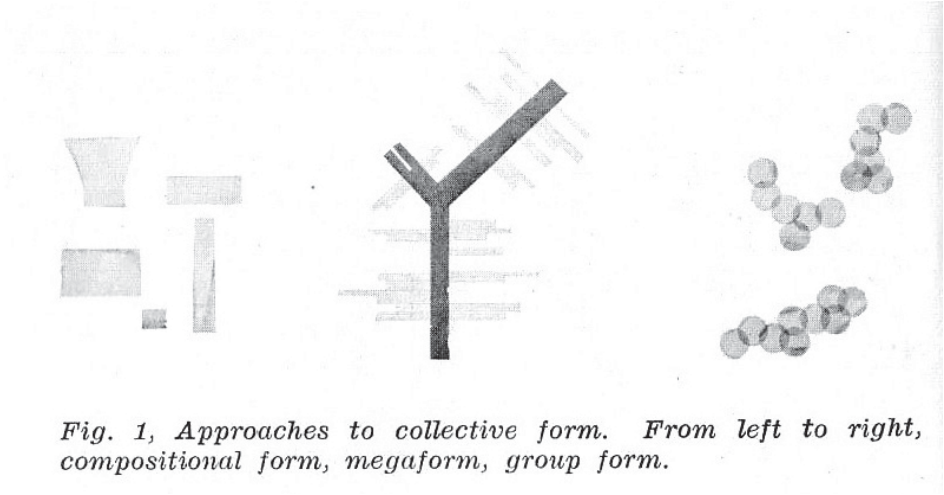


Fig. 1, Approaches to collective form. From left to right, compositional form, megaform, group form.

Figure 1. Compositional form, megaform, group form.

Fumihiko Maki, *Investigations in Collective Form* (1964)

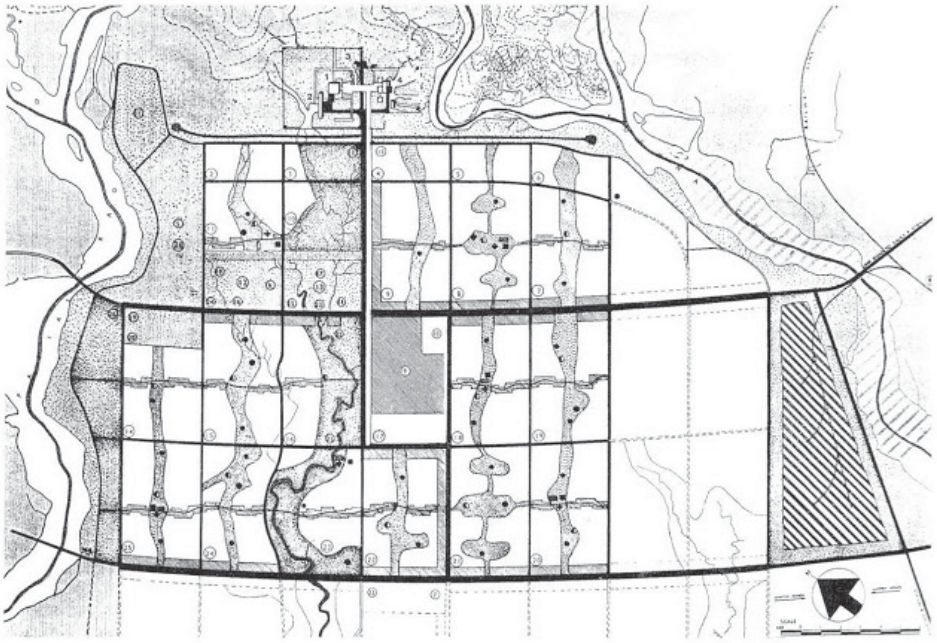


Figure 2. Le Corbusier, Chandigarh General Plan

< http://www.thepolisblog.org/2013_02_01_archive.html >.

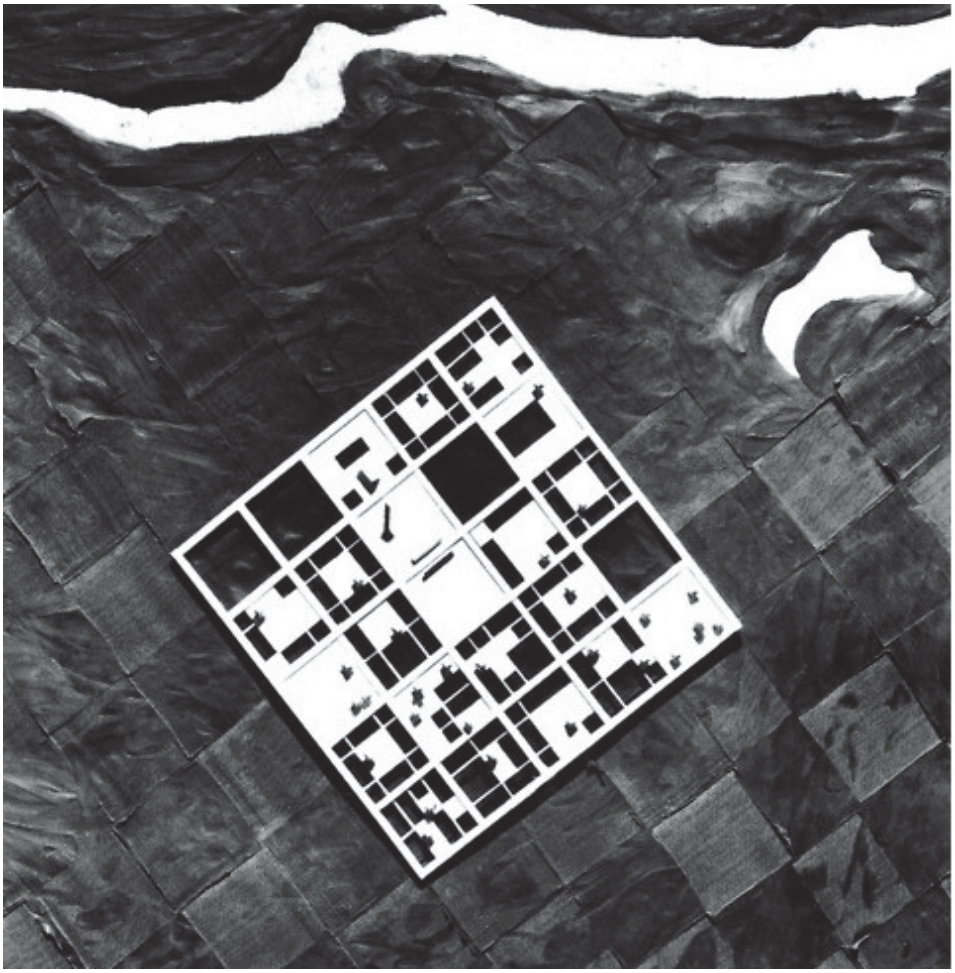


Figure 3. Kisho Kurokawa, Agricultural City

<http://savage-america.tumblr.com/post/5835157920/fuckyeahbrutalism-agricultural-city-plan>.

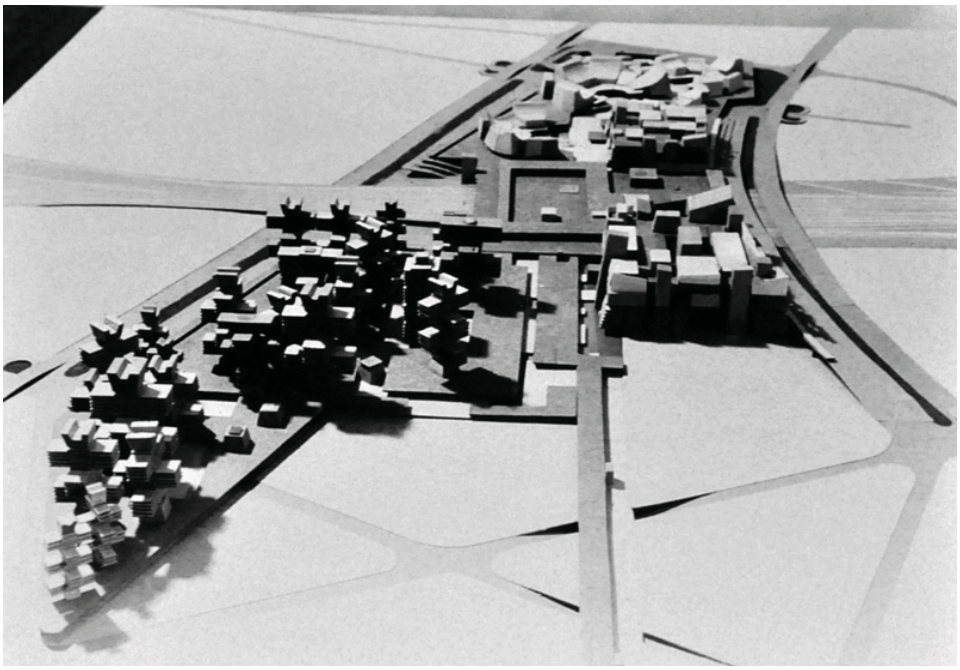


Figure 4. Fumihiko Maki and Masato Ōtaka, Shinjuki Plan

<http://architecturalmoleskine.blogspot.com/2011/10/metabolist-movement.html>

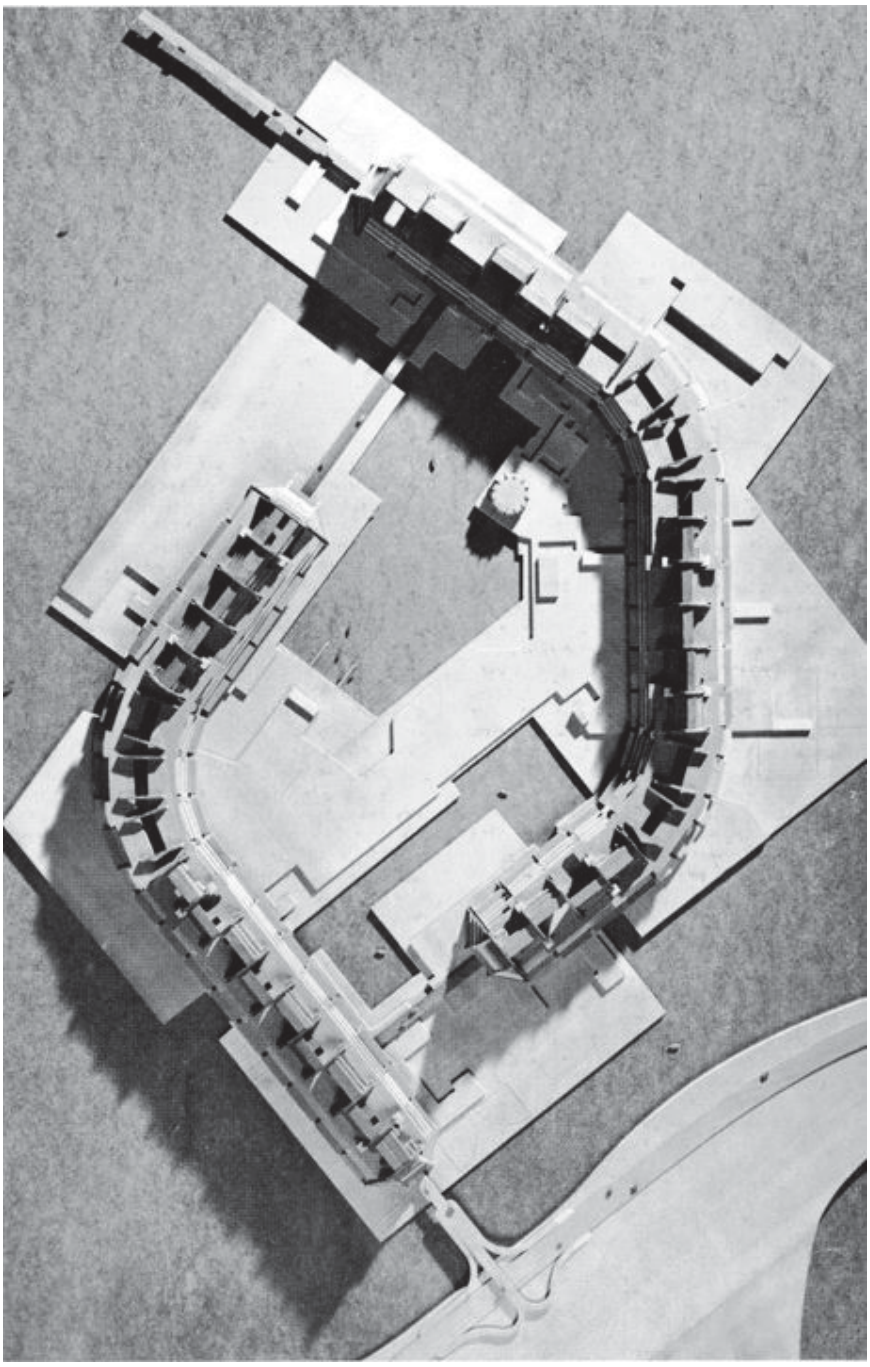


Figure 5. Kenzō Tange, “A community for 25,000”

< http://archimodels.info/page/28>

Figure 6. Hydra, Greece

< http://www.britannica.com/EBchecked/media/11929/The-port-of-Ydra-Greece>

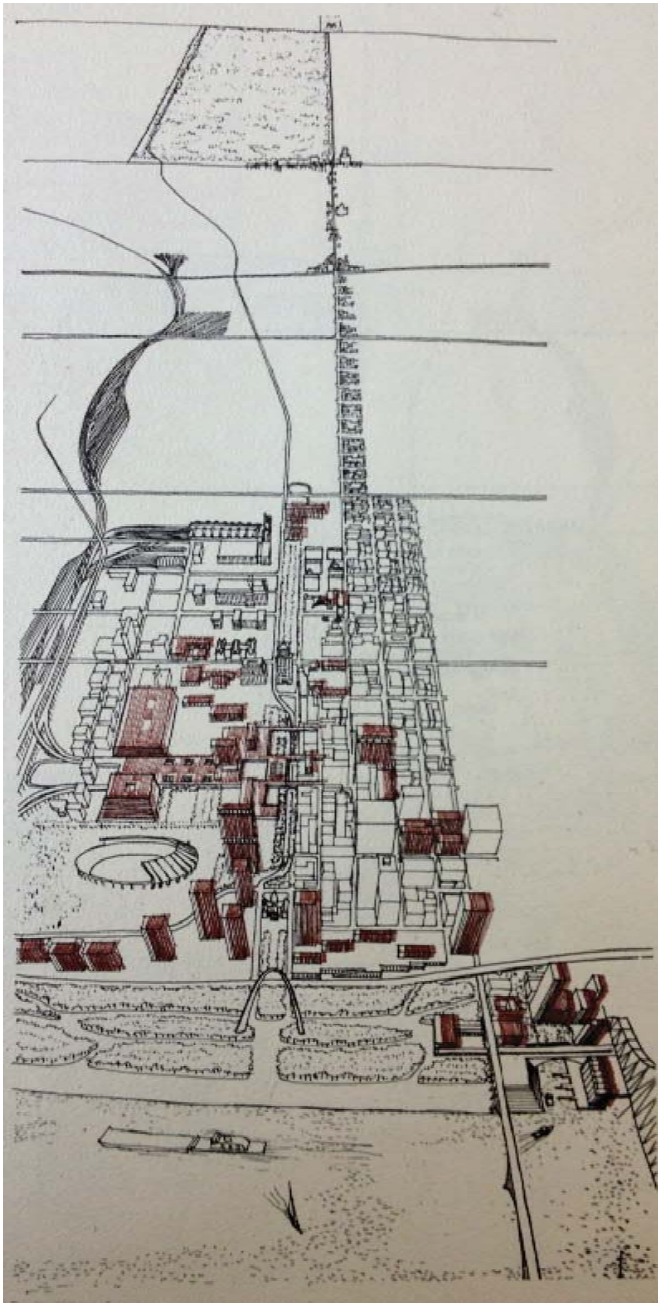


Figure 7. *The Humane Core; A Civic Center for St. Louis, Mo* (1961)

Figure 8. Giancarlo de Carlo, Student Dormitories at Urbino (1962-65)

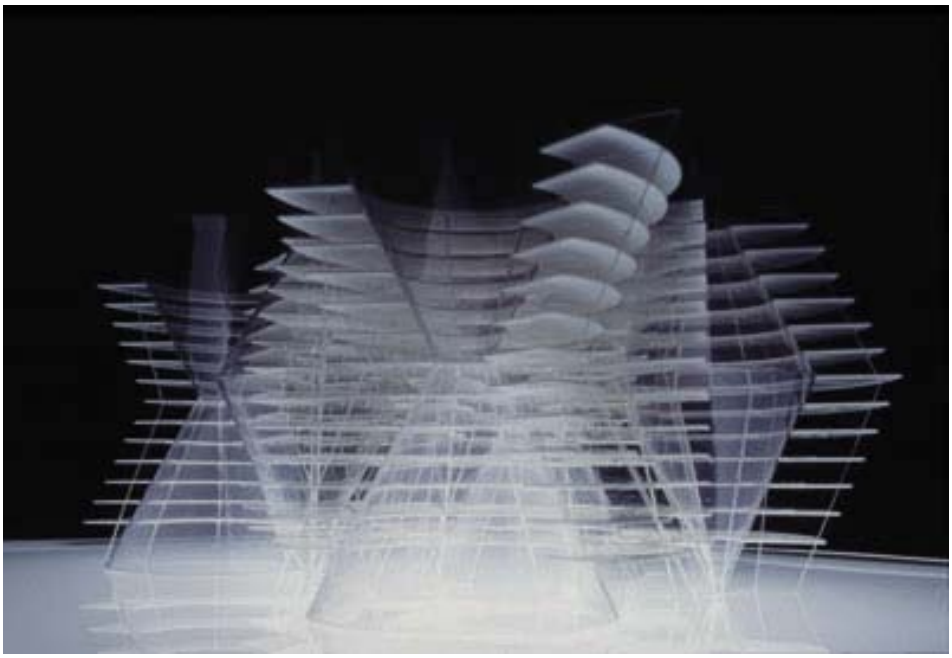
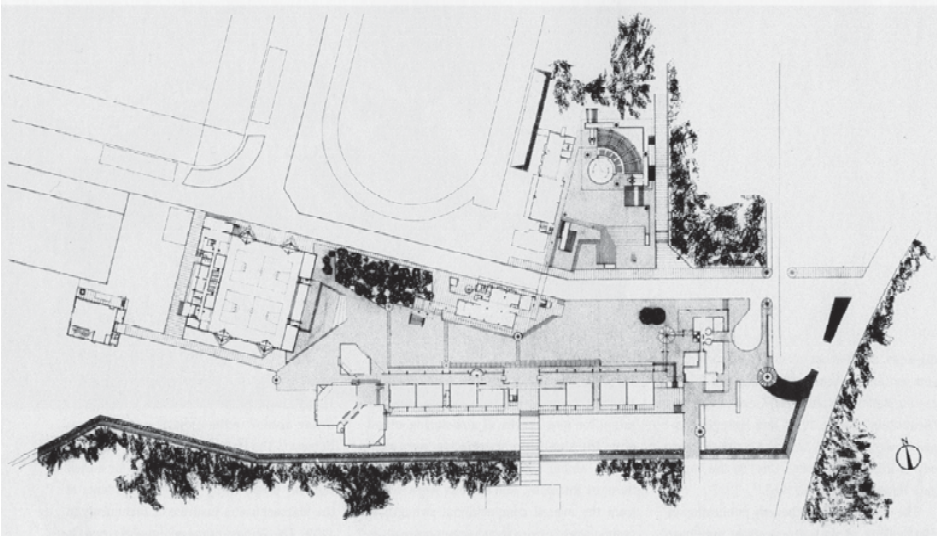


Figure 9. Fumihiko Maki, Golgi Structure (1968)

<http://samfoxschool.wustl.edu/node/2252>

Figure 10. Fumihiko Maki, Hillside Terraces (1967-98)

< http://places.designobserver.com/feature/words-and-pictures/12682/ >



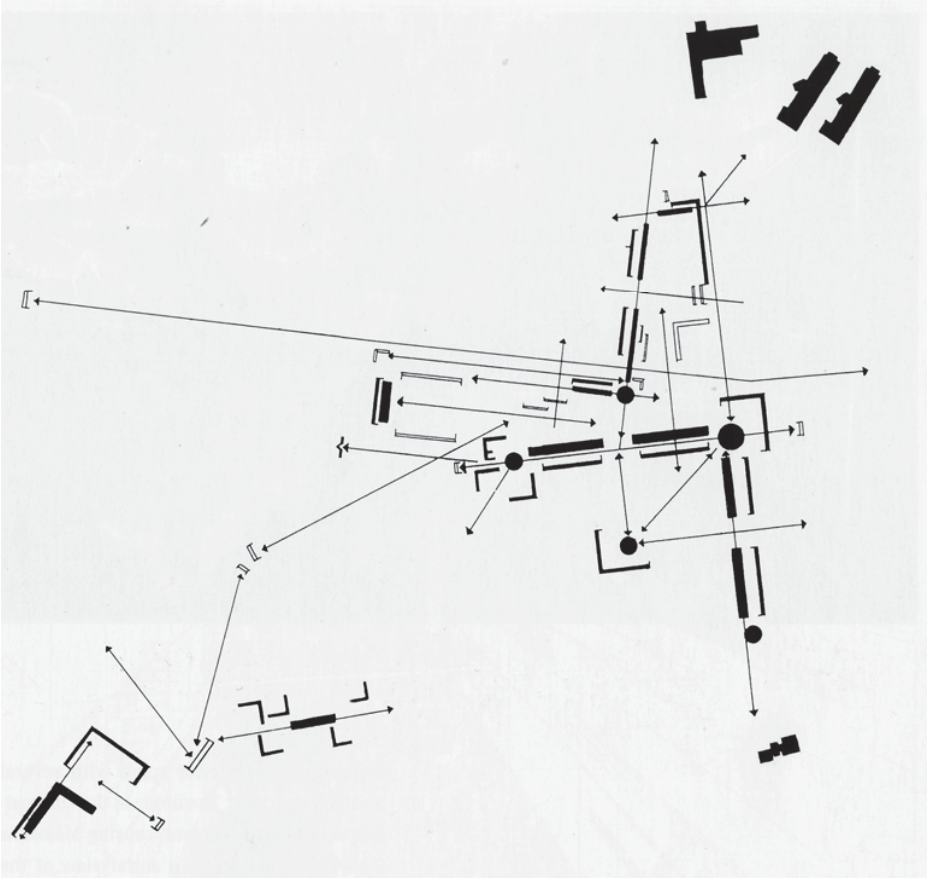


Figure 11. Fumihiko Maki, Kumagaya Campus at Risshō University (1966).

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Figure 12. Fumihiko Maki, Republic Polytechnic Campus (2002)

< http://www.maki-and-associates.co.jp/details/index.html?pcd=86>

Figure 13. Fumihiko Maki, Tokyo Metropolitan Gymnasium (1990)

< http://www.pritzkerprize.com/1993/works>

Figure 14. Boston: Area Differentiation

Fumihiko Maki, *Movement Systems in the City* (1965)

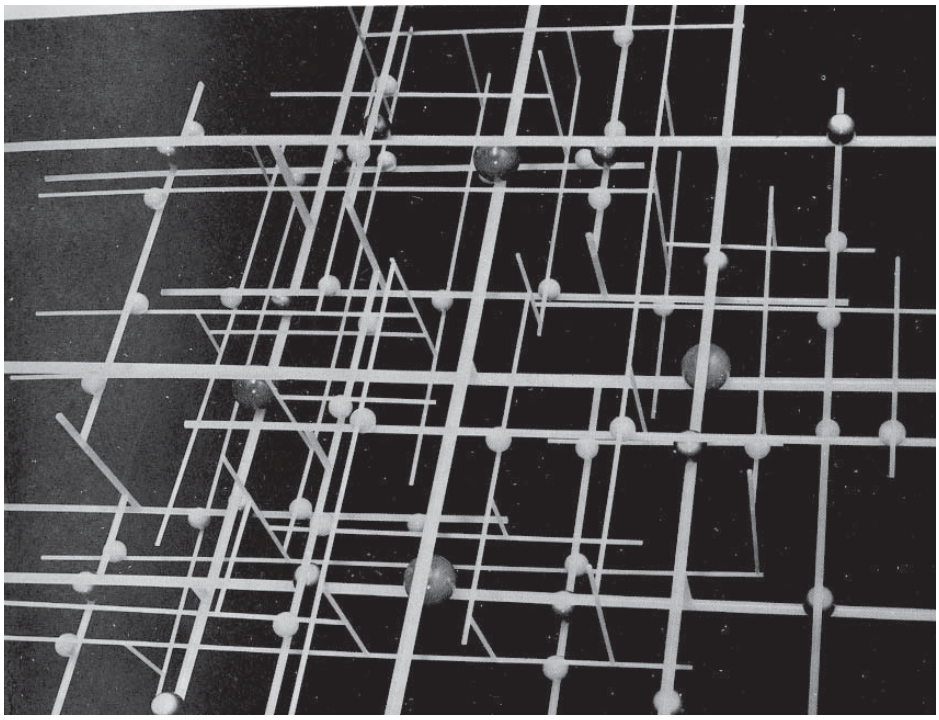

Figure 15. Open-ended System

Fumihiko Maki, *Movement Systems in the City* (1965)

Figure 16. Proposed Network System

Fumihiko Maki, *Movement Systems in the City* (1965)

Figure 17. Part I, Student Proposal, *Intercity II* (1965)

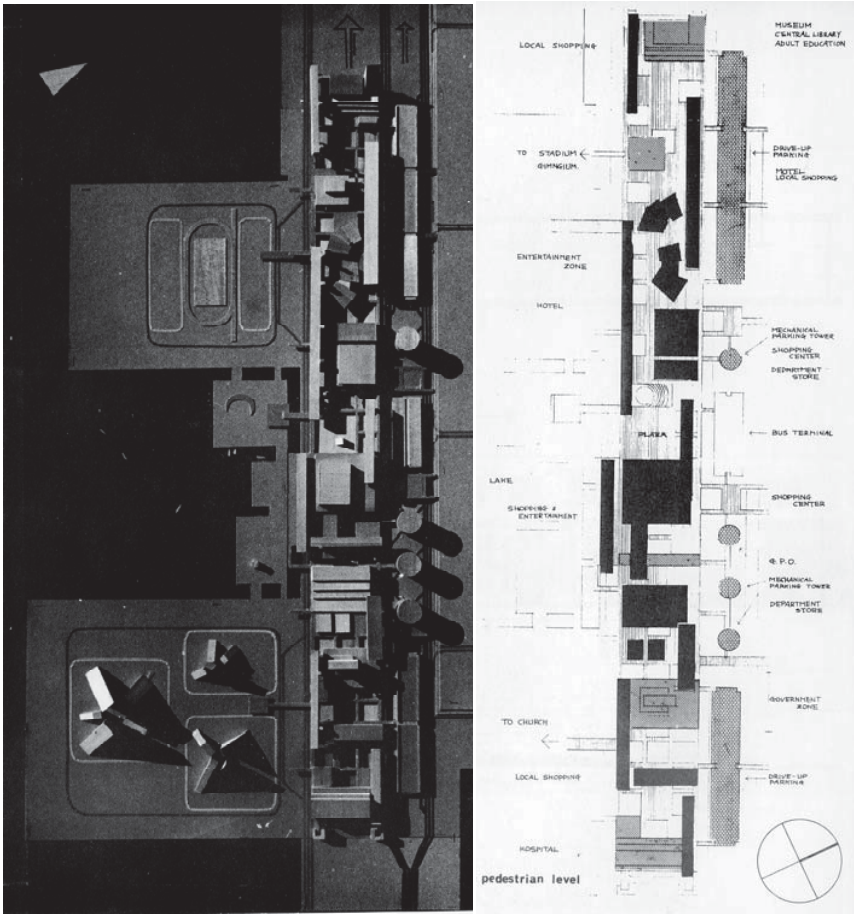

Figure 18. Part III, Student Proposal, *Intercity II* (1965)

Figure 19. SANAA, The Louvre-Lens Museum at Lens, France

"*Redefining Collectivity,*" *The Japan Architect 78* (Summer, 2010)

Figure 20. Sou Fujimoto, Tokyo Apartment

"Redefining Collectivity," The Japan Architect 78 (Summer, 2010)