City on the Move: Mobility, Structure, and Symbolism in Kenzo Tange's 1960 Plan for Tokyo

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The classic approach of master planning, formally established in the Athens Charter by the *Congres Internationaux d'Architecture Moderne* (C.I.A.M.) in 1933, advocates strict division of functional zones according to the four major components of the city: living, working, recreation, and circulation. This Modernist canon, however, was widely challenged by urbanists in the postwar decades as they observed the dramatic changes in urban structures. The increasing proliferation of automobile not only resulted in tremendous mobility within the city, but also pushed the boundary of city far into the regional areas. Facing the chaotic urban landscape due to the incompatible approaches, the visionary architects of the postwar generation, prominently among them Luis I. Kahn in America and Team 10 in Europe, called for replacing the Cartesian methodology of zoning with new strategies of spatial planning, in which the mobility was regarded as an important characteristic and the key in restructuring the modern city.

While most urban theorists looked at automobiles and freeways as responsible of urban sprawl and the many evils of the modern city, these architects held a different point of view. Properly planned, they argued, the modern automotive infrastructure could paradoxically become an effective tool in reorganizing urban structures, framing urban boundaries, making cities legible and walkable, and regaining the traditional value of a city and the dignity of humanism. Influenced by the classical analogy of house/city that can be traced to Leone Battista Alberti, the contemporary utopians saw no difference between designing a building and design a city, and envisaged highways and streets as "architecture of movement" characteristic of the contemporary city.

In Japan, such new notion of urban mobility influenced a group of architects known as the Metabolists. They set off to revolutionize the approach to designing cities. Their ideas of the modern city were fully expressed in the visionary plan for Tokyo proposed by a team under the leadership of Kenzo Tange in 1960.[1] This paper aims to revisit the radical concept of mobility embodied in this plan for Tokyo. In Tange's conception, mobility was viewed not just as new means of technology in the planning of modern cities, but was instrumental in creating a truly modern urban structure and a new social order that the architect was dreaming for and pursuing. I will investigate the way Tange employed modern automotive infrastructure in restructuring the city, and the meaning he applied on such infrastructure. It thus reveals the political implications that were embodied in such reinterpretation of mobility in city design.

TANGE AND METABOLISM

A pupil of Kunio Meakawa, who had in turn been trained by Le Corbusier and Anthonin Raymond, Kenzo Tange was a critical figure in postwar modern architecture in Japan. Since 1945, he had designed a series of magnificent buildings, including Hiroshima Peace Memorial Park in 1949, Tokyo City Hall in 1957, and Tokyo Olympic Stadium in 1964, which brought him international reputations. Tange had traveled to Europe and America to attended C.I.A.M. meetings since 1951 and later taught at the prestigious architectural schools like MIT, and thus maintained a close connection with the leading architects in the world including Louis Kahn, Alison and Peter Smithson, and other key members of Team 10.[2]

Surrounding Tange was a group of young architects in Tokyo who called themselves the "Metabolists." The name came from the title of their manifesto on city design published at the 1960 World Design Conference in Tokyo, *Metabolism 1960: Proposals for New Urbanism*.[3] This small pamphlet featured a series of radical urban schemes envisioning new cities expanding in futuristic ways — erected on the sea or spiraling into the sky — which was apparently inspired by the latest scientific and technological innovations in the postwar period. In contrast to the traditional concept of "master plan" which dealt with cities in terms of a stable state, the Metabolists called for an attitude that envisioned no physical destination, but rather a sense of the city as a dynamic process of transformation. To accommodate the city's growth and regeneration, they advanced transformable technology based on prefabricated components and the replacement of obsolescent parts according to the different durations of these elements. Regarded as the mentor of the young Metabolist architects, Tange was also influenced by their idea of the city as an organic process. In fact, his plan for Tokyo involved a few Metabolist members in the design team.

Designed for a city of 10 million, Tange's plan envisioned that Tokyo extend across the bay and reach the prefecture of Chiba on the opposite shore. The most notable feature was a central spine carrying a sophisticated highway system, which consisted of a series of interlocking loops and covered 18 kilometers over the sea. The public and commercial facilities, including the civic center, the port, and office buildings, would be located within these loops. These buildings took the form of habitable bridge trusses spanning between gigantic service towers, which were arranged on a rectangular grid with an interval of 200 meters. A number of subsidiary freeways depart from the central spine at right-angle, connecting the main line to clusters of tent-like residential units which spread across the broader water. The whole plan, conceived of as a giant structure with hierarchical arrangement of circulations and programs, constituted one of the most heroic visions of city planning in the 20th century. It was often regarded as a monumental project that initiated the decade-long megastructural movement, and made significant impacts on practice of urban de-sign throughout the world in the 1960s.[4] [Fig. 1]

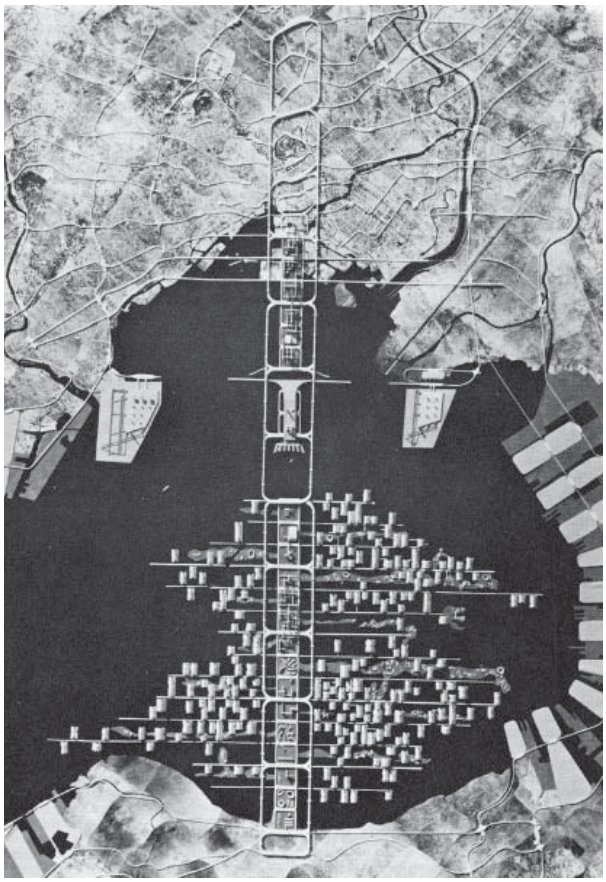

Fig. 1 Kenzo Tange, Plan for Tokyo 1960

MOBILITY AS URBAN PROCESS

Tange initiated the plan from his interpretation of the characteristics of what he termed the world's "pivotal cities", that is, those with population of ten millions or more. In his point of view, such cities, including Tokyo, were in a state of confusion and paralysis, because the physical structures of the cities had "grown too old to cope with the current rate of expansion," and the only way to save the cities was a radical transformation of their fundamental structures.[5] Tange insisted that the modern city should be treated not as a composition of separate functional zones as the orthodox modernists had suggested, but an open complex linked together by a communication network. The organic life of Tokyo lied exactly in the flowing movement of its ten million people who were engaged in the communication of various functions and created the total function. Mobility was the factor that gave life to the city's organization, and the transportation system was the physical foun-

dation of the city's operation. The significance of the communication system within the city was articulated by Tange with a metaphor: "It is the arterial system which preserves the life and human drive of the city, (like) the nervous system which moves its brain. Mobility determines the structure of the city."[6]

The urgency of re-establishing the current physical structure of city was brought about, first of all, by the rapid proliferation of individual automobiles. The automobile had changed the relationship between architecture and street, and the new relationship demanded a completely new system of transportation:

> "In the past, people walked along streets until they came to their destination and then simply disappeared into the door… With automobiles on the street, however, everything is different. In the first place, it is necessary to divide pedestrians from vehicles, to create highways and streets that are for the exclusive use of vehicles. Thanks to the coming of the automobile, there is need for a new order in which a vehicle can move from a fast highway to a slower one and then come to a stop at the destination."[7]

Tange contended that the speed and scale that automobiles had introduced into urban life were changing people's conception of space. This new sense of space, in turn, required a new spatial order in the city. Since the old transportation system could no longer meet the demand of contemporary society, Tange called for replacing it with a system based on the hierarchy of speed and the separation of pedestrian and automobile. This consciousness of the demand for greater mobility in the sense of more intense communication within contemporary cities underlay all parts of his plan for Tokyo.

The issue of mobility had been a theme of theoretical exploration of city planning among the European Modernists since early in the twentieth century. Le Corbusier's *Ville Radieuse* (1935) was a profoundly important step in introducing a new awareness of mobility into architecture and city.[8] In this theoretical scheme, although the segregation of different functions remained, the function zones and green spaces in the city were streamlined into a continuous linear strip, which was distinct from his previous plans. A series of elevated arteries formed a network that constituted the communication system of the city. Le Corbusier applied the concept of *pilotis* in his urban project and made it a basic structuring element of urban design. The purpose of *pilotis* was to separate the pedestrian from the automobile. By elevating the highways and buildings, the whole ground was virtually left open as enormous green space for pedestrians. Le Corbusier's theories significantly influenced Tange. The latter introduced this *pilotis* system into the plan for Tokyo and integrated it with the so-called "core system" of his own invention, that is, the vertical shaft holding stairways, elevators, and services. [Fig. 2] The ultimate goal of the "*pilotis* and core" system was to substitute the traditional two-dimensional zonal method of planning with a three-dimensional generative system, through which the interaction peculiar to modern society could develop freely.

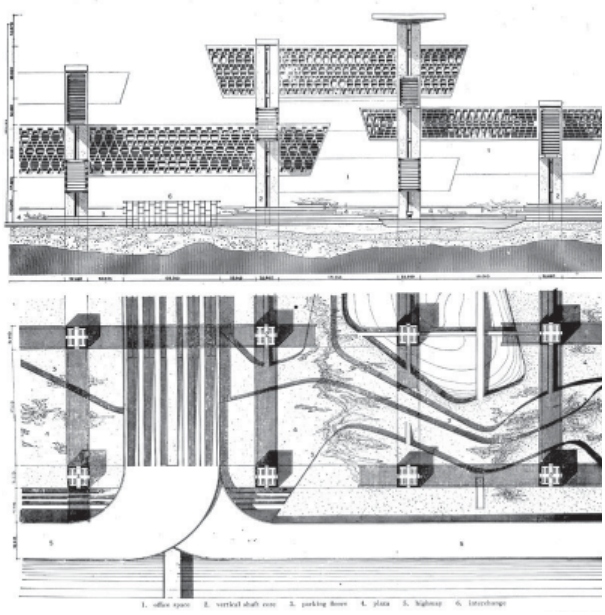

Fig. 2 Kenzo Tange, *Pilotis* and Core System, Plan for Tokyo 1960

Tange's anti-zoning position and emphasis on urban communication system was shared by his contemporaries, especially Kahn and the Smithsons. In a series of plans for Philadelphia dated from 1952, Kahn suggested that the traffic pattern could become the generator of new city forms. His diagram of circulation, which defined different types of movement, gave visual form to the traffic and became the departure point of the plan. For him, the transportation was not just a

mechanical process, but embodied the essence of the modern metropolis. This notion was manifest in his novel analysis of the movement patterns, especially through analogy between the flow of traffic and the flow of rivers:

> "Expressways are like RIVERS. These RIVERS frame the area to be served. RIVERS have HARBORS. HARBORS are the municipal parking towers; from the HARBORS branch a system of CANALS that serve the interior; the CANALS are the go streets; from the CANALS branch cul-de-sac DOCKS; the DOCKS serve as entrance halls to the building."[9]

This poetic analogy offered a new and symbolic meaning to the banal structures serving traffic, which inspired Kahn in developing new ways to organize the transportation and thus re-structure the whole city. This was evident in several plans, including "Viaduct Architecture" of 1963.

Alison and Peter Smithson's 1958 competition entry for *Hauptstadt Berlin* was also based on a study of movement, both physically and in its social ramifications. Although it represented a less symbolic and more pragmatic perspective, the plan went somewhat further than Kahn's plan for Philadelphia, and envisaged a more drastic re-ordering of the city. There were separate systems for cars and pedestrians, each adopting quite different geometries and operating independently. [Fig. 3] Regarding mobility as the characteristic of "our period," the Smithsons called for an "aesthetics of change" to replace the traditional Cartesian aesthetics in design.[10]

Fig.3 Alison and Peter Smithsons, Hauptstadt Berlin, 1958

Tange had attended CIAM meetings since 1951, and was familiar with the theories of Kahn and the Smithsons. In the Tokyo plan, he further developed the idea of mobility as a characteristic of the contemporary society, rendering it concretely with a strong formal language – a large-spanned suspended highway system expanding from downtown Tokyo across the Bay. By projecting the infrastructure of his new city directly onto the water, the controlling framework of its highway system was revealed with a startling clarity. The great size of this project, the perspicuity of its loop and branch road network, and the formal inventiveness of the extraordinary buildings which were clipped onto the highway skeleton, all combined to make the plan an articulated statement of a city form generated in the age of automobiles. Tange's symbolic attitude regarding this issue was evident in such gesture: the enormous scale and strict hierarchy of the transportation system not only made it the most dominant element of the plan; it also demonstrated the rigorous structural organization of the city and make it comprehensible. The carefully-designed transportation pattern thus provided a new spatial framework through which a new urban order could be created. More importantly, in Tange's point of view, this system would become the icon of the new city and symbolize a contemporary society characterized by openness, mobility, and adaptability to continuous growth.

Linear Axis

The symbolic dimension of mobility in Tange's plan for Tokyo was most evident in its central circulation spine. Tange declared that the major goal of this plan was, among others, to transform the current radial centripetal structure, which he called a "closed system," into a linear structure, which represented an "open system" and would encourage the spontaneous mobility of modern society. In his point of view, the current spatial organization of Tokyo was a typical centripetal system with

a civic center as its core. Tange defined it as the structure of the medieval city that was obsolete and dysfunctional for a city of current magnitude. He said:

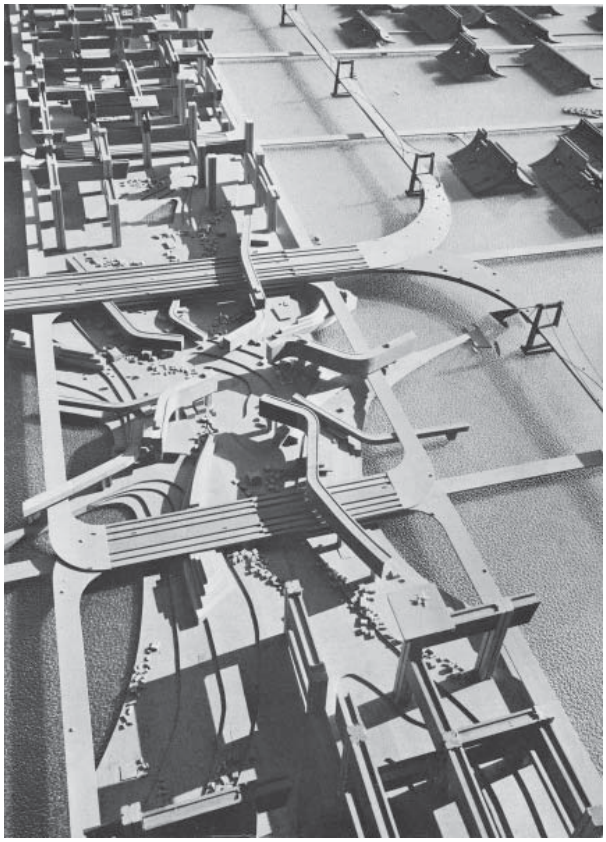

Fig. 4 Kenzo Tange, Civic Spine, Plan for Tokyo 1960

> "In the age when cities developed around central squares or plazas and when people lived within limits prescribed by regional societies, the central square was the nucleus of communication, and the cathedral, the castle, and the city hall were the spiritual supports, as well as the symbols, of city life. Horses and carriages moving along radial streets past rows of buildings must have formed a very harmonious ensemble. Now, however, mass communication has released the city from the bonds of a closed organization and is changing the structure of society itself. In the society with an open organization and in the pivotal city of this organization the mobility involved in free, individual communication is assuming a larger and larger scale. This movement, added to the fixed movement of regular commuters, has led to extreme confusion in the larger cities."[11]

Tange's argument seemed to counter the concept of "urban core" advocated by CIAM at its 1951 meeting at Hoddesdon, which called for rebuilding European cities with an identifiable "heart" modeled after the traditional urban core such as Italian piazzas. Tange clearly rejected this notion of civic center, and was instead in favor of a linear form that he called the "civic axis." [Fig. 4] He argued that the civic axis would allow the spontaneous mobility characteristic of the contemporary age on one hand, and maintain the proper relationship between different sections and functions of the city on the other. It thus embodied the very essence of social progress. The significance of this central spine transcended mere questions of transportation as a form-giving feature and became the symbol of the post-industrial city, just as the cathedral sitting at the center of the closed organization was the symbol of the medieval city.

In order to provide adequate means of communication for a city of 10 million, Tange's team went on to design a cyclical transportation system for this civic axis. This cyclical transportation system, invented by one of the Metabolist architect Noriaki Kurokawa, was composed of two loop systems, one within the other, which were intended for different speeds of automobile transportation. The outer loops, which accommodate the high-speed through traffic, were put on suspension bridges. Its obvious prototype was the Bay Bridge in San Francisco, an indication of Tange's American experience. [Fig. 5] Each side of the loop would have one-way traffic, but cars could not travel straight-ahead. Instead, they had to move clockwise and counterclockwise alternately. In the middle section, where these two traffic flows overlap, cars on both sides of the loops would be moving in the same direction. The inner cycles, designed for the local traffic, provided access to buildings and communities. They followed the same principle as the outer loops and were located on a lower level. The high-speed lanes and low-speed lanes would be connected by means of ramps.

Fig. 5 Kenzo Tange, Suspension Bridge, Plan for Tokyo 1960

Despite the obvious inconvenience of such zigzag traffic patterns, Tange boasted that this cyclical system would avoid any intersection, and thus increase the capacity of the transportation system by ten to thirty times. He also claimed that this feature would make gradual expansion of the civic axis possible: at each stage of development the system was complete, but it would always be possible to add another unit.

However, in an essay written in 1964, Peter Smithson threw doubts on the feasibility of such a linear transportation system. He pointed out the serious flaw of this system, that is, all movement must proceed via that spine even when it has no business there. Thus he argued against the possibility of handling more traffic with this system, as well as the flexibility which Tange repeatedly claimed for his linear plan.[12] This acute observation plainly countered Tange's appeal. Instead of providing a practical solution in tackling traffic problems in the contemporary city, Tange's ingenious plan remained a gesture representing the transformation toward a new spatial system characterized by mobility and continuous urban growth.

There were also debates on the plan's metaphorical meaning. In order to convince people that linear development was inevitable as a city expanded, Tange, like the Metabolists, invoked a biological analogy. He compared the transformation of the city structure from a radial form to a linear form with the evolution and growth of living organisms:

> "The amoeba and the asteroid have radial centripetal forms, but vertebrates have linear bone structures with parallel radiations. When the living functions of organisms differentiate and perform the composite function of life, the centripetal pattern evolves into a system of parallel lines grouped around an axis formed of a spine and arteries. The process whereby a vertebrate body hatches from an egg illustrates the possibility of gradual development on the part of a linear system."[13]

While most organisms initially take a radial form, as they mature and are required to perform more complex functions, the radial pattern would evolves into a linear one. What was true for organisms was also true for cities, Tange asserted. The same belief was held by the Metabolists, which was not coincidental because the Plan for Tokyo 1960 involved Kurokawa Noriaki and Isozaki Arata, both of whom were sympathetic to the Metabolist theory and viewed the city as a vital process of continuous development.

Interestingly, when Christopher Alexander commented on Tange's plan in his essay "City is not a Tree" published in 1965, he also introduced a biological analogy. He called the city of such kind of organization a "tree," and said that the Tokyo plan was a "beautiful example" of a tree-like structure.[14] He criticized the artificial cities created in the pattern of a "tree" for being monotonous and rigid, and having lost the necessary characteristics of human organization, and he believed they were doomed to fail. He countered the "tree" model with a different urban pattern called "semilattice" with intrinsic organic adjacencies, which originated from all natural cities and provided complexity, variety, and real openness.[15]

Therefore, both Smithson's technical critique and Alexander's biological analogy called into question the "openness" and "flexibility" which Tange repeatedly claimed for his linear plan. They revealed that Tange's monumental structure remained an illusive model for urban growth and free movement.

Conclusion

Tange's plan for Tokyo was proposed at a time when the cities in the world were undergoing dramatic changes. The inefficiency, confusion and inequity of the industrial metropolis made a ready case for bold, comprehensive approaches rather than piecemeal remedies cast within existing parameters. Tange's plan responded exactly to this situation. As a distinguished urbanist with the ambition of re-organizing the city according to revolutionary principles, he adopted a technocratic approach. His innovative undertaking projected a future Tokyo based on a radical interpretation of the concept of mobility. It featured a complex transport system and super-scaled structures, and created a new relationship between urban space and architecture. In so doing, the architect not only tried to channel the rapid urban growth, but also to impose a new texture into the existing metropolis based on the principles of linear city. In Tange's view, this revolutionary urban form on an unprecedented scale would bring a new order and new meaning to the contemporary society.

However, various aspects of his proposed solution, as we can see now, were problematic. The system he envisioned was based on a segregation of pedestrian from automobile traffic on one hand, and a hierarchical organization of space according to different speeds on the other. The separation of pedestrian and automobiles would be attained only at the sacrifice of human scale in the city, as manifested in the following decades. The hierarchical transportation system, once built, could be highly efficient, but hardly flexible.

Tange's ideal city showcased a series of advanced technologies and new methods in city planning resulting from the notion of mobility. However, they were presented in a symbolic way in the plan, which communicated with people and reflected the social ideals but nevertheless remained technically unachievable. The paradox between the order and spontaneity, both critical to the contemporary city, was fully represented in the scheme but could hardly be reconciled. Here, the Metabolist idea of change and growth was mingled with a strong architectural language of expressional monumentality which Tange had perfectly applied in his earlier works. The result was an ideal city form which would act as an exceptional vehicle for the transformation of a culture facing the need for new communal symbols.

ENDNOTES

1. Kenzo Tange Team, A Plan for Tokyo, 1960: Toward a Structural Reorganization (Tokyo: Shikenchikusha, 1961),

2. Tange's travels overseas and interactions with the American and European architect-urbanists were recorded in his autobiography published in Japan Architect from Apr. 1985 to June 1986. Kenzo Tange, "Recollections: Architect Kenzo Tange ," Japan Architect, Apr. 1985-June 1986.

3. Noboru Kawazoe et al, Metabolism 1960: Proposals for New Urbanism (Tokyo: Bijutsu shūpansha, 1960).

4. For details of the Megastructural movement, see Reyner Banham, Megastructure: Urban Future of the Recent Past (New York: Harper and Row, 1976).

5. Kenzo Tange Team, 6.

6. Ibid, 7.

7. Ibid, 9.

8. Le Corbusier, La ville radieuse: éléments d'une doctrine d'urbanisme pour l'équipement de la civilisation machiniste (Boulogne: Éditions de l'Architecture d'aujourd'hui, 1935).

9. Luis I. Kahn, "Toward a Plan for Midtown Philadelphia," in A Latour ed., Louis I. Kahn: Writings, Lectures, Interviews (New York: Rizzoli, 1991), 28.

10. Alison Smithson eds., Team 10 Primer (Cambridge: MIT Press, 1968), 57.

11. Kenzo Tange Team, 12.

12. Peter Smithson, "Reflections on Kenzo Tange's Tokyo Bay Plan," Architectural Design 34 (1964): 479-480.

13. Kenzo Tange Team, A Plan for Tokyo, 1960: Toward a Structural Reorganization (Tokyo: Shikenchikusha, 1961), 13.

14. Christopher Alexander, "City is not a Tree," Architectural Forum 122, no.1(1965): 58-62; 122, no.2 (1965): 58-61.

15. In this essay, Alexander used his mathematical expertise in architectural criticism, and applied the set theory models to his analysis of "tree" model and "semi-lattice" model. Ibid.