

Committee III
Human Beings and the Urban Environment:
The Future Metropolis

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UTOPIAN PARADIGMS OF MARINE METROPOLIS

by

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Utopian Paradigms of Marine Metropolises

1. Paradigms of Urban Planning
2. Metropolitan Tokyo
3. Marine Metropolis

My report is concerned with plans for a marine metropolis. While it offers prescriptions for the future of the metropolis, it does not present the future of the metropolis in itself.

My report covers three major topics: firstly, the metropolis, Tokyo, is discussed from the perspective of urban planning; secondly, the various plans for the future of Tokyo are studied; and thirdly, plans for a marine metropolis are examined.

1. Paradigms of Urban Planning

The concept on metropolis can be analyzed according to the following approaches to urban planning;

Paradigm #1: Assuming that a metropolis will at sometime face various crises, some means to avoid or overcome such crises must be devised. Crises can be solved through planning, and planning is the only way to achieve a happy future. The harsh facets of reality can only be overcome by expert planning.

Various crises facing cities, including overpopulation, energy problems, traffic wars, pollution, deterioration of residential areas, and so forth, must be overcome by planning.

Paradigm #2: Cities undergo an evolutionary process as a result of changing individual human residential styles. Cities lack any coherent order because of the juxtaposition of the various life styles chosen by their inhabitants. These are slowly but constantly changing. Though the overall picture of a city may seem like a confusing labyrinth, it is a proof of the city's vitality; it is evidence of individualization and diversification.

The seemingly chaotic reality of cities is a transitional phenomenon of revolution. The introduction of planning into this reality will only stimulate transition by providing general guidelines for change. Through the planning chaotic conditions in cities become more orderly, only to become chaotic again with the

passage of time. As this process is continuously repeated, inhabitants create ever more sophisticated cities.

Paradigm #3: Cities are melting pots of culture. The laws governing culture have it that cross-cultural encounters will always produce something new. History testifies that new cultures are born in cities. This is particularly evident in a metropolis, where some cultures may cease to exist when new cultures take over the scene, while at the same time other cultures may coexist. Such development may be characterized as a sort of self-proliferation of culture. This cannot be controlled by planning. However, planning can ensure that there is room for this development to take place.

Paradigm #4: Disaster prevention methods are sought. Planning to avoid the worst effects of disasters such as earthquakes, typhoons, fires, floods, tidal waves, ground subsidence and so on, are required indicating that the effects of disasters in urban areas can be minimized by planning, and urges that plans to achieve this be implemented. This approach is persuasive in that it aims to control the urban environment by ensuring against not only natural disasters but also man-made disasters, such as crime and accidents due to human error.

Experts have predicted the possibility of a major earthquake in Tokyo. Past city structures have been examined, and suggestions were made for the creation of earthquake-proof bases, and

#6

green belts, and for the re-development of urban areas to create earthquake-resistant cities.

Paradigm #5: The development of technology will bring about transitions in cities. Various hardwares such as new energy sources, traffic and communication systems, as well as softwares such as new administration and laws will contribute to this.

When city dwellers are alienated by the contradiction and stagnation of the place where they live, they forget about the possibility of creating a city with higher efficiency, more rationalization and lower taxes, and start examining the possibility of moving into a new city in search of a new world.

It is necessary, therefore, to re-establish the concept of a city and to plan and control a new city, where the benefits of new technologies are fully reflected.

These are the main problems, which are common to the world, facing the metropolises of the future. These paradigms illustrate the present perception of how to address the question of the metropolis in the so-called "megalopolis age" of the 20th century.

2. Metropolitan Tokyo

Today, the following discussion considers the current situation of metropolitan Tokyo. Edo, the predecessor of Tokyo started to function as a metropolis in the 16th century. In addition to the concentration of people and goods in Edo, Edo also collected and disseminated information all over Japan since the feudal lords resided in Tokyo one year, and then in their hometowns the following year.

It is interesting to note that Edo and Kyoto formed the two poles of Japan, maintaining a balance between politics and rituals, and playing symbolic roles.

In and after the Meiji Era, it should be pointed that Tokyo was able to modernize because of historical background over 400 years and of its almost total destruction as a result of two large-scale earthquakes and war damage.

Reconstruction will be reached in and around Tokyo within a radius of 50 to 70 kilometers from the center, involving a population of 30 million.

City reconstruction today must try to solve the following five basic problems:

- 1) Central parts of the city are too exclusively used for business purposes. As a result, the center of the city is deserted. How can this problem be solved?
- 2) Residential areas are increasingly far from the city center,

and in some cases have sprawled as far as suburban areas, causing a shortage of public facilities, confusion, and lack of solidarity in communities. Traffic is heavily congested. Problems related to long-distance commuting, an average of 1.5 hours required to reach work places, have not been solved.

Housing is very poor, as illustrated by the fact that one third of all houses are extremely small, old, wooden houses. The natural environment has been destroyed by air pollution, noise and vibrations. How can these problems, caused by overcrowding of the metropolis, be solved?

3) Supply and demand conditions for land, water and energy have been tight. At the same time, problems concerning waste disposal, sewerage disposal and so forth have become acute. How can these be overcome?

4) Measures to cope with large-scale earthquakes should be established. As indicated by one theory on the periodicity of earthquakes, another earthquake may hit the metropolitan area. In order to minimize the damage if this happens, it is necessary to plan ahead and adopt measures for disaster prevention.

5) Life styles, and livelihoods have changed, as a result of the aging society, diversified sense of values, and increased leisure hours. Such changes have affected Tokyo more than any other place, and therefore Tokyo must change in order to be able

11/1

to adapt to these changes.

In order to address the above problems, five possible urban plans have been thought out:

- 1) Transfer of legislature: a proposal to transfer the legislative body and its related mechanism to a new city.
- 2) Transfer of functions: a proposal to transfer part of the functions of the capital to another city in the Kanto Plain, close to Tokyo.
- 3) Regionalisation: a plan to divide and transfer part of the functions of the capital to areas outside the Kanto District, and to reallocate them possibly to areas all over Japan.
- 4) Rationalisation of the Capital: a redevelopment plan to drastically revise part of the capital's function, to eliminate uneconomic, overconcentrated factors of the megalopolis.
- 5) Capital Cessation: a proposal to alternate city functions cyclically in order to use the city space fully.

The above five plans are being reviewed as possible ways to improve metropolitan Tokyo.

No conclusion, as to which plan should actually be applied, has been reached. Moreover, there are several factors

restricting possible improvements. For instance, the limited space available in the city. However, Tokyo, for example, is expanding its land area by reclaiming land, using the city's refuse. Thus, space available for creating a new city has been enlarged. It is certain that the coastal area of Tokyo, has been highly developed. However, closer observation will reveal that the purposes for which this reclaimed land can be used, are limited, since it is affected by such problems as uneven subsidence and emission of gases.

It is estimated that metropolitan Tokyo will require 100,000 hectares of land by the year 2,000. However, Tokyo will only be able to provide about one half of the amount needed, or 46,000 hectares. There will not be enough land to meet demand.

Take, for instance, the example of water. Annual demand for water will be 12 billion tons. This can not be met unless a dam is built to provide a new source of water.

As far as energy is concerned, annual demand will amount to 300 billion kilowatts. However, the energy supply too has its limits. The demand for energy will not be satisfied, due to a shortage of energy supplying facilities, as space to built thermal power plants is limited. In addition, concern has been expressed about the continuous supply of natural gas from abroad, as Japan depends heavily on imported energy sources, which are subject to various restrictions and obstacles.

Tokyo is producing about 40 million tons of waste per year, and about 140 million tons of residium soil a year. How can

these be disposed of?

Even though the resources of Tokyo are limited, and Tokyo is subject to changes which are difficult to deal with, people cannot leave Tokyo because there are no cities that are more attractive than Tokyo.

3. Marine Metropolis

The creation of a marine metropolis will change the concept of Tokyo. The following is the outline of a plan for a marine metropolis.

It is to be located about 100 kilometers off the coast of Tokyo, where the depth of the sea is 100 meters. It is to be about 5 kilometer in radius.

The city will be constructed by placing vertical buoyant poles, 10 meters in diameter and 150 meters in length, at intervals of 50 meters. Several layers of artificial land will cover these poles at a height of 20 or more than 20 meters above sea-level.

The lower ends of the poles rest on the bottom of the sea. No moorings are necessary, because the structure is fixed at one point.

Thus a stable city space, unaffected by waves and currents, is naturally be created. A city is built by connecting units erected on every vertical pole. The city can be expanded or renewed with ease. The upper load is balanced by controlling the buoyancy of the vertical poles, thus making the city an economical one. The initial size of the city, a radius of 5 kilometers, was chosen based on the size of Kyoto in the Heian Era which was 4.6 kilometers in width and 5.2 kilometers in length, an appropriate size to walk around. It is one half the area inside the loop formed by the Yamanote Line in Tokyo. The construction of the marine metropolis will cost 15 trillion yen, will require 60

million tons of steel, and will take 20 years to complete.

How will resources be supplied to the marine metropolis?

Firstly, an infinite amount of energy can be generated from the sea itself by using temperature differences. Mineral resources can be obtained from the ocean. Water can be easily obtained by purifying sea water. Rainwater can also be recycled for continuous use.

The marine metropolis will be blessed with a natural environment. The surrounding ocean, an extremely large open space, can be used for leisure and recreational purposes. Looking towards the land, one will be able to enjoy the superb scenery of Tokyo with its flickering lights and Mt. Fuji.

More convenient traffic and communication systems can be created than those found in cities on land. Schemes for capital reconstruction pose traffic problems, as there is a shortage of land for roads and railways. However, a city on the sea will require only airplanes and ships, which do not need roads or special routes. Travel between cities will become carefree. Research is being carried out to develop faster more stable ships for mass transportation. It will be possible to travel between the city and Tokyo within one hour. This will have many advantages.

Free exchange of information with other cities will be made possible by communication satellite. The characteristic which distinguishes the marine metropolis from cities on land is the fact that the city space can be enlarged, revised and renewed at


will. In order to solve the problems facing metropolitan Tokyo, the development of related technologies, economic and industrial capabilities, and the realization of a political and administrative situation that will enable the rational and efficient operation of a city, marine metropolis will surely be very important.

The creation of a marine metropolis, which will take over part of the capital's functions and combine advanced technologies with marine industries, can be said to be a realistic plan for the future, far from being a mere utopian dream of futuristic urban planning. While the reconstruction of metropolitan Tokyo on land is an urgent task to be tackled, it is also necessary and feasible to seek a solution on the sea.

Various plans already made for artificial islands, marine polis, and marine cities are good evidence of the feasibility of this solution.

In the future, the marine metropolis is expected to assume the functions of a centerpolis of the ocean space, twelve times larger than the present area of Japan, or 380,000 square kilometers, as provided by the 200 mile economic zone. The metropolis on the sea will be a good counterpart for metropolitan Tokyo on the land.

If we consider the Pacific Ocean as a whole, it is easy to predict that several centerpolis on the sea will be required to act as nuclei controlling hundreds of ocean cities in the Pan Pacific sea area, maintaining favourable relationships with many countries.



A marine metropolis, an artificial but organic environment, in harmony with nature and the sea, an attractive city most suited to the new society of the 21st century, satisfying human hopes for freedom, equality and peace, a dynamic monument symbolizing a new era for cities.

I am confident that humanity, with its infinite zeal, curiosity and pride, will realize, without fail, marine metropolises in the future.

13/6