Twin Cities – Cyberspatial Qualities of Contemporary Tokyo

by

Tong Chen

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Author .....
Department of Architecture
January 20, 1995

Certified by .....
William J. Mitchell
Dean, School of Architecture and Planning
Professor of Architecture and Media Arts and Sciences
Thesis Supervisor

Accepted by .....
Roy J. Strickland
Chairman, Departmental Committee on Graduate Students

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Abstract

The cityscape of contemporary Tokyo is undergoing a dramatic transformation caused by a proliferation of technology, such as the rapid mass transit network and the advanced telecommunication system. On the one hand conventional urban design criteria such as physical proximity and spatiotemporal consistency are challenged or even rendered obsolete; on the other hand many new characteristics of the city are being established, and some of them have become prominent criteria in comprehending today's Tokyo. In order to apprehend this process of transformation and its impact on the city's form, and eventually to respond to the new situation, it is necessary to identify those unconventional characteristics brought to Tokyo by the proliferation of technology.

In this thesis those peculiarities of contemporary Tokyo are pinpointed through a process of analogy with cyberspace, which bears tremendous resemblances to Tokyo. Contemporary Tokyo is found to contain two cities: the visible chaotic city and the invisible ordered city. In the visible city, the intonation of criteria used to form the mental image of a city is transformed; time is given importance over space; schizophrenia is a persistent theme; the boundary between human and machine is blurred; hierarchies and distinctions among objects are eliminated through codification. In the invisible city, the pattern of city's evolution is prescribed as piecemeal decentralized spontaneous growth; each node contains all the information of the whole system – the part equals the whole; connectivity becomes the prominent feature of a place – it promotes concentration and deconcentration simultaneously, and replaces Euclidean geometry with topology; layers of matrices cast ubiquitous control and circumscription over the whole city. The two cities rely on one another yet never compromise with each other; together they lay down the affordances and constraints of the city, and give it a new form. Both the visible city and the invisible city are the offspring of the Japanese culture of congestion, of which a full embrace or a total rejection will only cause lament.

Thesis Supervisor: William J. Mitchell
Title: Dean, School of Architecture and Planning
Professor of Architecture and Media Arts and Sciences

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Contents

Chapter 1

Introduction

1.1 Foreword

On my first exposure to the city of Tokyo about two years ago, I was dumbfounded by the extreme visual chaos in its urban environment, and the extraordinary efficiency of the city itself. It was very difficult for me to put these two impressions together, and all of a sudden, the urban design theories I had been familiar with that taught me how to put together a habitable, pleasant, and well functioning city with clear physical patterns, all seemed to be irrelevant to the paradoxical reality exposed in front of me.

During my two-year engagement of research at the University of Tokyo, through constant observation and reflection, it became ever clearer that this city did have a pattern which explained this contradiction. The pattern was promoted by the proliferation of technology, such as the rapid mass transit network and the advanced telecommunication system, and therefore, was drastically different from conventional urban design principles based on Euclidean geometry; by this I mean physical proximity and spatiotemporal consistency. This pattern, never encountered before, remained illusive and implicit for me for a long time.

I had the occasion to read an article "The Imaginary Real World of CyberCities" written by M.Christine Boyer. Though the paper was an investigation of the intrinsic qualities of cyberspace, to my surprise, and based on my knowledge of computer

science, I found that many parallels can be drawn between cyberspace and Tokyo. I was fascinated by the idea of excavating Tokyo's peculiarities by looking at it through this new media – cyberspace. Since then, I have been laboriously pursuing this tedious but enjoyable path.

After coming back to MIT, I participated in Professor William Mitchell's seminars "Virtual Communities" which benefited this research tremendously with their systematic investigation of the nature of cyberspace. Also through intensive reading and consistent exploration of the on-line resource, which was already available at MIT's Athena network, I gained a considerable amount of knowledge on this virtual world.

This dissertation is a summary of this pursuit, which is not meant to be finite. The major achievements of this research are first, that many critical characteristics of Tokyo which were imperceptible before, are identified; second, the method of analogy with cyberspace is proved to be meaningful. Rather than a closing, the completion of this dissertation is more like an opening from which future research may proceed. In such research, ways to respond to those peculiarities in our contemporary cities may be explored so as to make urban design more pertinent to today's technical and social environment; inquiries may be made concerning which level(s) controls can be exerted in our cities, what the role designers should play, and what kinds of skills they need to fulfill their newly defined tasks...

The method of this research can be summarized as a phenomenal approach, which means that it is mainly carried out through observation, experiencing and reflection. Library research is an indispensable part of this study. My Chinese background coupled with the training I received from the MIT Japan Program have not only contributed to my understanding of this unique Oriental culture, but have also enabled me to read Japanese literature as well as Tokyo's streets composed of signs. While in Tokyo, I also benefited tremendously from exchanging ideas with professors, students and friends there, as well as going to many lectures, exhibits and trips. It is especially worth mentioning that a significant amount of research was done on-line at MIT, particularly through the World Wide Web, for document retrieving and communication.

In this way I learn as I do, and I formulate ideas as I gain experience. On-line study will become a critical method in future research.

1.2 On the Title

The title "Twin Cities" refers to several pairs of polarities in this dissertation. First it refers to the two subjects being analogized in this dissertation, namely, the city of Tokyo and cyberspace (cybercity); second, it indicates in both Tokyo and cyberspace that there coexist a visible chaotic city and an invisible ordered city; third, it implies the question raised, but not answered in this thesis: between the "real", objective domain and the virtual, "subjective" domain where is the borderline?

1.3 Concepts

Cyberspace:

Cyberspace is a globally networked, computer-sustained, computer-accessed, and computer-generated, multidimensional, artificial, or "virtual" reality. In this reality, to which every computer is a window, seen or heard objects are neither physical nor, necessarily, representations of physical objects but are, rather, in form, character and action, made up of data, of pure information. This information derives in part from the operations of the natural, physical world, but for the most part it derives from the immense traffic of information that constitute human enterprise in science, art, business, and culture. – a definition by Michael Benedikt[1]

The concept "cyberspace" used in this dissertation includes virtual reality, simulation, telepresence and Gibsonian cyberspace. The innovative spatial conceptions brought forth by the emergence of cyberspace and dramatically different from Cartesian Space will be systematically explored; peculiarities of cyberspace in terms of its structure, operation, evolvement, accomplishments, as well as its impacts on human beings and society at large will be touched upon.

[1]Benedikt, Michael et al. *Cyberspace: First Steps.* The MIT Press, Cambridge, 1992. pp.122

Tokyo:

Contemporary metropolitan Tokyo is the subject of study in this dissertation. The adjective "contemporary" in this thesis refers to the period of Japan's explosive economic development from 1960s till today, 1995. However, a few examples from more remote locations and eras will also be selected to support certain arguments. The urban configuration of contemporary Tokyo, a culmination of technological and economical advances and at the same time the antithesis of conventional city planning theories, will be the focal point of discussion.

Tokyo is not a totally unique city among the world's megalopoli, and it is not the only city that possesses cyberspatial qualities. The reason for choosing Tokyo as the target of investigation in this thesis is first, because this city is an extraordinarily congested city in terms of its population, its products, and its information; second, within an extremely short period of time this city has been undergoing a fundamental change caused by technological and economical development; third, Tokyo is an unabashed accumulation of all sorts of ideas, wonders and bizarreries. In other words, Tokyo is an accumulation of world megalopoli. Therefore, cyberspatial qualities in this city are most intense and most perceptible.

1.4 Methodology

The single most prominent method used in this research is analogism. By definition, analogism means the method of explaining by comparing something with another thing that is like it in some way. There are two advantages in utilizing this method.

First, by using analogy an intuitive apprehension of something abstract, obscure, or intangible can be achieved. This method is especially useful in acquiring a comprehensive understanding of unfamiliar, unprecedented, ultra-large and ultra-complicated subjects or phenomena, by associating them with something tangible and familiar. In this dissertation the city of Tokyo is analogized with cyberspace. The extravagantly complicated city of Tokyo is made somewhat apprehensible, not

by using traditional tools of urban study, but seen from the point of view of a new media the hidden peculiarities of the city are revealed.

By no means does this imply that cyberspace is something that is already familiar to us and well understood. On the contrary, it is a brand new phenomenon and is as intricate and intangible as, if no more than, Tokyo. But by starting from the investigation of those contributions already known to us, no matter how insignificant they might seem, we are able to put together piece by piece a larger picture of this seemingly incomprehensible landscape. And from there analogies to Tokyo are drawn. Often, through this analogy a better understanding of cyberspace is achieved by referring to qualities sometimes more obvious in Tokyo.

What is important is to convey meaning. Logic and language are effective means to convey meaning or, to reach understanding. But sometimes they fail. So very often we have to resort to metaphors, analogy, graphics, arts, and even meditation, as practiced in Zen Buddhism, to short circuit the cognitive process, to reach understanding intuitively in one thought (Fig. 1). A cliche of Zen Buddhism says "pointing at the moon with your forefinger can help people to locate the moon in the sky, but without looking through your finger the moon is still there." In this dissertation, analogy is just a forefinger; it is hoped that the moon, the meaning, has been effectively delivered through it.

The second advantage of analogy is its potential for derivation. It is our common experience that when two pictures are juxtaposed, a special connection between the two, an unfamiliar experience, a new meaning will likely emerge that does not exist in either of the pictures before the juxtaposition is made. Maybe this is the source from which Savadore Dali's surrealistic paintings acquire their charm. So is the method of analogy. When A is analogized with B, the result is not simply A+B, but something more like A+B+C. Here C is the derivative of this juxtaposition.

Throughout this research, the author has enjoyed and benefited this derivative process tremendously. New conclusions have been constantly found, such as convertible space, living machine, parts equaling the whole, simultaneous process of central-

ization and decentralization, signs eliminating hierarchies, topology over Euclidean geometry, etc. etc.

Chapter 2

Visible City

2.1 Mental Map

About three decades ago, Kevin Lynch used five urban elements to examine the legibility and mental image of cities. These elements were: node, district, path, edge, and landmark. He argued that "a legible city would be one whose such elements are easily identifiable and are easily grouped into an over-all pattern." Interestingly enough, official terms used in Hypertext of W3(World Wide Web) also include similar notions such as region (a set of documents), node, path, link, navigation, topology and web. This fact implies that W3 not only has an inherent city-like nature, but also may be compared with contemporary Tokyo through such criteria to clarify the total image of these labyrinthine worlds.

As a result of this investigation, following conclusions have been reached: first, it can be found that the mental maps, or the perceivable patterns of W3 and Tokyo bear tremendous similarities. Second, although this criteria still can be used in observing Tokyo and W3, in these cases the connotation of the concept in each criterion has significantly changed. The question is: are such criteria still relevant in determining the legibility of contemporary cities? Do any new elements need be added?

2.1.1 Some Definitions

W3 (World Wide Web): W3 is a conglomerate of a vast amount of globally distributed files that are linked to one another. One can look at a file that has a link to another file and then follow that link to read the next file. These files can also contain graphics, or snippets of animation or music. W3 is the universe of network-accessible information, an embodiment of human knowledge.(Fig. 2)

Hypertext: Hypertext, the basic text form used in W3, is a text which is not constrained to be linear. It is text which contains links to other texts. The term was coined by Ted Nelson around 1965. Hypermedia is a term used for hypertext which is not constrained to be text: it can include graphics, video and sound, for example. Apparently Ted Nelson was the first to use this term too.

Hyperlink and How it works:

(1) *Anchor*: An area within the content of a document which is the source or destination of a link. Typically, clicking a mouse on an anchor causes the link to be followed, leaving the anchor at the opposite end of the link displayed. Anchors tend to be highlighted in a special way (always, or when the mouse is over them), or represented by a special symbol. An anchor may, and often does, correspond to the whole document.

(2) *Link(Hyperlink)*: A relationship between two anchors, stored in the same database or in different ones.

(3) *Web*: A set of documents interconnected by links.

(4) *Navigation*: The process of moving from one document to another through the hypertext web. This is normally done by following links.

(5) *Topology*: The allowable connectivity between documents, anchors and links: for example, one to one or many to one mappings[1].

In summary, the most peculiar characteristic of hypertext is its connectiveness, which is realized by navigating through the web. Navigation is performed by follow-

[1]Information on these concepts are available on-line at:
http://www.mit.edu:8001/, http://info.cern.ch/hypertext/WWW/WhatIs.html,
http://info.cern.ch/hypertext/WWW/Terms.html,
http://info.cern.ch/hypertext/WWW/TheProject.html

ing hyperlinks which connect anchors located in different documents. Theoretically all documents on the web can be accessed by any end user, but in reality retrieving certain documents could be very troublesome due to the lack of a clarified catalogue system of all documents on the web. However, thanks to the newly developed navigating techniques such as the indexing and searching functions on Mosaic, the lack of legibility of the web has been significantly alleviated.

2.1.2 Mental Map and Re-thinking of Lynch's Criteria

(1) *Node*

In W3 Node is a unit of information, usually it refers to a document that may contain many anchors.(Fig. 3)

In Tokyo a node is a "Sakariba" (bustling place) where interchanges of railway lines are located. Within a node also congregate devices for information display and transfer.

Nodes are points, the strategic spots in a city into which an observer can enter. They may be junctions or the convergence of paths. Nodes used to be where large number of people congregated and where things happened, but now each node also contains the entire information of the whole system in which it resides. In other words, today's nodes are holograms of the city. In this sense they are similar to one another.

But the significance of a node is not the same to everybody; different people have different preferences. In W3 users can simply put their nodes of interests on their personal "hot-list", and start navigating in the web from such "hot nodes". That is to say, different nodes attract different groups of people. Since W3 allows a two-way communication – readers can put their feedback and comments on the web – eventually small communities are formed around various nodes. In Tokyo this is also true. For instance, gentlemen like to go to Ginza which is a gentrified high fashion node with a masculine taste; housewives like to frequent Ikebukuro where there are many big department stores with reasonable prices; young people prefer to linger in Shibuya where fashion and eccentric tastes prevail; Shinjuku has a mixture of all

these features and has become a place where everyone goes, so a mixed crowed of businessmen, housewives, students, gangsters and bar girls can all be found there.

(2) *District*

In W3 a district is a set of documents, also called a "region"; it is a collection of nodes on related topics, possibly stored or distributed as one.

In people's minds districts in Tokyo have been reduced to their own living, working, entertaining and shopping areas due to the difficulty in comprehending and memorizing other places without having considerable familiarity with them.

Districts are the medium to large sections of the city which have some common identifying character. A district is an area that can be accessed with reasonable convenience and comfort. Different from conventional sense, in both W3 and Tokyo distance is no longer a concern for a district. If topics are related, nodes in W3 can be within the same district even if files are located at the opposite ends of the globe. With Tokyo's rapid transportation system, places separated by long distances can be within one district for somebody if his/her activities in these two places are related. Nowadays people even commute to their work by Shinkansen, the bullet train. People living in Chuo, Nakano Ward would rather go to a park called Shinjukugyoen 3 km away in distance, but only 5 minutes away by subway, rather than go to Hewanomori Park in their own ward – since only maze-like streets connect the two, and probably it would take 30 minutes to get there, even if they did not get lost.

(3) *Path*

Within a W3 node paths are text lines and scroll bars. These paths are linear. But among nodes a path is an ordered set of nodes or anchors which represent a sequence in which a web can be read. This kind of path is non-linear, since the sequence is realized by hyperlinks that contain the names and addresses of the connected nodes.

In Tokyo on a local scale the paths are those maze-like streets, but on the city scale the paths are the train and subway lines.

Paths are used as channels along which the observer moves. Now the channel has a new meaning; it can be both linear and non-linear. This two-layered path system allows one to either "walk" in local area, or "jump" into a remote place, at any time.

(4) *Edge*

In W3 "edge" is vaguely defined due to the continuum of the web. Edge differs from user to user according to their interests and purposes in using the web; edge is subject to frequent change.

In Tokyo edge is also vaguely defined due to the continuum of the built environment, which forms an endless sprawl. The diminishing natural features leading to the lack of natural boundary also contributes to the vagueness of edge.

Edges are the linear elements not used or considered as paths by the observer. They are the boundaries. Now both in cyberspace and in Tokyo physical barriers have been significantly removed, and landscape becomes homogeneous. Edge is more and more likely to correspond to boundaries in people's minds, namely, their interests, inclinations, purposes, and so on. Edge has become something personal and psychological, but no longer physical.

(5) *Landmark*

In hypertext W3 landmarks are graphic marks on each title page and are used to signify the identity of the document. Due to the lack of hierarchy in the web, the relative significance of landmarks cannot be felt among nodes; whereas within the individual node a landmark can somehow stand out from the rest of the texts.

In Tokyo an endless list of land marks can be provided: Tokyo Tower, New City Hall, YoYogi Stadium, Tokyo Dome, Honganji, Meiji Shrine, etc. etc.. But none of them can represent the city itself since no single node is more important than any other. Therefore, on a large scale none of the landmarks can stand out. Within each node, the built environment has taken on an ephemeral and kinetic quality, so in order to be felt, landmarks should either change rapidly like Studio Alta, a building with a huge TV screen at Shinjuku to catch the eyes of the crowed, or keep stable and tangible, like the Hachiko Dog Statue at Shibuya Station.

Landmarks are point-references. They are usually physical objects such as a building, sign, store, or mountain. By definition a landmark should be unique, tangible, and easy to describe. In a place where having hierarchy and uniqueness is impossible, the ground for the legitimacy of landmarks is no longer there. There are two ways

to make yourself heard amongst white noise: one is by screaming at the top of your voice; the other is by keeping silent while everyone else is shouting. Are these the only options left for landmarks? Are landmarks still relevant to our cities?

2.1.3 Experience

While wandering in such cities, such deserts of civilization, one has no idea how big the city could be – it just stretches on and on; nor can one imagine where the city might lay down its boundaries. Since no clue of hierarchy or center can be found, and even worse, false clues are often provided, it is almost impossible not to lose oneself in this boundless labyrinth, unless one knows where to stop and give up the rest of one's curiosity. At least, fortunately, there are still some ways to find rescue: a retreat step by step from the path taken, or instead, a prompt leap back home.

One may end up with anguish and disappointment, feeling cheated – having all the clues to find the way out but eventually being led to the heart of a desert. Or else one may experience a series of ecstasies, since at every turn, something surprising and gorgeous can always be found. Not infrequently these are the very things one has been searching for a long, long time. When eventually one finds the place that seems familiar, and realizes that is the point of departure, one is at home. Then the map of the explored areas starts to reveal itself. Is this the only way to explore such cities? Are there means to make such cities more legible and navigable?

2.2 Ephemerality

2.2.1 Convertible Space

Cyberspace

In contrast with the universality of neutralized Euclidean space, cyberspace is personalized, colorful, and transformable. In cyberspace, one has accessibility to a number of applications and databases. Depending on the changing circumstances, the domain of a user's cyberspace can be expanded or shrunk into a much smaller scope; it can even be totally eliminated. The sphere of such a space is in constant transformation.

For instance, on MIT's campus computer network Athena, one has accessibility to WWW for document browsing, Emacs and Latex for word processing, C for programming, Gopher for networking, and other applications for modeling, image processing, library searching, online help, etc. etc.. At any given moment each of these applications is either opened or closed. When an application program is opened, that portion of cyberspace is added to the user's cyberspace and made visible through a window on the computer screen. Thanks to the X Window environment on Athena, multiple application programs can be run at the same time. So on the computer screen, several windows can be opened and viewed simultaneously. In this way the user's cyberspace is augmented instantaneously to those corresponding applications and data, even though they may be located at the other end of the world. Likewise, the user can shrink his reach into a smaller domain in cyberspace simply by closing some of the windows. Cyberspace is activity oriented, highly customized convertible space.(Fig. 4)

Tokyo

At his first encounter with Japanese architecture, Robert Venturi made a remarkable comment triggered from the sharp contrast between what he saw there and his Occidental background. He made a sketch in his notebook and added that traditional Japanese buildings are collective elements which had "Roof as Umbrella", and "walls

as furniture". As an architect nurtured in orthodox Beaux-Art architectural training and a vehement advocate of Pop architecture, Venturi is understandably acute in catching the fundamental differences between the culture carved in stone and that assembled with wood.

Indeed, Japanese traditional architecture does have a furniture-like quality. As is widely known, unlike a stone mansion found in Europe, in a traditional Japanese house there is no functional separation of living room, dining room, and bedroom. Instead, the same space above the elevated tatami floor is used differently at the call of different occasions. Sliding paper panels are utilized to facilitate this kind of flexibility in spatial use. For instance, the entire interior space can be used as a big living room during day time while in the evening simply by closing all the sliding partition panels individual bedrooms can be created.(Fig. 5)

These paper panels are virtually opaque but they allow light to come through. This very quality enables various moods of interior space to be generated by manipulating light through varying combinations of paper panels. In this way Japanese people's sensitivity to the nuances of moods is complimented. In this account it can be acknowledged that time, an additional dimension, is skillfully incorporated into the three dimensional spatial design of a Japanese house. Japanese architecture is not simply a built entity, it is also a process which can only be appreciated as time passes.(Fig. 11)

The tradition of "time over space" in Japanese architecture is clearly manifest in Machiya, traditional Japanese town houses. A machiya, or town house, is not only furniture for the household that lives in it, as has been elaborated before, but also it is furniture for the whole street toward which it opens. This furniture-like quality can be vividly demonstrated by examining the openings on facades of these pre-modern town houses, whose occupants were usually merchants, artisans, and laborers. Since most businesses at the time they were built were small family businesses carried on at home, the town house was used both for the living of the household and for doing business, and in many cases it was also used for manufacturing. In order to perform such multiple roles, the facades of the town houses were ingeniously contemplated in

such a way that they could be opened up in various ways according to each individual circumstance.

For instance, a small sliding door for everyday use by family members could be opened onto a much bigger swing shutter which likely filled the entire space between two columns and was only opened when goods were moved in or out; for a small hotel keeper the most convenient way to solicit customers from the street was simply by sliding aside a small opening on the facade and hawking to them. The clients inside the hotel could enjoy the cool air by lowering the upper part of sliding Shoji (paper panel) while obstructing the view from passers-by; for a book store owner the lower part of the wall panels could be swung even to make a platform for displaying his books, while the upper part could also be swung out and hung beneath the protruding roof as a shield against summer sunshine. In the evening all these parts could be folded up as shutters to blind the store. A clock repair shop might have a convertible fenced porch protruding to the street so that the master could make a temporary working space to perform his expertise half way into the street and show off his craftsmanship there.(Fig. 6,7)

Devices composed of wooden parts and paper panels are interlocked in various ingenious ways, and the perfect precision of Japanese carpentry makes them easy to slide, to swing, and to fold up either horizontally or vertically. Infinite ways of combining such devices forms a luxuriant repertoire weaving the activities inside each house into the fabric of the whole street. That is why the street is full of life and vitality, even though there is an absolute lack of the vista, boulevard, and square that are deemed to be the basic elements of urban beauty in the West, and that is why neighbors can live harmoniously like one family in a virtually crime-free environment, even though few policemen can be found patrolling the streets. Buildings change their faces as circumstance demands; permanence, frontality, and monumentality are really alien concepts in Japanese cities. Here architecture is furniture, and city is a theater.(Fig. 8,9)

When pioneer modern architects first came to Japan, they were overwhelmed by the awesome simplicity of Japanese architecture. In 1933 when German architect

Bruno Taut was shown around Katsura Rikyu in Kyoto, he was fascinated by what he saw and called it an "exquisite jewel", "eternal beauty". Gropius also wrote "With great simplicity and restraint of means a truly noble edifice has been created in which a sense of freedom and peace resides as an inherent quality."[2] After traveling half way across the world, they found, with astonishment and ecstasy, an exquisite example corresponding perfectly to modern architectural principles which they had laboriously established over more than a decade. Taut wrote "...In Katsura I found in a building the absolute proof of my theory, which I regarded as a valid base for modern architecture."[3] But in their revelation of Japanese architecture they forgot to mention it is people and their very activities that give life and form to the simplicity and cleanness. Divorced from activities, simplicity will die.

2.2.2 Theater

Cyberspace

Cyberspace has a quality of agora – it is activity-oriented time-based transient loci. This quality is well exemplified by electronic newsgroup. Newsgroups, known collectively as Usenet, are on-line discussion groups. Each newsgroup is devoted to a specific topic, and members in the group can post their messages which can be seen by other members in that group. Topics are discussed, ideas are exchanged – much in the same way the ancient Greek agora had functioned.

Just like temporal plays in a theater, not only do messages on Usenet have an ephemeral quality – they can only live for a few weeks on the net – but also newsgroups, the players themselves, are temporary. Whenever there is a common interest or a sudden hot topic, newsgroups emerge instantly. By July 1994 there were nearly 2,000 newsgroups distributed globally and there were many more locally; seven million people are in these groups. There are newsgroups in which the O.J.Simpson trial is fervently debated; newsgroups were set up within hours of Los Angeles' big earth-

[2]Popham, Peter. *Tokyo – The City at the End of the World.* Kodansha International Ltd., 1985. pp.146

[3]ibid.

quake in January 1994 to exchange the news of the disaster; for certain classes at MIT newsgroups are organized for after class discussion – just to cite a few examples. Such newsgroups are destined to dissolve sooner or later as hot topics cool off, or as common interests fade away.

Time is an important dimension for theatrical arts, and this is also true for cyberspace. Still taking newsgroups as an example: for a group member the significance of this newsgroup is in direct proportion to the length of the time he or she stays in it and the frequency he or she visits it. On-line time can function as a quantified measurement of how significant the newsgroup is to a participant. This concept could potentially be used for job surveillance, an unwelcome mechanism for many people. Suppose in the not very far future many work places were to become telecommunities, in other words, employees became nomadic workers who performed their tasks at home or wherever it was easy for them and they were to communicate with their bosses through the net. At first it would seem that employees would get much more freedom than before by remaining out of sight. However, their devotion to the work can be exactly quantified by tracking their online time on the company's net or their frequency to the work-related database, and thus they could be evaluated based on such information. Time is a critical dimension for cyberspace.

Tokyo

The dimension of time is also well incorporated into the city life of Tokyo. Just as in farming, the seasons dominated rural lives, Tokyoites' activities are time-oriented. Thus the city is transformed into a huge theater. Ashihara accredited the unique characteristics of Japanese cities to the very fact that Japanese people are used to taking off their shoes before entering their homes, thus their homes are treated as bedrooms while streets, along with all the small shops, restaurants, bars, and entertainment parlors, are considered their living room. Whether theater or living room, what is implied by the metaphor is that what really matters here is the program or the activity, rather than the background which is subject to change as the play changes. Understandably in such cities ephemerality is a persistent theme.

During the day on every weekend, the boulevard in front of NHK Broadcast Center and Tange's renowned Yoyogi Gymnasium becomes a paradigm for youngsters. Traffic is cut off; flamboyant music bands right next to one another fill the entire 1 km street in a manner not unlike the food stalls which are lined up right behind them. Bands of various styles compete with each other with their state-of-the-art musical instruments, queer costumes, and loudspeakers. Each band has its own distinct style and its own group of fans. Ardent interaction sharply contrasts with the shy and reserved everyday Japanese. It is not a place to enjoy music since deafening sounds are mixed together, but rather it is a place to relieve oneself from the stress of the routine of everyday life, to release something deep inside, and to enjoy a festive communal life. But this unbridleness is transient – exactly at six o'clock in the evening, following a whistle from an on-duty policeman, an endless array of cars start to move in from two ends of the street, in the same style that bulldozers address earth, and the gay mob is pushed out of sight.(Fig. 10)

Tokyo is also used as a seasonal theater as it was a 100 years ago: every year in early April when cherry trees are in full blossom, under clouds of cherry flowers there gather clouds of people – this is called "Hanami", or "Cherry Viewing". The most spectacular "Hanami" can be found in Ueno Park and Kudanshita, which are so crowded with cherry viewers that one can hardly move forward. The ground under the rows of cherry trees is entirely covered with plastic sheets on which families, friends, or colleagues are sitting in groups, showered in a snowfall of dropping petals, drinking and singing until late night. On certain days of each summer Tokyoites crowd along shore of Sumida River that runs through the city for another festive event called "Hanabi", namely, "Firework Viewing". In autumn there are festivals for celebrating the harvest and worshiping various "Kami", gods in the native Shinto Religion, and streets are filled with groups of people in traditional rustic costumes carrying portable shrines and parading from temple to temple. In winter there are still exciting things going on. For instance, on "Shogatsu", New Years Day, Tokyoites crowd major shrines all over the city to pray for good luck in the coming year.

The persistent theme behind Tokyoites' willingness to embrace the transients is their deep rustic rootedness and "sense of the earth"[4]. Earth, nature and the wheeling of the seasons bringing constant change are well understood and highly appreciated by Japanese people. And therefore they are particularly sensitive to the moving shadows of bamboo shrubs under the moonlight, fallen maple leaves floating in a running stream, and snowfall-like cherry petals drifting down in the wind. These transient things are most likely to move the heart of a Japanese.(Fig. 11)

Interestingly, the theatrical character of Japanese cities is analogous to that of European cities. In an Italian piazza such as Saint Marco Piazza a sea of coffee tables with chairs around them are deliberately arranged in the open air, so that people can watch other people in the sunshine while enjoying their coffee and casual talks with their friends. A theatrical atmosphere is promoted in this way. This seems in distinct contrast with Japanese cities which have neither piazzas nor coffee tables in the open air. However, if the fact is considered that numerous facades of small shops and restaurants are totally open to the street during the day, people lingering between vegetable stalls, haggling in a shoe store, or sitting tightly around a noodle bar enjoying their Soba are really not very different from those sitting at coffee tables in an Italian piazza.(Fig. 12)

2.2.3 Ukiyoe – a floating world

Cyberspace

Unlike the stable physical built environment in which people are reduced to being passive recipients, in cyberspace people are active creators who make cyberspace a dynamic and transient flow. Also taking WWW as an example, the Web is not a one-way medium as is the newspaper, but rather it is a network for two-way electronic data flow. Each document in the web is not a stable node that users can only read passively, but rather it is subjected to constant change if the information in it is obsolete or misleading: users can provide feedback, modification and further

[4]Seidensticker, Edward. *Low City, High City.* Alfred A. Knopf, New York, 1983. pp.139

illustration in a new commentary node and link it to the existing one. This function is called annotation. Through annotation readers become active creators and thus the quality of the information in the Web can be significantly improved. In such a case, where information is subjected to constant update and modification, there are no longer unchallengable authorities or eternal truths. With nostalgia, out of date information is sunk without a trail, in a sea of floating bits.

The dynamic of the Web is more than just annotation – one can add his or her very own homepage, so that everyone on the Web can read it. This can be done by creating a file with a special language called HTML; then, after getting the permission from a Webmaster, the file can be linked to the Web. The homepage doesn't have to be restricted to text; it can contain graphics, photos, sound, and video clips. At MIT's Laboratory for Computer Science, David Wetherall set up a mini-camcorder in the lab and linked it to his homepage. Anyone bumping into that home page can see him doing his work, answering his phone, idling, or doing whatever he chooses to do in real time.(Fig. 13)

The kinetic quality of cyberspace can even be made visible: on your computer screen you can have a virtual clock with hands that move as time passes; the weather forecast can appear on the screen periodically to show current temperature, humidity, wind speed, and so on, with a satellite weather chart as well. You can also step into a homepage of stock exchange information showing the current Dow-Jones average index chart, in which the curve's heading up or diving down synchronizes what is happening on the Wall Street trading floor. It is the floating and flowing bits that make up the entire cyberspace, nothing more than that.

Tokyo

Since pre-modern time the world has been viewed as impermanent and transient by the Japanese people. Ukiyoe, a traditional woodcut painting style that was popular in the Edo Era, literally means "painting of a floating world", since in such paintings everyday life in Japanese cities is artistically depicted in minute detail. Even the national symbol of Japan is not a permanent monument. The Grand Shrine in Ise,

the symbol of Shinto religion and the nation for the past 1,300 years, is burnt up and built anew every 20 years on alternative empty sites next to one another. In this way its reincarnation goes on forever – the eternity of the shrine is maintained not in its permanence but in its rebirth. Because it is both the birth place and funeral ground of the shrine, the site is immune while on top of it floats the passing of life.(Fig. 14)

During the Edo Era (1603 – 1867) the the city of Edo (the name was changed to Tokyo in 1868), was the largest city in the world of its time. It was crammed with fragile wooden huts that were so vulnerable to fire that those fires attained a poetic name "Edo no Hana", literally "Flower of Edo". In 1923 the entire city was destroyed in the Great Kanto Earthquake and its following fires; again in 1945 the whole city was flattened during American air bombing. Tokyo has been erased from the ground twice, not once, in the past 70 years. Earthquakes are so frequent that the city virtually swings a couple of times every month. In history devastating quakes took place about every 70 years – the next one is already overdue. Perhaps that is why the Japanese people wholeheartedly embrace the Buddhist belief that "reality is impermanent and yet trying to retain it is the cause of the human suffering"[5]; and perhaps that is why they devote themselves to their everyday life so much that Tokyo's streets are full of life and vitality.(Fig. 15,16)

The ephemerality of Tokyo has been further exaggerated during the explosive economic development that followed the Second World War. It has been mentioned before that in the old time Japanese houses were built with flimsy materials and had a fragile quality. A man was considered successful if he was able to build his house four times within his lifetime. This mentality has been carried on into modern times, especially during the second half of 1980's, the so called "Bubble Time", when land prices were driven up so high in the frenzy of real estate speculation, that they were over 10 times construction costs in many areas such as Ginza. In order to make a profit from real estate, land owners have to replace old buildings whenever they can no longer accommodate the changing demand or are out of fashion. This happens so

[5]Chang, Ching-Yu. *Japanese Spatial Conception.* Doctor Dissertation Thesis. The University of Pennsylvania. 1982. pp.100

frequently and so extensively that places often become unrecognizable for those who have taken a leave from Tokyo for several years. If Frank Lloyd Wright's renowned Imperial Hotel can be torn down, what cannot? In a city described as having "neither memory nor imagination" the only thing left for people to celebrate is their present.

As for the image of the city, frequent changes can be found in huge signs and aggressive billboards which hide buildings behind them and dominate the entire street view. The life span of these texts and graphics can range from years to just a few seconds, if new electronic media is taken into account. In the evening when buildings dissolve totally into the dark, the novelty starts to show up: shiny neon-signs, frenetic lightning on the facades of Pachinko parlors, electronic news billboards that make one wonder where texts come from and where they go, and buildings covered with huge TV screens that change their faces instantaneously. In evenings when the weather is good, a huge lighted airship carrying signs for Konica Color Film can be seen drifting in the sky above the city.(Fig. 17)

Tokyo's architects, long familiar with the ephemeral and the kinetic, have already taken on its aesthetic. More and more aluminum panels, glass, metal strings and pinnacles which give an appearance of lightness and glow are used in the exterior finishing of buildings; the shape of the plans and even the elevations in some cases are streamlined into curves and ovals to give a feeling of speed and flow; structures are severed, twisted, and displaced to attain an effect of instability and dynamism – the transplanting of Deconstructivism into building design which has been fashionable for some time in Europe and America has uncannily found at home in Tokyo, not unlike what has happened in modern architectural history over the past 60 years. Fumihiko Maki's Tokyo Metropolitan Gymnasium has taken on a UFO look – it seems ready to take off; Watanabe's Aoyama Drafting School Building No.1 is a literal translation of Lebbeus Woods's Freespace Structure; Lightness and fluidity have materialized in the phenomenal approach of Toyo Ito's Silver Hut, Wind Tower and Itsuko Hasegawa's S.T.M House; and so on, and so on. In Tokyo ephemerality is enjoyed and celebrated.(Fig. 18,19,20)

2.3 Virtual Reality

Definitions from Webster's Dictionary:

Virtual: "being in essence or effect though not formally recognized or admitted."

Reality: "a real event, entity, or state of affairs."

Virtual Reality (VR) is the real effect of displacement achieved by substituting the participant's normal sensory input with artificially created information while the participant remains in the same place[6].

VR possesses the quality of being both "real" and "surreal". The effect of "being real" is the result of the participant's capacities enabled in such a way as to have perception of and to be able to interact with, through his or her own senses, that which has been created artificially. As a result the participant can feel convinced that he or she is actually in another place. VR also has the quality of surreality since the essence of its creation is not based on substance but on information that is associated with the participant's past experience and knowledge.

VR can be attained through various techniques. In this dissertation techniques of simulation, virtual community and telepresence will be discussed.

2.3.1 Simulation

Cyberspace

Information technology is being developed to achieve a convincing simulation of objects and environment through human sensory experience. Today a computer generated three-dimensional image of objects using millions of colors, a full range of light radiosity and all kinds of shaded texture has attained a photorealistic or even supper-realistic effect. Computer aided animation has not only been used to simulate the flow of air masses in meteorological studies and the molecule variation process in biological research, but it has also been juxtaposed to real environment and live char-

[6]This definition is a modification of the one given by Micheal Heim in his book *The Metaphysics of Virtual Reality*, in which VR is restricted to computer generated virtual environment; here the concept extends to a broader realm. Heim, Michael. *The Metaphysics of Virtual Reality*. Oxford University Press, New York, Oxford, 1993. pp.160.

acters in futuristic movies – if the effect of reality in Terminator 2 is not convincing enough, in Jurassic Park it definitely is.

The latest simulation allows the participant's full sensory immersion into a virtual environment by cutting off his or her visual and audio sensations from the surrounding world and replacing them with computer generated illusions. Such systems usually deploy goggles, or HMD (Head Mounted Display) which give the participant a stereoscopic view of the virtual world through two small three-dimensional optical displays known as "eye-phones". HMD is also equipped with headphones that create a three-dimensional acoustic effect. New equipment is being tested to give the participant a sense of temperature and touch through stimulation generators installed in a sensor-equipped garment called "datasuit".

New developments in computer simulation also enable the participant to achieve a sense of control over the virtual environment. Simulation cannot take full effect if the participant is just a passive data recipient unable to actively participate in and interact with the virtual environment. Devices have been tested to allow a certain degree of interactiveness by facilitating data feedback from the participant. HMD can also track head movement (Some are even capable of tracking eye movement by sending low-level laser beams directly onto the retina[7].)and use that data to correspond the perspectives on the virtual environment to participant's body orientation.

Other feedback devices include dataglove, datasuit, and hand-held devices such as joysticks. This equipment provides data feedback of body movement to the computer and thus enables the participant's virtual movements and his manual access to objects in the virtual environment. Another approach in human-computer interaction taken by Myron Krueger, often called "the father of virtual reality," is to liberate the participant from the burden of body-encumbering gears by tracking his or her body movements with cameras and monitors, so the body can be projected on the screen and interact with what is there through constant data feedback.

[7]Heim, Michael. *The Metaphysics of Virtual Reality.* Oxford University Press, New York, Oxford, 1993. pp.152.

Although it originated for military purposes such as flight simulation used by the U.S. Air Force, today computer simulation is used to serve peaceful purposes such as planetary exploitation, architectural design, and entertainment which has eventually succeeded in opening the market for state of the art equipment and in driving prices down.

Tokyo

"Le Chinois (name of a Chinese restaurant in Shibuya Ward –the author) Le Chinois serves Cantonese- and Szechuan-style dishes slightly modified for the Japanese palate. The interior is a modern mix of art deco mirrors and marble. The excellent service is compatible with NY's most fashionable restaurant..." –from *Tokyo Access*, a tourist guidebook to Tokyo

Rather than a work of poetic collage, this is a brief introduction to a Chinese restaurant named Le Chinois that occupies the basement of a building in Shibuya Ward. God knows why a Chinese restaurant in Japan should take on a French name that literally means "China", and how it could be possible for Chinese food, Japanese taste, art deco interior redone in a modern way, and New York style service all to come together. But in Tokyo it does not matter – memories of residues from the past and desires for exotic wonders can all be put together piece by piece in just such a bold way, so that the real loci and time can no longer be recognized. Not only foods and restaurants, but the whole city can be put together in this very manner. (language)

In fact, simply by putting on the dresses of other cities, Tokyo has pretended not to be itself since its very early days. During the Tokugawa Period (1603 – 1867) the Tokugawa Shogunate built their stronghold in Edo City and entrenched itself there to contend with the emperor in Kyoto, the nation's capital at that time. In those days place making relied heavily on geomancy, and people had a strong belief in the connection of their destiny and the genius loci. According to Japanese architectural historian Hiroyuki Suzuki, the Tokugawa family had reconfigured the genius loci of Kyoto and transplanted it in the new city of Edo so as to usurp the emperor's

authorities. This intellectual trick of passing off the sham as the genuine was a brainchild of a monk named Tenkai, who also acted as a political consultant to the Tokugawa family[8].

In this game the hill at Ueno in Edo City was renamed "Toe Mountain" after the Hie Mountain in Kyoto – by changing the first character "Hi" into "To" that literally means "east" the hill at Ueno became the "East Hie Mountain". In Kyoto's Hie Mountain there is a famous temple called Enryaku Temple which was built in the Enryaku era – the use of the nation's era name granted the temple a national importance. So in Toe Mountain a similar temple was constructed in 1624, the first year of the Kane Era. The temple was given the name Kane Temple – thus national significance was transfered to this replica in the east. Beneath the hill at Ueno there is a pond called Shinobazu Pond. This, as suggested by Professor Suzuki, represented a much bigger lake at the foot of Hie Mountain – the Biwa Lake in Kyoto.

It seems that the topography of Kyoto was dutifully transplanted to Edo City. But the game was not over yet. In Kyoto, the important Tsukubusuma Shrine stands on a small island called Chikubu Island in Biwa Lake. Monk Tenkai was very enthusiastic in constructing Nakano Island, an artificial isle in Shinobazu Pond, on which a similar shrine was also built later on. The whole replica was finally completed by adding a last stroke – a small town called Sakamoto at the foot of Toe Mountain, in correspondence to the town bearing the same name down the hill of Hie Mountain in Kyoto. Piece by piece, Monk Tenkai stole the genius loci from Kyoto in a manner not unlike the way Salvatore Dali conceived his surrealistic paintings – a "Paranoid Critical Process"[9]. Since then Kyoto's genius loci also lived in the new city of Edo; townsfolk were convinced, and so was the monk himself.

Tokyo has been transformed through this Paranoid Critical Process from then on, and each time it has taken on a drastically different face borrowed from somewhere afar so as to cast off its own old skin. In the time of the Meiji Restoration (1868) when Edo was changed into the nation's capital and named Tokyo, Japan decided

[8]Suzuki, Hiroyuki. *Tokyo No Genius Loci.* Bungeshunju. pp.71.
[9]Koolhaas, Rem. *Delirious New York.* Oxford University Press, New York, 1978.

to adopt a western look as evidence of its civilization, in the hope of winning the respect of western big powers and to end the unequal treaties Japan was forced to sign. So "The emperor sprouted whiskers," wrote Peter Popham, "wore a braided jacket with epaulettes, half-sat, half-slouched in an armchair, ate beef. ...The earliest Western-style buildings in Japan were built by Japanese carpenters who ingeniously reproduced in wood the proportions and surface decorations their clients required; the structure within was a traditional one of posts and beams."[10]

2.3.2 Virtual Communities

Cyberspace

Virtual community is an on-line group which can access a shared database or program, exchange information and modify that virtual environment by following the same rules laid down for that group by the group master.

Among a great variety of virtual community types the role-playing type such as MUD and Habitat has a lot of similarities to Tokyo. MUD, known as Multiple User Dungeon is a text-based multi-user virtual reality environment in which each user takes control of a computerized persona to interact with other people's personae and to manipulate the virtual environment. Lucasfilm's Habitat is very similar to MUD. But instead of using text exclusively, Habitat is graphic based.

As Chip Morningstar and Randall Farmer, the creators of this game, described, "Lucasfilm's Habitat project was one of the first attempts to create a very large-scale, commercial, many-user, graphical virtual environment. ...Habitat presents its users with a real-time animated view into an on-line simulated world in which users can communicate, play games, go on adventures, fall in love, get married, get divorced, start business, found religions, wage wars, protest them, and experiment with self-government."[11]

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[10]Popham, Peter. *Tokyo - The City at the End of the World.* Kodansha International Ltd., 1985. pp.125

[11]Morningstar, Chip and Farmer, F. Randall, *The Lessons of Lucasfilm's Habitat* in *Cyberspace: First Steps*, The MIT Press, Cambridge, 1992. pp. 273

"The social space itself is represented by a cartoon-like frame. The virtual person who is the user's delegated agency is represented by a cartoon figure that may be customized from a menu of body parts. When the user wishes his/her character to speak, s/he types out the words on the Commodore's keyboard, and these appear in a speech balloon over the head of the user's character. The speech balloon is visible to any other user nearby in the virtual space. The user sees whatever other people are in the immediate vicinity in the form of other figures."[12](Fig. 21)

In 1991 the population in this game reached some 15,000 participants.

It is the feature of "role playing" of virtual communities that bears extreme resemblance to Tokyo. A persona can have absolutely no connection with the real person who plays it – the player can be a bashful young girl whereas her persona might be a bearded hoodlum who seduces other virtual ladies in Habitat. In Tokyo buildings and even towns have also taken on this role-playing character – they take on what ever image they fancy, absolutely free from all sorts of contextual, historical and cultural connections and restraints. In contrast with what Steven Hall proposes that a house should "anchor" into its environ, buildings in Tokyo float in the air.

The legitimacy of role-playing is based on two conditions: first there must be tolerance and even encouragement from society; second there needs be a recognition of the role and cooperation from other players, namely the community. In Habitat the need for freedom, encouragement and recognition are fully satisfied since these are what this game is all about. In Tokyo the freedom is derived from the circumscribed government control in a radically changing society whereas the impetus for role-playing is different from case to case and from time to time, as being elaborated respectively. The recognition of role-playing is likely to be the result of the group oriented consensus-seeking nature of Japanese people.

[12]Stone, A.R., *Will the Real Body Please Stand up?: Boundary Stories about Virtual Cultures* in *Cyberspace: First Steps*, The MIT Press, Cambridge, 1992. pp. 94

Tokyo

After the Second World War in Tokyo imitating foreign cultures ceased to be a means of establishing national identity but rather it is out of a straight forward fantasy for the exotic. Vernacular architectural styles all over the world are accumulated in Tokyo's pop architecture such as coffee shops, fashion stores and love hotels.

Near Shibuya Station there is a valley called Spain Dori. The Spanish flavor was initiated by a coffee shop owner named Yasuo Uchida. As Peter Popham detected, after a holiday trip to Spain, Mr. Uchida was inspired by what he saw and decided to replace his house there with a miniature Spanish-style villa. After Mr. Uchida's pioneering work the neighbors in the valley took to the idea and did likewise. From then on the street was named Spain Dori, or Spain Street. But what has resulted is an eclectic collage of fragments from all over Europe in what Peter Popham called "the round-the-world-in-fifteen-seconds tour"[13].(Fig. 22)

The schizophrenia has gone one step further during the economic bubble time – it expanded on the city scale to suburban development. Due to the rapid growth of population in Tokyo, in the past twenty years new satellite towns have been extensively developed. "Bedroom Towns," as they are called, are lived in by middle class families whose bread earners, namely adult males, commute daily by train to downtown Tokyo. Railway stations are the centers of these satellite cities, with shopping malls, amusement areas, restaurants and cultural facilities. These new towns are totally free from any restraints imposed by old urban fabric, so they can take on whatever image they fancy, even though they have no real foundation.

In Tama New Town in the western outskirts of Tokyo, the large campus of the Tokyo Metropolitan University was designed like the hill towns of Germany; next to the university a residential area was given an Italian hill town image, together with an Italian name "Belle Colline"; in the same new town a replica of a bridge built in pre-war time Tokyo was erected in an effort to transplant the memory of Tokyo into this place of no memory; in Horinouchi, a sub-center in Tama New Town, a large

[13]Popham, Peter. *Tokyo – The City at the End of the World.* Kodansha International Ltd., 1985. pp.169

scale Gaudi-style structure boldly stands between the railway station and residential areas(Fig. 23,24,25). Hajime Yatsuka gave a good account:

"Moving on to Horinouchi, one is confronted with another amazing structure in front of the station; a series of stairs and escalators (this is a hilly area) evidently inspired by Gaudi. This sudden appearance of Gaudi in this context is the result of the fact that he became very popular in Japan because of extensive mass-media coverage of his works, and the largest landowner in this area was an admirer. He was willing to sell the land for the development on one condition: that a public Gaudi-style structure be erected there. There is little doubt that he was quite sincere in his intentions, but the results appear somewhat ridiculous, especially for Europeans, in spite of the fact that the developer employed the services of artists from Barcelona and Italy, in order to achieve the 'real thing'."[14]

The artificial community is a celebration of affluence and freedom, but its immaterial and fictional nature also conveys a sense of placelessness – the very nature of virtual reality.

2.3.3 Telepresence

Cyberspace

According to Michael Heim, telepresence is "Operations carried out remotely while the user remains immersed in a simulation of the remote location.(The Greek word tele means 'at a distance,' and so telepresence means 'presence at a distance.')"[15]

Telepresence enables people to be present in multiple places at the same time and hence have augmented power of control over these environments. Its application is virtually unlimited and is still under exploration. Following are some examples.

Robotic telepresence can be applied in places such as toxic chemical plants to keep workers away from dangerous job sites by leaving those jobs to robots; it can also be used to conduct scientific research, such as ocean and planetary exploitation.

[14]Yatsuka, Hajime. "Ecology of the New Suburbs of Tokyo: Tama New Town." *Casabella* 608-609, January-February 1994, pp.118

[15]Heim, Michael. *The Metaphysics of Virtual Reality.* Oxford University Press, New York, Oxford, 1993. pp.159

Heim wrote "Robotic telepresence brings real-time human effectiveness to a real-world location without there being a human in the flesh at that location. Mike McGreevy and Lew Hitchner walk on Mars, but in the flesh they sit in a control room at NASA-Ames."[16]

Telepresence also facilitates the access to remote resources. This kind of augmentation of accessibility is highly demanding especially when resources and expertise such as advanced education are limited. In China the opportunity for higher education is extremely scarce, compared with its huge population of 1.2 billion. But now they have state-sponsored television universities all over the country and diplomas are issued. Whoever has a TV set is virtually able to enjoy the opportunity of higher education.

Telemedicine is another promising application of telepresence. Today medical diagnoses and operations are increasingly dependent on electronic equipment and digital data flow. In a not-so-far-future doctors will not have to be physically present at a patient's bed – they can diagnose via video image and digital data. And even more, they can conduct remote surgery by manipulating a robot in a distant site, given the fact that such robots are tinier than human fingers and are more precise than human eyes. The significance of telemedicine is multi-fold: first, it makes the expertise of medical doctors available to places lacking a good medicare system; second it saves critical time needed to send the patient to a big hospital or wait for an expert; third it can reduce the risk of surgeons in a battle field – research in this area is so attractive to the military it is self explanatory.

Telepresence also provides the means to conduct business on different sites and access remote markets. With multimedia tools teleconferences are already being widely conducted in the business world. This technology also has a great potential for businesses to penetrate remote and even international markets traditionally segregated by geometric boundaries. Virtual Design Studio is a pilot project conducted at the Department of Architecture at MIT. In this project students, faculties and juries from universities across the world worked on the same architectural design project in

[16]ibid.

real time through the internet. This pilot project has the potential to extend into the international construction market where there is a significant imbalance between work opportunities in one region and expertise in another. This technology will shift the political economy of the world.

Tokyo

Telepresence has already been widely utilized in the urban environment of Tokyo, though it is still in a very primitive stage. TV buildings – buildings with huge television screens on their facades – function as tools for this type of telepresence, usually used by businesses in remote locations. The impact of these TV buildings on the vitalization of the urban environment is significant. The best example is Studio Alta in Shinjuku.

Studio Alta is located in front of the square of Shinjuku Station East Exit. The building is a giant white box with a huge TV screen on the facade (Fig. 26, 27). Since Studio Alta's completion it has become a local landmark due to the strong impact of its kinetic image on its surroundings. In fact, the Station Square in front of it has since become a meeting place. It is estimated that 100,000 people pass in front of Studio Alta daily, and the price for the land in front of it was the highest in Japan in 1982.

Aside from the huge video sign, Studio Alta's attraction is due to its mixed use. Basically the simple box houses three functions: first, its basement floor contains restaurants and cafes, and connects the subterranean shopping mall and Shinjuku Station; second, small boutiques fill the six floors above ground; third, a television studio that produces TV programs and commercials occupies the top of the building. Studio Alta is conceived to attract 15- to 20-year-olds – it gives them exactly what is needed: fashion, restaurant, and information.

The facade of Studio Alta is also composed of three parts: the top part is very simple: on a plain white surface there is a clock at the upper left corner, and Roman letters STUDIO ALTA occupy the lower right corner. Both the clock and letters are lighted in bright colors at night. The middle part of the facade is a huge Panasonic

color monitor. On each side of the screen there hangs a long cloth banner with written texts announcing forthcoming events. The lower part of the facade contains two levels: the upper level is a "Balcony-stage", a stage with a backdrop prepared for events such as rock concerts. The lower level is the entrance level. The facade beneath the balcony is purposely set back to create an open space for promotional events. "Data Plaza", as it is called, thus becomes a show case of live animation. Piled on the left side of the entrance and hung from the mirrored ceiling above Data Plaza are 33 color monitors on which scenes on the main screen are multiplied.(Fig. 9)

Studio Alta functions as a medium for the self presentation of the owner – a joint venture between Fuji Television and Mitsukoshi Department Store, and as an interface for other parties' telepresence. The self presentation is both conducted locally and remotely.

When a concert is held on the Balcony Stage above the main entrance of Studio Alta, a small band and singers appear on the stage. But in a place like Shinjuku Station East Exit, one of the most hectic and noisy bustling places in Japan, in order to catch people's attention and make themselves heard, they have to resort to Studio Alta itself which is a powerful audio/video equipment. Their voices are amplified by its loudspeakers, and close-ups of their faces and performances are presented on the huge screen, duplicated on the 33 small monitors at the entrance, and mirrored upside down in the ceiling. An excited crowd crams the the Data Plaza and Station Square, and once in a while they can find themselves appearing in the huge screen and small monitors, cheering and chanting. By augmenting reality Studio Alta presents itself to the local people and vitalizes the place.

But Studio Alta's reputation goes far beyond Shinjuku, even beyond Tokyo. In the television studio atop the building the famous TV program "Waratte ii tomo!" (It is good to laugh!) is produced and broadcast to millions of television sets across the country, together with its commercials which promote the latest fashion. People from far away are already familiar with Studio Alta long before they come to worship it in person.

Studio Alta also facilitates telepresence for many businesses. Capron in his Doctorate thesis provides an interesting example of how this building is utilized for business rivalry in a fierce marketplace. Bic Camera is one of the three major photographic appliance shops in Tokyo. The other two rivals, Yodobashi Camera and Sakuraya stand side-by-side facing the Station Square in Shinjuku, competing strongly with each other with all kinds of sales strategies, while Bic Camera is isolated in Ikebukuro, another sub-center of Tokyo. "Surprisingly," as Capron put it, "Bic Camera commercial – well-known because broadcast on T.V. regional channels, and for its unforgettable tune as well as for its Superman caricature – frequent appraisal on Studio Alta screen, allow Bic Camera to be 'present', at the same time on the rival site as well as in the shop('s) own fief where there is no rival. Bic Camera('s) ubiquitous capability is what many marketing consultants dream to be able to propose to their clients."[17]

[17]Capron, Jean-Luc. *Man, Media, Architecture: Actors of a Built Environment Spatiotemporal Dynamization - The Case of Tokyo (1590 - 1990).* Doctor Dissertation Thesis, the University of Tokyo, Tokyo, 1990. pp. 13

2.4 Double Life

"KUBLAI: I do not know when you have time to visit all the countries you describe to me. It seems to me you have never moved from this garden.

POLO: Everything I see and do assumes meaning in a mental space where the same calm reigns as here, the same penumbra, the same silence streaked by the rustling of leaves. At the moment when I concentrate and reflect, I find myself again, always, in this garden, at this hour of the evening, in your august presence, though I continue, without a moment's pause, moving up a river green with crocodiles or counting the barrels of salted fish being lowered into the hold.

KUBLAI: I, too, am not sure I am here, strolling among the porphyry fountains, listening to the plashing echo, and not riding, cacked with sweat and blood, at the head of my army, conquering the lands you will have to describe, or cutting off the fingers of the attackers scaling the walls of a besieged fortress.

POLO: Perhaps this garden exists only in the shadow of our lowered eyelids, and we have never stopped: you, from raising dust on the fields of battle; and I, from bargaining for sacks of pepper in distant bazaars. But each time we half-close our eyes, in the midst of the din and the throng, we are allowed to withdraw here, dressed in silk kimonos, to ponder what we are seeing and living, to draw conclusions, to contemplate from the distance.

KUBLAI: Perhaps this dialogue of ours is taking place between two beggars nicknamed Kublai Khan and Marco Polo; as they sift through a rubbish heap, piling up rusted flotsam, scraps of cloth, wastepaper, while drunk on the few sips of bad wine, they see all the treasure of the East shine around them.

POLO: Perhaps all that is left of the world is a wasteland covered with rubbish heaps, and the hanging garden of the Great Khan's palace. It is our eyelids that separate them, but we cannot knowwhich is inside and which outside."

– Italo Calvino, Invisible Cities

2.4.1 Cyborg

Cyberspace

Cyborg means half-man, half-machine. This term is a combination of "cybernetic" and "organism". In this dissertation the term "cyborg" refers to a separation of one's mental domain from his or her physical domain by artificial means.

Such cyborgs are proliferating as our culture becomes more and more information dominated. In fact, the separation of mind from body has existed in history for a long time, since writing began. As technology evolves, mind and body can be farther and farther detached from each other. The invention of telephone, radio, and television has made it possible to incorporate sound and vision into one's mental world. These days the imaginary world becomes so tangible and less imagined, that people may submerge themselves totally in such an imaginary world without paying attention to their physical surroundings. "Couch Potato" is a term recently created to describe those people who spend long hours watching television or playing computer games.

Today, a milestone in the course of pursuing a double life seems to have been reached. Equipped with the tool of computers, cyborgs are no longer confined to be onlookers in their mental world as they used to be; this new technological wonder transforms them from previous passive information receivers into vigorous actors and information contributors – they can interact with anything in the virtual world, communicate with people they meet there, and make changes by their own actions, as demonstrated in newsgroups and interactive computer games.

Their entitled capability to bring consequences into the virtual world by what they do or say there is powerful enough to obliterate the psychological boundary that separates the real and the virtual, so that cyborgs' can totally immerse themselves in the virtual world and be colonized by it. This kind of immersion has not only helped the success of Simnet's simulation of military exercise, in which "the participants were so caught up in the action that they didn't notice the bulky camera poking at them"[18], but also alarmed social scientists that the proliferation of cyborgs' immersion into video games and role-playing computer games might change human relationships and cause serious social problems.

Aside from interactiveness, networked multiple-player participation is another powerful mechanism in making the imaginary world more realistic. In cyberspace one's pure mental world is not only perceivable to oneself, but also becomes visible to

[18]Stone, A.R., *Will the Real Body Please Stand up?: Boundary Stories about Virtual Cultures* in *Cyberspace: First Steps*, The MIT Press, Cambridge, 1992. pp. 93

other people. Considering Lucasfilm's Habitat, "avatars", as those cartoon-like animated human figures are called, are representatives of those players behind computer screens. All conduct performed by avatars vividly displays in real time how those players act in their mental world, and these actions are visible to all players behind computer screens.

Tokyo

Metropolitan Tokyo has a population of 28 million people, of whom well over ten percent commute by trains and subways everyday to work in the 23 wards of inner Tokyo. It is very common for commuters to spend 90 minutes each way, standing in trains. During rush hour every morning, trains, each a quarter of a mile long, are fully packed with people who are in their sharp business suits or dresses – in some major stations trains have to be loaded with the help of professional pushers who wear uniforms and white gloves.

This kind of congestion could be the cause for a riot in a Western city. But in Tokyo the nightmare of cramming in trains is dramatically alleviated by the way people behave: motionless and soundless, avoiding each other's eye contact even when they are pasted face to face, and unwilling to loosen their neckties in a steamy summer morning – in time, the glass windows of trains are usually fogged from the inside by people's breath. No matter how uncomfortable, the train always remains a silent solid mass. Among the virtues of Japanese people, endurance ranks number two, just behind hard work. Also, the consensus among this homogeneous people definitely plays an important role in keeping the train amazingly ordered. But is this the whole story? What else keeps people from going insane in such suffocating conditions?

Through two years' observation, the author found a critical technique is utilized consciously or unconsciously by passengers in all trains: by summoning the power of mind passengers mentally keep themselves in a different place, so as to escape from their physical confinement in the train. In order to enter this state of schizophrenia, a number of techniques have been developed aside from reading books, newspapers and sleeping.

(1) Posters: Posters are pasted continuously along baggage racks of the train, or hung from the ceiling perpendicularly to the long axis of cars at intervals of about two meters. These posters list topics of articles in popular magazines, announce the latest events, movies and shows, and promote new products from cellular phone to hair oil. Since most of these posters are changed daily, poster holders are designed in such a way that a staff can walk along the train and change each poster in two seconds, in a ritual-like operation. Just by glancing through these posters, one can learn what is going on in the world, what is a hit, or what the latest fashion is in the town.

(2) Manga: Manga is a unique type of Japanese comic book which contains all kinds of stories. People of all ages are often found submerging themselves in manga while riding a train. Although in mangas images are loosely put together, and the structure of pictures is based rather on human sensation and familiarity with the context than on logic, mangas are very easy to browse. The high readability of manga is due to following reasons:

i) Manga's content is stimulating: violence, mysterious stories, and pornography. It is said that the reason why Tokyo is so safe is because Tokyo's violence has all been absorbed into mangas.

ii) Manga is picture dominated, and can be either flipped through or viewed in detail.

iii) Texts are very limited, and they are often restricted to short sentences, single words, and very often, punctuation. Onomatopocias comprise a large portion of texts, so manga is a unique visual-audio medium.

iv) The sequence of pictures in manga is not conveyed through numerical order but through graphic impact on readers. Each page of a monga book may contain one to several pictures. Within the same story sometimes a page should be viewed horizontally, either from left to right or from right to left; sometimes it needs be viewed from top to bottom; and there are not a few occasions in which readers need to "jump" from picture to picture within one page. But the reading sequence is

somehow obvious at the first glance since it is clearly suggested by the size of pictures, story context, and graphic continuity, such as close-ups.

In conclusion, manga is an extraordinarily powerful means of attracting readers' attention. Besides trains, mangas are also often found in waiting lounges of barber's shops and under restaurant tables.

(3) Walkman: Walkmen are used by train-riders to enjoy stereophonic music or to learn foreign languages. Walkmen provide an effective screen from the surroundings and a convenient bridge to a remote mental world by connecting directly to it through sense of hearing. The latest models of Walkmen that are popular among Tokyoites now have remote controls – a small bar half the size of a pen allows the rider to take leaps in the other world without having to struggle to reach the Walkman somewhere on his body. Remote control of a walkman further cuts off rider's connection to the secular world.

Very often, these techniques can be found being utilized together. For instance, reading manga can be complemented by listening stereo music from a walkman. The distant world is not the single one; they are overlapped. These train-riders are uncannily like the monks of Zen Buddhism. In Japanese Buddhist temples, dry gardens are created for monks to meditate. Such gardens are very heuristic, where stones, carefully arranged amongst raked white sand, often arouse illusion of mountains and islands in the sea, or what so ever. Through meditation monks are supposed to surpass the secular world and gain wisdom of the cosmos(Fig. 1). What is common here is their daydreaming process, their simultaneous existence in different worlds, and their schizophrenia, albeit different media are utilized to facilitate the process: posters, manga, Walkmen, or dry gardens.

Such devices are good enough to take cyborgs to other worlds, but how to bring them back? In Tokyo's trains basically there are two ways to accomplish this:

(1) Speakers: Through speakers station names, destinations, transfer routes are routinely announced as the train approaches and leave each station. Cyborgs are reminded not to forget their belongings as well.

(2) Bulletin Board: Such boards are mounted on top of each door of the train. The author has found four types of bulletin boards in Tokyo's subway and railway trains.

i) The simplest and probably the oldest – a diagram of the route, usually in a strait line, bearing all names of stops along the way. In most routes trains are differentiated by regular train, limited express, express, and super express. Very often parallel lines of different colors are deployed in correspondence to the hierarchy of trains.

ii) Semi-electronic Bulletin Boards – can usually be found in trains of Ginza Line or Marunouchi Line. This type of board is otherwise similar to the first type except the point representing each stop is lighted as the train approaches it, and on the board the line between two adjacent stops flashes when the train is on the way.

iii) Electronic Bulletin Board: Strings of lighted electronic text run from the right edge to the left edge of the display window, announcing the aforementioned information. But such devices also display abbreviated news – by incorporating the dimension of time, more information can be carried by this device than those mentioned above.

iv) High Resolution Color Monitor: Thanks to such monitor's non-linear display patterns and graphic capability, time can be used more efficiently by the monitor than previous media. Besides railway announcements and brief news, color monitors can carry even more information, such as foreign exchange rates, stock information, and advertisements. Color monitors are a prophesy that devices used to get in and out from the other world can eventually come together.

2.4.2 Living Machine

Cyberspace

If a person can be transformed into half-man/half-machine by displacing his mental world with the world in machines, or by implanting artificial organs in his body, it is reasonable to assume that machines can also be changed into half-machine/half-man by endowing them with intelligence.

Still taking Habitat for example, since avatars in Habitat can fall in love with each other and get married, it is natural to suppose they may have children, too! Technically this should not be a knotty task. The offspring may inherent some char-

acteristics from their parent avatars and behave accordingly, and they can also learn from their parents as they grow up. HOWEVER, they will not be able to attain souls, as other avatars did. These offspring are exclusively machines without any human players controlling their backstage, but they inherent proper behaviors from their parents and can still learn from them. These offspring may become living machines.

In cyberspace living machines already exist. "Agents", as they are called, are software objects that perform actions in virtual worlds. They can change, evolve, and learn. Such agents have been deployed to select news on the net, or to generate a personalized newspaper for the master based on his or her taste. Project Fishwrap is a personal newspaper on MIT's Athena network. It was initiated by a group of students and began service in January, 1994. Users may generate a customized newspaper specifically tailored to their personal taste, such as hometown news, special topic news, IAP scheduling information, and off-campus activities.

Other agents are deployed by some web masters to safeguard news groups from contamination by flames. These agents can remove irrelevant messages or even kick out those outlaws who enjoy flaming others in the group. Some malicious agents can be created and sent into the net to distribute viruses.

Tokyo

In Tokyo's subway and railway stations tickets are sold and checked automatically by machines. In Shinjuku Station alone, nine railway and subway lines converge, with 1,230,000 people embarking daily. In order to handle such a huge bulk of passengers, all railway companies have deployed automatic ticket vending machines, and most companies use automatic wickets to check and collect tickets.

The process of buying a ticket from a vending machine is much the same as dealing with human staff. In each station every railway line has their own ticket vending and embarking system. Near the entrance a row of vending machines can be found mounted in one side of walls; mounted on top of these machines are huge diagrams telling the fare to all other stations in the system. A passenger can simply insert money into one of the machines, press the button corresponding to destination

and number of tickets, and get tickets. In the whole process the vending machine behaves like a real person in the following ways:

(1) Vending machine is intelligent: it can recognize the amount of bills and coins, prompt the passenger to give necessary information such as how many tickets are needed, at what rate and so on, and acknowledge these information. It can calculate and give back the exact change and the ticket.

(2) Vending machine is friendly: the aforementioned process compresses complicated human-machine interaction, so the interface of the machine has to be user friendly. The newest model of the interface brings the machine one step closer to a real sales clerk: it incorporates a screen to display the input and output information. Also on the screen there is an animated human figure, female, wearing railway company's uniform. "Irasshaimasei(Welcome!)" She greets you as you approach the machine, and raises her right hand to indicate the information on the screen as you communicate with it. After you finish, she folds her hands in front and, bows as she says "Arigatoo (Thank you!)"

This scene uncannily looks like the one that can be found at elevators of major department stores, such as Odakyu in Shinjuku or Tokyu in Shibuya. In such department stores there are salesgirls (real people in this case) acting as professional elevator operators. They wear the same uniforms, white gloves, and the same smile, repeating exactly the same greetings as found on vending machines. They bow in a ritualistic posture as customers come to the elevators, and introduce the store's repertoire to the passengers, finally bowing again as customers descend.

In Tokyo, identities of places have disappeared, now even the boundary between machines and human beings has become blurred.

(3) Vending machines have attained a certain degree of human rights: A vending machine is not merely a bunch of metal parts and buttons knitted together, it is an agent of a railway company. The machine represents a financial group behind it, therefore, it has a soul. The machine is protected the same way a human being is – any violation of the machine, such as breaking it or cheating it, will subject the

violator to severe punishment. Its right of existence and right to be treated fairly are well recognized by Tokyoites.

Not only ticket vending machines, but also many other facilities in Tokyo's railway system are becoming human-like. For instance, an automated wicket can recognize obsolete and underpaid tickets, and force the passenger to go back by swiftly shutting two small doors and displaying a proper message; an adjustment machine can inform the passenger how much he or she owes, and prompt him or her to make up the amount due on the ticket; even a small ticket carries the information of embarking date, time, embarking station and initial payment, and this electromagnetic information can be recognized at all wickets and adjustment machines. Not only railway systems, but also bank ATMs, vending machines of soda and cigarettes, pachinko and other game machines, and even public telephones all have attained a certain degree of life.

2.4.3 Animism

Cyberspace

In contrast to offspring of avatars, who behave identically to others even though they may not have souls, in the object-oriented virtual world players may take on the persona of a lobster, a grasshopper, a tree, or whatever object they like as their masks. In such a world it is very difficult to tell which object/persona has a soul, and which does not. In such circumstances objects tend to be treated as human beings who require certain respect.

Since any entity in a virtual world is somewhat animated, animism becomes a fundamental attribute of cyberspace. Therefore, as Marcos Novak proposed, "a measure of empathy is required" to comprehend each entity's behavior and to determine its possible purpose[19].

Acknowledging that each entity may possibly possess a "soul" coerces each player into treating every entity in the virtual world with caution – they understand that they are not just dealing with objects, but rather they are dealing with real persons

[19]Novak, Marcos *Liquid Architecture in Cyberspace* in *Cyberspace: First Steps*, The MIT Press, Cambridge, 1992. pp. 94

of flesh. Their actions, or more precisely, their agents' actions in the virtual world, might have consequences in the metaphysical plane of avatars – the world players physically inhabit.

Tokyo

If the human body can be separated from its mind, and if a mind can be attached to a machine, should a changing attitude toward machines be adopted? Will the subversive future forecasted in Fritz Lang's Metropolis eventually come true? It seems the line separating humans and machine need be redrawn.

But in Tokyo this has not been a problem, and it looks as if it never will be. Different from the world outlook in the West, in which human and machine are viewed as the creator and the created, or the master and the tool, Japanese people take a less polarized view and put human and machine in a rather symbiotic relationship. No other people have been adopting to technological advances with such an ease as the Japanese. It is possible that this attitude toward machines is derived from the Japanese adherence to the Shinto religion.

Japanese people have a long tradition of believing in Shintoism, their indigenous religion, in which objects of worship are nature deities. Kami, as these deities are called, are believed to reside everywhere in natural objects, such as mountains, woods and stones, and "the creation function of the world is realized through the harmonious cooperation of the Kami performing their respective missions."[20] Shinto is a religion of animism; it fosters Japanese people's sincere pursuit for a harmonious relationship with nature as well as in communities. The sense of coexistence has long been established in this religion.

Raised in such a tradition, Japanese people perceive that what they work on and what they have created is as important as themselves. Thus they are willing to do their best in their work, and pay attention to minute details.

[20]Chang, Ching-Yu. *Japanese Spatial Conception.* Doctoral Dissertation Thesis. The University of Pennsylvania. 1982. pp.73

There are two effects of this world outlook on reality: first, the status of machine – the embodiment of work and product – is motivated. Second, people are voluntarily transformed into perfect cogs in a machine – in this way the symbiotic relationship is drawn. "In the West the realization that one is a cog in a machine is a source of shame, a reason for rebellion. In Tokyo, when you realize what a damn-near flawless and unprecedentedly magnificent machine you are a perfect cog in, it is, on the contrary, a matter for blissful contemplation."[21]

From traditional carpentry and wood-cut prints to Toyota automobiles and Sony electronic products, from department store elevator girls to the train driver whose "forefinger pointing up the track in a ritually gesture as the train easing out of the station, for the hearing of no one in particular,"[22] all have demonstrated the two aforementioned results this attitude of animism brings to the reality.

When the motivated machine and humbled people meet together, it is really something to see. Monday morning, in the assembly hall of a big company, all the staff of the company line up into a square array – men in sharp business suits and women in company's uniforms. Suddenly the wall in front of them lights up – it appears to be an array of monitors, showing the interior of an office. A door of the office opened, and the boss walks in. "Ohayugozaimasu (Good Morning)!" he bows to his staff. "Ohayugozaimasu!" shouts everybody in the hall as they bows together, bodies bent at 90 degrees, facing the monitor screens.

[21]Popham, Peter. *Tokyo – The City at the End of the World.* Kodansha International Ltd., 1985. pp.15

[22]ibid.

2.5 Codification

2.5.1 Signs for Representation

Cyberspace

The World Wide Web (WWW) is a space of congestion. Since numerous nodes are distributed around the globe and they are growing at an explosive rate, no one knows how big the web is now or will be in the future. Virtually all of these nodes are accessible through one's desktop computer, which has only limited memory and display capability – at most each window can only contain one node. This means that in order to access as much information as possible without consuming too much memory space, nodes have to be "abstracted".

Representation is an ingenious way to solve this problem. Representation means to signify a node by a sign which contains the name and address of that node. Memory consumed by a sign is insignificant compared to the node itself, but by following that sign, the signified node in a remote place can be accessed. Therefore, nodes can be distributed in computer memories around the world while linked together through signs, so that all of them can be accessed by any end user.

In WWW, anchors are signifiers of those globally distributed nodes. As has been mentioned before, a node may contain many anchors that appear highlighted (by color and underlining). Clicking on one anchor causes the address containing in it be followed, and through this path the signified node be retrieved and displayed in an instant manner. Usually anchors are implicitly the titles of nodes being signified. For example, in a node called "Salem Web Map" there may be located many anchors, one of which is called "Oregon State Archives". By clicking on it, a path called "http://159.121.28.251/" containing in it is followed, and the signified node "Oregon State Archives Public Information Server" is retrieved from a server in Oregon State Archives and is displayed on the screen (Fig. 29).

Therefore, a node is a page of a document filled with signs which are called anchors. It is these signs that make the node different from, and much more significant than, a conventional document – a node contains a much larger amount of infor-

mation, and has unlimited potential of accessibility to globally distributed human wisdom. Signs are the result of information congestion, but they also contribute to this congestion by giving it life and making it meaningful.

Tokyo

Tokyo is a culture of congestion. Within a radius of 50km from Tokyo Station there live a population of 2.8 million people. Tokyo is the ... crowded city in the world in terms of its density, but considering the fact that frequent earthquake and patch-like land ownership have ruled out the possibility to build large scale or high rise residential blocks, Tokyo may be the most congested city on ground level in the world. Yet Tokyo is one of the most lively cities, and the safest city in the world.

Ironically, Tokyo's congestion is a direct contributor to the vitality and safety of its city life. Unlike a rational city laid out by functional zoning, Tokyo's streets are filled with all kinds of small businesses. The fierce commercial competition among these businesses forces them to deploy every means to solicit customers in an already very crowded street, and thus the street is made full of life. The constant surveillance of the street by shopkeepers and customers is definitely one of decisive elements of public safety in this city – Jane Jacobs would surely agree on this.

But in such a congested place, how to provide space for the maximum amount of businesses, to generate maximum profit and yet, to make those businesses accessible to a maximum number of customers? The answer is the same as that found in the WWW – using signs as representations for those businesses. Replaced by signs protruding to the street perpendicularly, the area of store facade can be radically reduced without losing its traditional advertisement function or the store's significance in the street. In fact, the forceful style of signs makes stores even more visible and outspoken.

Therefore, stores, noodle bars, saloons or Karaoke parlors with strip-floor-plans are tightly packed side by side, or piled on top of one another from basement to the sixth or seventh floor in a slim building – "pencil buildings" as they are often called, not just because their proportion are similar to a pencil, but because such buildings are often topped with a huge billboard of a big corporation, just like the rubber eraser

of a pencil (Fig. 30). With the representation of signs, stores can even retreat in a remote place – Bic Camera on Studio Alta is an example of this extreme.

Most signs of these stores jut out from buildings, perpendicular to the street – this alignment gives the signs the longest exposure time to people strolling in the street. For those stores crammed in pencil buildings, their corresponding signs are also mounted on top of one another, occupying the entire available vertical space. Signs also fill the facades of buildings: on the first floor hung at the entrance there may be inscribed boards, lanterns bearing store names, half-size curtains printed with family signs and so on; on upper floors there may be long banners announcing sales hanging from the top of buildings, or a huge TV screen pasted on the wall; in the street there often found flags, placed aligning the sidewalk's outer edges, while at the inner edge are propped-up boards announcing items on sale in front of the store; in stores such as Bic Camera, aligned banners bearing store names are hung from ceilings, walls are covered with posters, even stair steps are fully covered with signs telling which floor sells what – when such stores' facades are fully opened up during daytime, it is quite a scene to see from the street.

Skylines are also filled with huge billboards atop pencil buildings, and buildings are fully submerged into this sea of signs that dominates the entire street view. As evening approaches, most of these signs are lighted. Lanterns, bulbs, lighted boards, neon signs, and TV screens start to show their awesome magnificence – the city is transformed into a collage of pure messages. But such messages are not limited to the visual ones – stores set up loudspeakers shouting out their merchandise and promotional songs; sales clerks wearing signs are sent into the street to veil their stocks while distributing flyers, etc.

Obviously the hectic and euphoric atmosphere in the street is promoted by those signs. Each sign is an abstraction and a signifier for a great amount of activities happening somewhere behind. That is to say, those activities are compressed and signified in each of the signs, which themselves are packed together and fill the whole cityscape. Therefore, the conglomeration of signs in the crammed street represents a much greater amount of invisible activity, endless energy, and hungry desire far beyond

the restraint of space and time. Signs bring all these into light in a straitforward, bold manner. The congestion of culture in Tokyo is coupled with the congestion of information; this congestion is made durable and rendered meaningful by Tokyo's signs, no matter how vulgar they seem to be – together they give Tokyo life.(Fig. 31,32,33,34)

2.5.2 Signs for Direction

Cyberspace

Although there is not a comprehensive map of all nodes and links on the web, and probably it will never be possible to have such a thing, since all the nodes are intertwined together through cross-reference, there are certain ways to make navigation in the web of hypertext easier.

One way to navigate in the web is to use "history mechanism", which allows one to retrace his steps by moving to the next, previous, or initial nodes. This is done simply by clicking on buttons labeled "back", "forward", or "home". Here, such buttons become signs for direction within that node. History mechanisms allow the user to grasp the image of, and to have certain control over, the explored area, but they can not provide clues about what lies ahead or how to get to a specific node not encountered before.

In order to enable this function another method of navigation is deployed. This technique is called "index". A WWW index is a node that itself is a table of contents of a book in hypertext form. These special nodes helps new readers of a large database quickly find an obscure node. An index is never intended to be a total catalogue of the web, and it can only cover a certain domain of information. Indices categorize nodes by their subjects, locations, disciplines and so on, so there are subject indices, server indices, miscellaneous indices, etc. Indices may be built by the original information provider, or by a third party as a value-added service.

In an index node each item is a sign for a different direction – just like a forefinger, items in an index do not contain data, but just direction. Very often indices point to

other indices, which means a search on one index may turn up another index in the result hit list. Also, indices can be multiply layered.(Fig. 35)

A search for a node of a specific topic may start from inquiry into an index "A", in which the item named "a" may be most relevant to that topic. Clicking on "a" might result in entering another index "B". In this index item "b" may be followed since it is closest to the topic. The search process may then take several steps before finally reaching the destination. In each of these steps the scope of searching is further narrowed down.

There seems to exist a tree structure which clearly defines the hierarchy of those index nodes. However, the final destination might contain several anchors. By following one of them the original index "A" might be retrieved. The preconceived hierarchy is suddenly rendered ridiculous – the hierarchy winds up in a circle! There are two implications of this fact, and these implications reflect some peculiarities of WWW: first, in WWW there only exists a relative hierarchy which is subject to change from case to case. It can be said that basically all nodes are equally important. Secondly, nodes and their signs are interchangeable. This is because there is no essential distinction between a regular node and an index node (sign) – only in an index node hypertexts (anchors) outnumber the regular texts, whereas in a regular node the opposite is more common. The boundary separating objects and signs become blurred here.

Tokyo

Following signs is perhaps the only workable and reliable way to find one's way in Tokyo's railway stations, especially those large ones. Station complexes, as such megastructures are often called, are in fact multi-story small towns: not only do they contain railway terminals, but they also encompass many functions of a city, such as restaurant, retail, information service, travel agency, banking service, entertainment, police station, and so on. Station complexes are almost always the central part of subterranean cities which contain underground malls and connect surrounding office buildings, department stores, and hotels. In such a labyrinthian environment,

congested with people and commodities, signs for direction are not only necessary, but are the sole mechanism for providing guidance for movement and keeping circulation in order.

Take Shinjuku Station, the city's busiest station. There are nine railway lines converging in this station, including four JR lines with fourteen platforms, two subway lines, and three private railway lines. If Shinkansen, the bullet train line, is counted, there are in total ten lines. Multi-story department stores such as Odakyu, Keio, My City and Lumine, and many other commercial and office buildings all have their major entrances directly built into the station. The subterranean alleys of restaurants and boutiques supplement part of the station, and a tunnel links the station to the business district and the new city hall. Private shops, public spaces, multi-story department stores, and subterranean malls are all nested and overlapped in the station complex, just like the way WWW is configured. The sense of interior and exterior is being eroded.(Fig. 36)

In order to navigate within Shinjuku Station, all sorts of signs have to be called upon for help. An endless list of signs can be found in all stations: there are signs for the station names, exits, stores, restaurants, coin-lockers, toilets and so forth; there are route sings for direction and connections to other places; there are charts listing major places each exit leads to, or elaborating the business/merchandise each floor of a nested building contains; there are maps of streets and buildings in the vicinity; there are diagrams depicting railway routes and fare to every station; there are timetables, electronic announcing boards, etc. Such signs are not restricted to texts, but are also combined with graphics, numbers, and colors – a unique color is dedicated to each different railway route.(Fig. 37)

If people's circulation in a city can only relies on signs, the consequence might be that what eventually becomes relevant to people's life are only those web-like abstract diagrams of connections and relationships. In Tokyo, especially in station complexes, this is the case. If one needs to meet an appointment somewhere in the vicinity of Shinjuku Station, the best way (easiest and fastest) is to navigate in the underground

city simply by following signs, since are will surely be lost in the trap of maze-like streets on the ground.

As in WWW, signs for directions blur the distinctions among all the signified items and make the hierarchy of places irrelevant. Suppose someone in Ikebukuro wants to buy a pair of fancy shoes from Studio Alta, the fashion store with a TV facade. From departing Ikebukuro Station to getting those shoes she only needs to follow a series of signs: "Ikebukuro Station" $\Longrightarrow$ "JR Yamanote Line" $\Longrightarrow$ "Shinjuku Station" $\Longrightarrow$ "East Exit" $\Longrightarrow$ "Exit B13 ..." $\Longrightarrow$ "Studio Alta" $\Longrightarrow$ "3F ...Lady's Shoes". Here, stations, railway lines, buildings, and shoes are all abstracted into roughly the same size texts. Distinctions among these entities are reduced into roughly that of varied combination of characters.

As each step is taken to approach the goal, the scale of the search shrinks. There seems to exist a tree-structure clarifying this hierarchy. But just like in W3, this hierarchy is only relative and depends on circumstances. Suppose that lady needs to go back to Ikebukuro after her purchase, she can simply accomplish this by following a set of signs without stepping out in the street: (in Studio Alta) "B1, ...Subway" $\Longrightarrow$ "Shinjuku Station" $\Longrightarrow$ "Marunouchi Line" $\Longrightarrow$ "Ikebukuro Station". Through this kind of backwards link, the hierarchy becomes obliterated by the winding up of this circle. The city is not a tree.(Fig. 38)

2.5.3 Instant Access

Cyberspace

The third navigation technique in WWW which makes WWW even more distinctive is instant access. If the name of a node (which is known as its "URL address code" in WWW) is known, simply by entering its name, that node can be instantly retrieved – just like dialing a correct number and reaching a friend over telephone. Here the sign is the name of that node. If the name (address) of a certain node is not known, many searchable indices can be called on for help such as Aliweb, WWW Catalog, World Wide Web Worm, and Meta-Library. The user can enter the subject of the node being searched, keywords in its title, portion of its address, location of

its server, or a combination of these. Then the search will be executed automatically and the appropriate node or an index of it will be provided. This method is similar to dialing an operator service number – direct access can be attained without knowing what is passed in between.(Fig. 39,40)

Tokyo

Tokyo has its own means to get instant direction. Directory Assistance is one of them. Simply by dialing 104 or 105 one can get the phone number or the location of the destination in an instant manner. By the mid-1980's, Tokyo had 6,120,000 telephones, outnumbering all other cities in the world. Directory Assistance was used approximately 3,400,000 times daily. Shinjuku Station alone had 643 payphones (Tokyo Station 325, Ueno 147, Ikebukuro 136, Shibuya 120)[23].

By now telemaps, the latest electronic mapping device, have already entered Tokyo's consumer market. By communicating with positioning-reporting satellite systems, local maps of various scales, as well as one's position, can be displayed instantaneously on a liquid crystal screen. Not only are they installed in taxis, such gadgets can even be carried around by cyclists and pedestrians in Tokyo's streets.(Fig. 41)

2.5.4 Maps

In both cyberspace and Tokyo a total apprehension of the entire space becomes impossible, since the physical approximation of places is replaced by logical and numerical connections. The city can be apprehended piece by piece and layer by layer, but not all at a glance. In WWW, connections of nodes can be apprehended by indices of their topics, locations (server sites), file formats(text file, sound file, image file, or animation) and so on, but these indices are overlapped and nested into one another. Showing all their intricacy of connectivity in one chart is beyond anyone's reach.(Fig. 42)

[23]Wurman, Richard Saul. *Tokyo Access.* ACCESSPRESS Ltd., 1984

In Tokyo maps are abstracted and layered into railway station connectivity charts, time map (thanks to nearly perfect punctuality of Tokyo's trains, the time it takes to move from one place to another by train can be accurately indicated on a chart.), transportation fare chart, and so on. These maps make the city understandable and workable, though invisible it remains.(Fig. 43)

As FORMs give way to inFORMation, the significance of Euclidean Geometry of a city is giving way to Topology of the city. As M. Christine Boyer put it: "... this transformation (from Machine City of modernism to the Information City of postmodernism) displaces the Western space of geometry, of work, of the road, the building, the machine, with new forms of diagramming, bar graphs, spreadsheets, matrices, and networks expressive of 'a new etherealization of geography' in which the principles of ordinary space and time are being tampered with beyond recognition. This matrix appears to be a metaspace, or hyperspace, superimposed above the level of reality."[24]

[24]Boyer, M. Christine. "The Imaginary Real World of CyberCities." *Assemblage* 18. MIT, Cambridge, 1992. pp.116

Chapter 3

Invisible City

3.1 Biosystem

The evolutions of the Internet – the basic framework of cyberspace – and of Tokyo have demonstrated a biosystem-like quality. Unlike the U.S. interstate highway system, which was realized under a government-directed central plan, the Internet grew in a spontaneous, piecemeal manner. Its evolution is the result of constant response to the changing demands from end users by the steady addition of connectivities. The locally distributed networks eventually merged into a global network that is growing at an ever-faster pace. Like the flourishing of mushrooms after a shower, the growth of Internet is a decentralized from-parts-to-the-whole approach. That is why many people prefer the "biosystem" metaphor to that of "Information Highway".

In Tokyo, the city and buildings are viewed by Tokyoites as organisms which have life-death cycles, and often grow up spontaneously without any overall plan. This is likely the result of Japan's age-old agricultural tradition, the animism core of its vernacular Shinto belief, and its frequent disasters and drastic social changes throughout history.

The analogy to a biosystem can also be made on a micro scale, both in cyberspace and in Tokyo. The basic elements of an organism are its cells, in which all information for its reproduction is contained in collections of genes. Similarly, in the World Wide Web (WWW) a typical web page (node) contains all the information on the entire

global web system, not in the form of actual data, but in the form of "links", the information of connectivity. Just like genes in a cell can be used to recreate the organism, links in a node of the WWW can be followed to recover all other nodes.

This is equally true in contemporary Tokyo. A node, as defined previously, contains links both in hard form (railway and subway) and in soft form (information infrastructure) to all other places of the city and beyond. Goods, news, fashions and whatsoever from other places can all be accumulated in one node. Therefore, different from a traditional sakariba, a node in contemporary Tokyo contains the entire "gene" of the whole city.

3.1.1 Macroscale

Cyberspace

(1) What is Internet?

Even today there is still no agreed-upon answer that neatly sums up the concept of "Internet". In May 1993, Ed Krol and Ellen Hoffman gave a fairly thorough definition:

"Today's Internet is a global resource connecting millions of users that began as an experiment over 20 years ago by the U.S. Department of Defense. While the networks that make up the Internet are based on a standard set of protocols (a mutually agreed upon method of communication between parties), the Internet also has gateways to networks and services that are based on other protocols."[1]

(2) The evolvement of Internet

The Internet originated about 20 years ago from an effort trying to connect ARPAnet, a U.S. Defense Department network, with other radio and satellite networks. In the hope that it would withstand a catastrophe, such as a nuclear war, ARPAnet was designed in such a way that communications are not dependent on the network itself, which is assumed to be unreliable, but rather on the source and destination computers. In other words, by giving autonomy to individual computers,

[1]Krol, E. and Hoffman, E. *FYI on "What is the Internet?"*, May 1993. Information available online at e-krol@uiuc.edu.

the central control system commanding communications throughout the net can be eliminated. The redundancy of connections, as well as the resulting security, are the results.

The growth of Internet took a spontaneous, piecemeal approach from then on. Responding to the growing needs for communication and information sharing, many local networks were developed by various organizations, such as universities and research institutes. Rather than connecting to a single large timesharing computer at each site, organizations connected their networks to the ARPAnet, which itself was a network without a center. By adding lines to connect new sites to their neighboring sites, the Internet has grown at an explosive rate in the past few years. By the beginning of November, 1994, the Internet had 45 thousand autonomous networks. In over 50 countries, located all over the world, there are more than three million hosts. The overall growth in the third quarter of 1994 was 21 percent, which means that every 30 minutes another network was connected (Fig. 44,45,46).

(3) Pattern of Growth

The evolvement of Internet demonstrates the vitality of the decentralized from-parts-to-the-whole approach as compared to that of from-top-down total planning. No one is in charge of the Internet – there is no single authority figure administering the Internet as a whole. However, on the local level each network has a controller who administers that particular network, and each network pays for its own connection and communication cost – just like the railway companies in Tokyo, each of whom develops an autonomous railway system, and then connect it to those of others. Eventually the web of railway and subway covers the whole city, but individual companies still maintain their own segment, and only collect fees from passengers on their trains.

A certain level of coordination among networks is inevitable. Just as with Tokyo's railway companies, networks come together and decide how to connect themselves into a web and fund these connections. A voluntary membership organization called Internet Society helps to make standards and facilitate coordination. But more like a guild, the Internet Society does not possess the "ownership" of the net – No single groups does.(Fig. 47)

Tokyo

Deeply rooted in an age-old agricultural tradition, Japanese culture has a unique rustic character which is not only exemplified in their customs and many trivial aspects of contemporary daily life, but is also manifested in the way Japanese cities are put together. Unlike Medieval European towns, with their clarity of physical patterns, or modern American cities, portrayed as a pragmatic functional diagram, and even different from most Chinese cities, configured on abstract cosmic and ethical principles, Tokyo, described by some as a "group of villages" or a "mosaic city", displays a rustic character which bears tremendous similarities to an organism.

This by no means implies that Tokyo is closer to nature than other foreign cities. In fact, Tokyo has just one-eighth the parkland per capita of New York and one-fourteenth that of London. The biosystem metaphor of Tokyo, rather, has something to do with Tokyo's unique time consciousness in urban renewal, its peculiar pattern of piecemeal, spontaneous growth, its from-parts-to-the-whole approach in urban development, and its denial of totality in city form.

The organic character of Japanese cities has been consciously or unconsciously addressed in many different versions of city-form theories and design thinking of Japanese urbanists and architects. Here is a brief review:

Metabolism: advocated by a group of architects headed by Kenzo Tange and Kikutake in 1960s, echoing Team X from afar, envisioning an unlimited growth promoted by technological progress. This theory was rendered anew by Kikutake recently with a biological and ecological touch.

Amoeba City: Ashihara's interpretation of Japanese cities as amoeba-like organisms.

Collective Form Theory: formulated by Fumihiko Maki as an organic approach to urban design.

Symbiosis Thinking: Summarized by Kisho Kurukawa as the character of Japanese culture and architecture in which symbiosis of the past and the present, the native and the exotic, the man-made and nature has long been maintained.

Phenomenal Approach: design thinking advocated by Ito Toyo and Itsuko Hasegawa to emphasis the fluidity of contemporary Tokyo.

(1) Life-death Cycle

In Japan, everything, including cities, is viewed as an organism which is subject to birth, growth, and death. Eternity and monumentality, characterized by Western cities, are something alien to this rustic culture.

Rooted in a strong tradition of agriculture, Japanese people are particularly sensitive to the passing seasons, which are not only clearly marked by age-old ceremonies throughout the year, but are also intentionally expressed in Japanese people's daily life. For instance, in a Japanese cuisine known as "shun-no-mono", the first catch or harvest of the season is used to complement their sentiment of provisionality. Cultivated in this tradition, the world is not viewed as a stable eternity. Everything in it is perceived as organism in the sense that all are subjected to constant change in the flow of time, and nothing can escape the cycle of birth and death. Architecture and cities are no exception.

In 1590 Tokugawa Ieyasu, a warlord who controlled most of north-central Japan, established himself in Edo Castle. In a few decades, Edo City grew around the castle and became the largest city on earth. As a castle town, Edo was not enclosed by city walls but rather the castle, built in the center, was the focal point of the city. In 1868, when the Meiji Emperor retook power from the Tokugawa Shogunate entrenched in Edo, Edo was made the nation's new capital, and renamed Tokyo.

In its history Tokyo has marked its life cycle clearly. Arata Isozaki has noticed that by whatever coincidence, the 20-year cycle of Tokyo appeared astonishingly consistent[2]: in 1923 the great earthquake wiped the city away; 20 years later it was bombed flat again by Americans; 20 years after that the 1964 Tokyo Olympic drastically changed the face of Tokyo by its accompanied urban renewal; and again 20 years later, in 1985's economic boom (and its following bubble economy), more than

[2] "Learning from Tokyo." *Architectural Design*, March 1994. pp.16

25 percent of the city was torn down and rebuilt. Interestingly, this 20-year-cycle corresponds exactly to the period between rebuilding of the Grand Shrine of Ise.

Since 1,300 years ago, the Grand Shrine of of Ise, the symbol of the nation, has been rebuilt anew every 20 years. At the end of each 20-year interval, following a ceremonial ritual, the old shrine is burnt down and an exact replica is erected on an adjacent site. Regardless of the reason by which these figures come together, they do help to create the feeling that Tokyo does have a life-death cycle.

(2) Spontaneous Growth

Edo was built on the plain between the bay in the east and Yamanote Hills on the west. The castle, which was burnt down in 1860's, was located at the central point of a spiral system of moats and canals. Along the spiral-like waterway that wound out toward the bay areas, parcels of land were allocated to feudal classes according to their hierarchical standings. This system was said to be very effective for defense purposes – "should a revolt break out, rebels had to advance all the way through areas of all upper classes in the hierarchies until they finally reach the castle"[3], as Capron noted.(Fig. 48)

To insure the control of the country, the Tokugawa Shogunate also established a rule that required Daimyos in other areas of Japan to build mansions in Edo; they were obliged to leave their families as hostage in Edo, while they themselves lived alternately in local areas and Edo during the year. These mansions occupied huge areas and were mostly scattered in the hilly western part of the city – the high city, whereas commoners resided in the eastern part of the castle town, the low city.

From then on, the city's growth has been based on the farmland pattern left over between the scattered estates, and rather than adopting a clear physical pattern, the city took a spontaneous piecemeal manner of growth. The Yamanote district, the high city, is a topographically complex area with many rivers and valleys. Roads which eventually formed the skeleton of this part of the city followed the wrinkles

[3]Capron, Jean-Luc. *Man, Media, Architecture: Actors of a Built Environment Spatiotemporal Dynamization – The Case of Tokyo (1590 - 1990).* Doctoral Dissertation Thesis, the University of Tokyo, Tokyo, 1990

on the plain. Along these roads congregated small villages with large farm lands surrounding them. As the city steadily grew westward, these villages grew into small towns; farmland was converted into habitat, and the villages eventually conglomerated together into a big metropolis. In the 20th century, estates of former feudal lords were transformed into public institutions and parks; roads were widened; big lots were subdivided. But the skeleton and land patterns always remain unchanged. That is why Kishyo Kurukawa perceives Tokyo as "a conglomeration of 300 cities"[4].

Unlike Washington, D.C., or Brazilia, which were built on grand visionary plans, Tokyo's growth took a from-parts-to-the-whole approach. This approach seems to be especially akin to Japanese aesthetics in which more emphasis is given to details than to the totality. Kurukawa said "Japanese art and architecture and Japanese cities do not reveal their distinctions or their strengths when they are viewed as a totality, but as you approach them gradually and investigate details a whole new world opens before your eyes."[5] Such feelings can be experienced by sitting in an antique teahouse, or lingering in front of Fumihiko Maki's Spiral Building, or his Daikanyama collective housing projects (Fig. 49,50).

The from-parts-to-the-whole approach is best exemplified by the game Meisho Sugoroku, a traditional Japanese board game comparable to Parcheesi and known since Edo period. Meisho, literally "famous places of Edo", enhanced the polarization of Edo City, especially after the castle was burnt down and the center of the city remained void thereafter. One hundred such Meisho was carved by Ando Hiroshige in his famous woodcut prints. There is no apparent link between the Meishos, but together they form the entire image of Edo. Jinnai wrote "it is also possible to conjecture that the city itself is built like a Sugoroku board. Each spot is autonomous with little subordination to the whole."[6]

[4] "Learning from Tokyo." *Architectural Design*, March 1994. pp.9

[5] "Learning from Tokyo." *Architectural Design*, March 1994. pp.9

[6] Jinnai, Hidenobu. "Ethnic Tokyo." *Process Architecture* 72. Process Architecture, Tokyo, 01/1987. pp.45

(3) Denial of Totality

Since long-term total planning is impulsive and anti-nature, it is an alien concept to Japanese people. Although such plans may appear on drawing boards, seldom have they been implemented in reality. There are two reasons for this:

(i) Private land ownership is sacred, and landowners are free to divide up their properties in any way they like. Subdivision of plots is further prompted by Japanese tax law as a means to break up inheritance taxes. Therefore, land consolidation is extremely difficult in Tokyo, and a large scale central plan gets nowhere.

During Tokyo's Olympic years, when the city needed an expressway to alleviate its traffic jams, the circumscribed authorities figured out the only practical way was to build the expressway on city properties – canals and existing roads. That is what happened.

(ii) Small-scale autonomous growth is flexible and easily responds to changing demands. These changes occur so rapidly in modern Tokyo that no prediction can be made as to what might happen next, let alone the implementation of any control over it. Similar to ARPAnet, the redundancy of fragmented, autonomous growth helps the city at large to survive disasters, since the destruction of centers, if there is any, will have minimum impact on local communities. This pattern of growth is the most viable pattern of reconstruction afterwards should such disasters happen. In fact, every time in history the city of Tokyo was flattened, the city was rebuilt immediately in exactly the same manner.

That is why any total plan of this city is destined to fail. As Fumihiko Maki pointed out, "Besides the radial streets coming out of the center and the spiral of moats, there was the city's orientation to major mountain, river, and road, which was based on Chinese ideas. Downtown in the old merchant's center of Nihonbashi you find a grid plan, but always with a limit to it; it didn't extend throughout. Elsewhere you have whole sections oriented around a view of Mount Fuji or Mount Tsukuba.

"In this way there are five, six, or seven different morphological principles at work in the city. Tokyo was never a geometrical, abstract city like ancient Athens or modern New York.

"When the Meiji period came, Westerners gave a certain influence to the making of the city, but again it was always only up to a point. There was Omotesando, for example, and Gaien Higashi-dori, two broad, three-lined, boulevard-like streets – but only those two. They just end there. Then after the war we brought in the expressway system, which again is an absolutely different sort of notion...So there is no totality in modern Tokyo."[7]

3.1.2 Microscale

Cyberspace

For all organisms, the basic components are cells which reproduce themselves by following certain inscribed patterns. In the core of a cell, the whole information of such patterns is unmistakably encoded in DNA structures, a spatial structural form made up of different combinations of protein types. By decoding the DNA structure in a single cell, complete information about the structure and reproduction of the creature can be obtained.

Similarly, in the WWW the basic components are nodes (web pages). Just like a cell of an organism, such a node contains the entire information of the web. This is not done by compressing the entire data of the web into each single node, but rather the information on how to regenerate everything on the web is encoded in a spatial structure known as hyperlink – the DNA structure of the web, "Genes" are node names and addresses contained in each anchor. Each node has a unique pattern of link connections, but theoretically by decoding those "genes" by continuously following hyperlinks, the entire data on the web can be retrieved. A node to the web is as a cell to an organism – it is part of the whole yet it contains the whole.

Tokyo

A "collection of villages" has been a persistent feature of Tokyo since its very early time; what has been transformed, however, is the character in each of those villages.

[7]Popham, Peter. *Tokyo – The City at the End of the World.* Kodansha International Ltd., 1985. pp.119

In the Edo era, each "village" had a distinct character, much of which was derived from the unique natural settings of that place, as shown in Ando Hiroshige's series of prints, "One Hundred Meisho (famous spots)". These were places renowned for cherry blossoms, full moon viewing, Sumida river opening, or Mt. Fuji viewing, and so forth.

But since Tokyo entered into its modern age, natural features have been gradually eaten up by man-made environment; identities of places based on natural settings have become less obvious. As the railway and subway lines weave all the villages (nodes) together into a continuum of web, people and goods are transfered among those nodes at an unprecedentedly rapid speed; what is claimed to be unique of a place can be easily moved or copied into another, so all the nodes in Tokyo become more and more alike.

As Tokyo enters the information age, every node has access to the information in other nodes in an instantaneous manner, whether through mass media or through telecommunication tools; every node is exposed to all others in the same way. Furthermore, the distribution of these nodes is not just restricted to Tokyo or Japan, but has expanded to the entire globe since distance is less of a concern in information exchange – Kyoto is felt to be as close to Tokyo as New York is. As a result, among these nodes news is shared; fashions are traded; images are copied.

What can be found today are numerous nodes identical to one another; only signs bearing different names can separate them. However, the homogeneity of these nodes is not, as achieved in Corbusian Radiant Cities, the uniformity resulting from obliterated individuality, but rather it is the consequence of an unhindered additive process – the kind of freedom perhaps only enjoyed by Tokyo, which allows all the bizarre from across the world to be miniaturized and packed tightly into the collection of individual nodes. A Shinto shrine can stand next to or on top of a modern office block, whereas a love hotel built as a medieval European castle can be sandwiched between a tiny rustic-style sushi bar and a concrete pencil building – not unlike what is sold in Copen, a Shibuya restaurant where fish and vegetables are sandwiched between bread and dipped in soy sauce.

The additive process has made each node into a kaleidoscope of the city, of the country, and of the world – the node contains all their information both in the form of physical replica and of media-transmitted information, such as that displayed on Studio Alta. Therefore, a node to Tokyo is exactly like a cell to an organism. A node contains the entire gene of the city. That is why all nodes in Tokyo are similar to one another, and that is why each time the city was destroyed, it rebuilt itself in the same way. A node is the city itself (Fig. 51,52).

Since all nodes are similar (through this additive process), common patterns of their morphology can be traced. "Sakariba", as such nodes are called, are places of buoyancy. The physical patterns of sakariba are more or less similar: in the center of a node there is a main railway station, since such stations are often the origins of the growth of a sakariba as the city sprawling out into the hinterlands. Directly connected to the station are a few big department stores or shopping malls; immediately surrounding this station/shopping complex are small restaurants, bars, boutiques, video game centers, and pachinko parlors, where office workers often hang around for a couple of hours after work to avoid evening rush hour trains. Pachinko parlors are a unique architectural type of the 20th century Japanese city. Their blinding light and white noise make pachinko parlors the most aggressive buildings in the area(Fig.56).

The next immediate zones are much quieter but of opposite characters – one zone is an office area that becomes virtually empty in the evening; another is a pleasure zone filled with sex shops, karaoke bars, video parlors, love hotels and so forth. As dusk approaching this zone starts to show its novelty. Hidden behind pencil buildings along main thoroughfares and scattered farther away are residential areas, quite and dark at night. There trees, flowers, and birds can be found during the daytime. Streets directly connecting residential areas and the main station are often transformed into "Shotenkai" – shopping valley lined with vegetable stalls, mom-and-pop stores, small restaurants, and the like. Shotenkai are often decorated with banners and paper garlands along the way.

Newcomers in Tokyo are often fascinated by its colorful diversity and seemingly gay atmosphere in the street. But people who are familiar with the city may nevertheless have an opposite view: the city is greyly homogeneous and lacking excitement and surprise, especially when the pattern behind all its phenomena is recognized. What is worth mentioning here is this greyness is not a result of the reduction of colors to black and white, but rather from a mixture of all colors together so that no single one can be detected anymore.

3.2 Hyperlink

3.2.1 What is hyperlink

Cyberspace

Hyperlink is a relationship between two anchors which are stored in the same or different databases. This relationship is neither linear nor obtained by physical approximaty, but rather with electric code. So the link is instantaneous and similar to taking a leap. Being rapid, reliable and omnipresent, hyperlink is a fundamental feature of cyberspace and the very mechanism that makes cyberspace work.

(1) Hyperlink is rapid. By clicking on a highlighted anchor, the task of connecting to the designated node, wherever it might be, is performed with an electronic speed, with no perceivable time or space lag. Therefore, hyperlink is instantaneous.

(2) Hyperlink is reliable. Thanks to the redundancy of internet, virtually no damage can be done to the web itself, and information on it is always retrievable by hyperlink.

(3) Hyperlink is omnipresent. Nodes residing in all servers that are distributed all over the world and connected to internet can be accessed by every end user equipped with basic tools. Unless a site is purposefully closed by the host, there is no node around the globe unreachable by hyperlinks.

By incorporating these three fundamental features together, hyperlink has made the dream of having universal access to a vast universe of human wisdom into reality.

Tokyo

(1) Railway

Tokyo is a culture on rail. Everyday more than 20 million people ride on Tokyo's trains, which is the premier transit tool in that city. Most Tokyoites commute between home and work by trains daily, with an average of one and a half hours each way.

Tokyo's railway system has three components: JR, private railways, and subways.

(i) JR: JR lines constitute the basic railway transit framework for the city with its Yamanote Line encircling the inner city and Chuo/Sobu Line running through it (Fig. 53). Aside from acting as the backbone of Tokyo, JR line also connects the

city to the rest of the country since JR, being formerly government-owned Japanese National Railways (JNR) and privatized in 1987, serves to link all parts of the country together.

(ii) private railway: directly connected to the JR Yamanote loop, private railway networks radiate out from the inner city to the outskirts of Tokyo. Among Tokyo's private railway companies are Seibu, Tobu, Odakyu, Keio, Tokyu, Keisei and Sotetsu; each of these companies has developed a sophisticated railway network, namely a web of railway lines, without stepping on other companies' turf. Such companies also engage in, and in many cases dominate, suburban residential and urban sub-center developments.

(iii) subways: Totally twelve subway lines, two of which are still under construction, serve as the transit network for the inner city, especially within the Yamanote loop. These lines are interconnected to form an integral web. Now subways are no longer just in the city; they have extended to the far ranges of the suburbs. Also the subways meet both JR and private lines in many locations and often offer through service to suburban areas on either end of the line.

Tokyo's trains are rapid, reliable and convenient. Since railways can be buried in subterranean tunnels, elevated in the sky on overhanging viaducts, or simply straightforwardly cut through tightly nested city alleys, Tokyo's trains can run at a speed of 60 - 100 km/h (for Shinkansen, or bullet train, 275 km/h) and become the fastest transit tool in the maze-like continuum of urban sprawl.

Tokyo's trains are reliable not only because of their high safety record, but also because they are perfectly punctual: the average overdue time is only 0.8 minute on all JR lines. Private lines and subways are more or less the same. Therefore, timetables in each station can be accurate to the minute, and the time it takes from one stop to another can be predicted so precisely that they can be marked on railway maps. By using such time maps, one can tell exactly how many minutes any given branch-line station is from any terminus.(Fig. 54)

Tokyo's trains are convenient since, firstly, the entire urban area is covered by the web of railway system, so from any given spot in the city, there is at least one railway

station within walking distance. Secondly, there are plenty of trains on every railway line. For instance, during the morning and evening rush hours, the interval of trains on Yamanote Line is 2 or 3 minutes; at the other hour of the day it is 4 to 6 minutes. It is not excessive to say that in Tokyo trains are omnipresent.

With such a perfect railway system, Tokyo has been transformed into a city living on rail. In fact, the city form of Tokyo is rather like numerous nodes scattered across the landscape, with an omnipresent web of railway lines knotting them together. Between those nodes, instead of pasture or forests, is an endless continuum of tightly packed residential neighborhoods.

Yet the distribution of those nodes and the railway web does have a pattern. JR Yamanote loop line is the key to understanding this pattern. Yamanote Line encircling the inner city with its 21-mile loop is the only physical enclosure of the city, and the only tangible reference for the conceptual separation of the inner and outer city. Interestingly, while one rides a train on this line of boundary and completes its 60-minute circle, he finds that he actually has never left central Tokyo. In other words, all the 29 stations on the loop are among the most important nodes of Tokyo: Tokyo, Shimbashi, Shibuya, Shinjuku, Ikebukuro, Ueno, and so on. In fact the center of Tokyo is actually lined around its periphery – Yamanote loop is the center of Tokyo; it is the world's busiest rail line and sees 10 million riders every day.(Fig. 53)

The periphery-as-center is the result of the development of private railway lines. As aforementioned, each private railway company has developed a separate suburban railway network radiating out from the inner city, and each company dominates a different portion of the outskirts. Many of these companies also develop residential areas along their railway routes, and very often they put an amusement park at the far ends of their lines. The other ends of these lines are plugged into Yamanote loop into which all subway lines are also connected from the inner side. Being a threshold where subways become train lines, where city meets suburbs and, last but not least, being itself a circular spine connecting all these critical points into a continuous flow, Yamanote loop becomes the center of Tokyo.

Each station on the railway line becomes a node of the vicinity. Local retail, entertainment and restaurants conglomerate around the station which sees the biggest population passing through in that local area. At the station where two railway lines meet, more people are brought in and, therefore, stores are made bigger, hotels more luxurious, and services more diverse. In other words, the nodes on conjunctions become more significant than those on a single line. When three or more lines come together at one point, the node really becomes something: a huge crowd of thirst is brought together; everything characterizing a small node is enlarged and multiplied; a giant Sakariba is thus created. Typical nodes of this kind can be found on the Yamanote loop, on which the biggest ones usually have the largest number of lines converging. Shinjuku, Tokyo and Ueno have nine lines each; Ikebukuro has seven; Shibuya has six. Thus, private companies have built huge department stores in this kind of node where their lines join the Yamanote loop.

Each railway line brings with it not only extra population, but also an extra value to the land it lies in. At the crossing where two lines join together, populations are added. Due to its increased accessibility and augmented population, the place's land value is also likely to be added up. When many lines come together at the same node, the land value is multiplied by adding all these layers of value on top of one another (Of course, the actual calculation of land value is more complicated than simple arithmetic adding. The description here is just for the sake of illustration). Accessibility, population and land-value are in the right proportion. Thus, the land value of Shinjuku Station Square became the highest in Japan.

(2) Telecommunication

The advanced information technology has significantly transformed the appearance of Tokyo and the essential feelings of its places. The connectivity of one place to others has been extraordinarily enhanced by these technologies such as telephone, electronic bulletin board and television, and the Japanese people's ubiquitous love of signs has prompted a visual proliferation of such things throughout the cityscape. The result is a visualized connectivity of the world beyond projecting itself on the

original urban fabric – exactly the same way that many windows of a house open up and sceneries from the outside flush in.

Telephone has been dealt with in the previous discussions on "instant access". Virtually public telephones can be found wherever there is a shop in Tokyo – the small green box is omnipresent. Tokyo probably has the largest number of public telephones amongst cities in the world. Links to other places such as posters, electronic text boards and monitors found in Tokyo's trains have also been discussed in detail. Here the focus will be given to the examination of electronic bulletin boards and televisions in Tokyo's public spaces.

(i) Electronic Bulletin Board: These boards are often found in the most crowded public places such as station squares and major street crossings. The size of these boards varies; they might stick out perpendicularly from a pencil building, in which case their heights are almost the same as those slim towers and single lines of text run from bottom to top, or they may be pasted on facades of buildings and take up a large portion of it, sometimes up to a half of the facades.

Texts and simple graphics are made up of numerous illuminated electronic bulbs and controlled by computers. The most up-to-date news of the local place and the world, stock and foreign exchange rate information, current temperature, weather forecast and so on are broadcast throughout the day. Since these boards are put there by either the government or private companies, government campaigns and commercial promotions compose a large portion of the content.

(ii) television: TV monitors can be found everywhere in Tokyo, from the huge screens covering the facades of buildings to tiny ones mounted in taxis. TV buildings are usually found in bustling places; arrays of multiple TV monitors typically are located in railway stations, big department stores and facades of some moderate shops; in busy streets such as Bunkamura Dori in Shibuya, small TV monitors are even mounted on electronic poles aligning the street; in small restaurants monitors are hung from ceilings...

These monitors are used to bring in news and promote products and services. Their proliferation to every corner of the city has brought a flood of repetitive infor-

mation into the city. From the redundancy of information that the city brings to its scene in which the city seems to be indulging itself, the bewildered mood of the city can nevertheless be sensed: the information explosion being coupled with a sense of void and placelessness. At the same time that these monitors have opened up numerous holes through which the outside world can be peeped, the locality and identity as well as the sense of belonging to the place leak out from these very channels.(Fig.55)

3.2.2 Impact of Hyperlink

Cyberspace

The impact of hyperlink on global information is two-fold: concentration and deconcentration. These two consequences seem to contradict one another but in fact, with the tool of hyperlink they not only coexist but enhance each other.

(1) Deconcentration: In WWW, information is located in servers all over the world. Data are produced and stored in machines of end users, and the connectivity to other sites is facilitated by local network servers. Not only are new documents continuously added to each computer, but also the number of servers is growing at an accelerating rate all over the globe. By June 1994 there have already been more than 3,000 W3 servers in the world; the figure tripled in four months. Therefore, the distribution of global data has a deconcentrated pattern.

(2) Concentration: W3 is a culture of information congestion. Hyperlink has enabled each end user to have accessibility to all nodes on the entire web, no matter how far they are, and to retrieve them in an instantaneous manner. Therefore, each individual user acquires some kind of ability only available to God previously: possessing the entire knowledge of the universe and being able to reach it in a single glance – a kind of eternal present. The whole repertoire of information is concentrated at all ends of the net. Here, the part equals the whole. The one-ness of everything in the universe, the age-old Chinese philosophy known as Taoism, seems to have found a proof here – every person is a universe.

There are several impacts brought forth by this peculiar culture of information congestion:

(1) Information democracy: since everyone on the net is a virtual God who has equal access to the equally large collection of wisdom, there are many fewer information privileged and unprivileged people on the net than before. Academic authorities, whether being institutes or individuals, are no longer that authentic they used to be over others. A kind of uniformity of knowledge possession is in formation.

(2) Polemic character: The distinction becomes obvious between those on the net and those not. People with access to the net will become the information-rich, whereas people with no access tend to become the new information-poor, and they are lagout-spaces in cyberspace. The distinction of these two poles will be obvious in many folds. Since people of these opposite poles may eventually segregate themselves into different social groups and behave differently, new social classes may be formed based on this division.

(3) Fragmentation: In W3 nodes the continuum of traditional text is severed by anchors, which tend to transform the traditional linear manner of reading and thinking into a new jump-cut-like reading and thinking. Therefore, the conventional linear text and logic become fragmented, but a more comprehensive understanding, or a total perception may be achieved at a higher level of cognition by acquiring more comprehensive knowledge.

(4) Symbolization: Due to the extraordinarily vast amount of information on the web, symbolization and navigation techniques become very critical. Document titles, graphic icons and anchors are utilized to compress large amounts of information into the limited visible space in the node; indexing and searching techniques are being developed to make it easier to find the most relevant information and make the navigation in the web less disoriented. There is still a lot of work to be done. Previously people were information seekers and collectors, but nowadays on the web they should become information managers who can find clues quickly in the sea of bits.

(5) Ephemerality: The overload of information in the net and the quick feedback known as annotation from readers determine information on the web be short-lived. The nature of imperfect information makes their constant renewal inevitable. The totality of information on the web demonstrates a dynamic flow.

(6) Connectivity: Texts have attained a new dimension from hyperlink: connectivity. The difference between the texts with connectivity (anchors) and those without is significant – texts with connectivity are not only linear components in a document, but also function as gateways to larger domains of information outside that document. In hypertext, the location of the document and the time and distance it takes to reach that document have lost significance; the most vital issue is connectivity.

Tokyo

There are three major impacts of hyperlink on urban forms of Tokyo: first, connectivity or accessibility becomes the most critical criterion in evaluating the significance of a place. Similar to cyberspace, the other two impacts are in pairs: hyperlink has promoted two simultaneous processes in urban development – deconcentration and concentration. With the aid of hyperlink, these two trends go side by side and complement rather than counteract one another.

(1) Connectivity

Connectivity of a place to other places is the crucial factor and the raison d'etre of the whole estate: how many railway lines pass through it and how many minutes it takes to get to a premier railway interchange are critical factors in determining the land price of a node, and therefore its potential scale and prosperity. As the old place hierarchy based on physical proximity dies out, such as the feudal warlords' estate aligning the spiral-like waterway, a new hierarchy of places emerged. This hierarchy solely relies on connectivities of places.

On one end of the spectrum of this new hierarchy there are places like Shinjuku with nine lines converging at one place; on the other end there are places not so lucky and it takes half an hour's walk to get to a train station, and such places are not necessarily located in exurban areas.

A distinct result of the new hierarchy on the urban form is that the city demonstrates a polemic character: nodes, or places around a railway station are highlighted whereas places inbetween them are lagged out and ignored by most people. While nodes are transformed drastically, the lag-out spaces are likely to be kept intact for

decades. These are places where ordinary people live, where trees grow, where birds sing, and where folklore is kept. An understanding of Japanese cities has to reflect these two ends of the same spectrum.

(2) Deconcentration

The proliferation of railway networks has brought the result of unlimited urban sprawl. With this rapid transit tool, people can have their homes in remote exurban areas and commute to their work in central Tokyo everyday. Private railway companies have pushed their lines far into the hinterlands, together with residential development all the way along their lines.

The result is a megacity: the center of the metropolitan Tokyo is not a plaza, a palace, a church, a city hall, a downtown crossing or the like, but rather another city also called Tokyo – areas enclosed by the 21-mile-long Yamanote loop line.

Another result of urban sprawl is the loss of nature, which has been pushed farther and farther out and eventually lost to Tokyoites. Thus an artificial nature is reincarnated in the inner city to compensate for the longing for the paradise now only in memory: people play golf on top of skyscrapers; people go to ski in a ski-dome erected on scaffolds next to railway tracks; people go to the seashore in a covered, painted and artificially illuminated and ventilated setting to enjoy sea waves generated with mechanical pulsation system; people enjoy breezes and cool air under metallic trees and clouds, listening to the splashing echoes of streams running in ditches carved out from marbles, speculating at mountain views fantasized by jagged metallic roofs (Fig. 57)...

(3) Concentration

The augmented connectivity of railway and telecommunication accumulated extraordinarily large amounts of goods and information into each node. Their acquisition and discarding rate is more and more rapid. A culture of congestion is created in each node.

The unprecedented rapid accessibility to and from any node has made all nodes more or less similar, therefore, each has lost its identity. The result is not a colorless uniformity, but a dynamic full-colored compound.

The culture of congestion also accelerates the process of fragmentation in each node. Rather than being constrained by local materials and tradition, designers have access to virtually all possible materials and styles in the world and thus each building has a different face from its immediate neighbors – the continuity of the city image is severed, and eventually gives way to paranoia.

The culture of congestion stimulates the process of consuming and discarding, and thus promotes the ephemeral quality of the city. Rapid shift is demanded to make room for new comers.

The culture of congestion requires symbolization of physical entities into signs and codes so as to encompass as much content as possible in a limited container.

The culture of congestion creates virtual reality and schizophrenia to compensate the mass thirst for the informationally available and the physically inaccessible.

3.3 Matrix

3.3.1 Control and Chaos

Cyberspace

Cyberspace is a controlled chaos. The features of ephemerality, virtual reality, schizophrenia and miscellaneousness of cyberspace have projected a chaotic image of a landscape made of bits. It indeed seems to be so on the surface. However, beneath the chaotic phenomena there lies a highly ordered and strictly controlled matrix. This matrix lays out the basic operations and structures wherever there are bits; it defines the affordances and constraints of cyberspace.

There are two major parts that constitute this matrix. The first is composed of technology, which is supplemented by the second part, the political economy of cyberspace. Technology carries out its control on several levels. On the most obvious level is the limited number of computer commands only with which users can navigate and operate in cyberspace; the next level of control is the language with which software or programs are written, and there is always a limit of accomplishment imposed by any language; then comes the control of system software that circumscribes what kind of applications are allowed; the next level is the constraints of hardware such as computing speed, memory, interface, bandwidth and so forth. The technical part of matrix determines that cyberspace is a highly circumscribed environment, and with the advent of technology freedom will be continuously enlarged.

The second part of the matrix is the political economy of cyberspace. This part circumscribes critical issues such as who can have access to cyberspace and who cannot, what sorts of rights individuals should maintain and what they should relinquish in this new landscape, to what extent corporations may expand their control and influence, and what kinds of power government should possess in order to guard the well-being of the public at large. It is this part of the matrix that will relocate the power of the individual, corporation, and government in this new landscape, and it is this part of the matrix that will redefine conventional notions such as property, value, ownership, and the nature of wealth.

Tokyo

Matrix is the basic framework of a city. This framework includes the physical pattern and infrastructure, economic partition, governmental regulation and ethical restrictions. This matrix lays down the restrains and prescribes affordances given by the city.

Behind the paranoia prevailing all over Tokyo, there can be glimpsed, somehow, layers of matrices that relentlessly confine Tokyoites' room for action: the mosaic-like land pattern resulting from unchallengeable private land ownership is a visible matrix lying on the ground; this matrix defends the city's piecemeal pattern, promotes fragmented city image, and defeats any ambitious attempt of land speculation and total plan whether from private financial groups or from the government.

The next layer of matrices is the partition by big economic powers. A few financial giants of Japan have taken over almost every part of Tokyoites' daily life into their domain, so as to maximally carve up the social wealth. The government, though its power is very circumscribed in Japan, is still capable enough to lay down another layer of matrices to control the city's growth – zoning is one of its powerful tools in putting a limit on the third dimension of the city and confining its total volume of space. The next layer are the compelling social and ethical restrictions. The influence of Japanese culture and traditional values on people's behavioral pattern is one of the major forces in keeping stability and harmony in Japanese society. Two vital mechanisms – hierarchy (vertical) and boundary (horizontal) are the psychological matrix that controls people's behavior and the manipulation of the society at large.

Incorporating all these matrices, Tokyo becomes a clearly ordered and strictly circumscribed city. But this bridle does not pose any contradiction with the visible delirium of this city – its chaos is likely to be the outlet of confined energy and desire. A metaphorical comparison with New York City may help to illustrate this argument: Both Tokyo and New York City are paranoid cities, but their approach to the vital issue of control and chaos are from absolutely opposite directions. Historically New Yorkers are heterogeneous immigrants, whereas Tokyoites are homogeneous natives;

New York City needs to lay down a visible control, namely the grid pattern of streets and blocks to confine the inherent chaos in its population, whereas Tokyo needs to create visible chaos to release people's energy and desire relentlessly confined by its hidden matrices; in New York City, control is revealed as the city's grid system while chaos is restricted within each block, whereas in Tokyo the inescapable control is hidden while chaos is perceivable everywhere.

In the following discussions matrices laid down by individuals, corporations, and the government will be analyzed in detail in terms of how they contribute to the formation of the current physical morphology of Tokyo.

3.3.2 Political Economy

Until now the matrix of the political economy of cyberspace is still a wild frontier of power struggles and a battlefield of ideas; the present picture is very gloomy and the future is even more unpredictable. Therefore, in order to attain a better understanding of this issue of cyberspace and to render a more desirable future for it, it is helpful to look at some existing examples, namely our current cities, to see how the power structure is prescribed in each, and to draw some lessons from them. So the author will investigate the power structure of Tokyo in relation to its impact on the city form, studying individuals, corporations, and the city government itself. In this context, cyberspace will then be reexamine.

(1) The matrix on the ground

Tokyo

Partially due to Japan's agricultural tradition and partially due to its frequent natural disasters, land is considered one's safest possible investments in Japan, and a great source of pride, whereas everything built on it is assumed unreliable and short-lived. In Japan the private ownership of land is treated as sacred and unchallengeable.

Any compulsory land speculation, either by government or by real estate developers, without consent of the landowner is destined to fail. Therefore, over-all planning

has been impossible and the fragmentation of the urban fabric occurs; the mosaic-like pattern of urban land becomes a matrix lying on the ground.

As has been illustrated before, this matrix is based on the former farmland pattern, and through the generations, landowners have been freely subdividing their properties to hand down to their offspring. Land subdivision is also conceived of as a means to reduce inheritance taxes. As a result, the matrix becomes a conglomeration of irregularly shaped small pieces of land. Boundaries of properties are made visible by belts of stone pavements and tiny bronze markers embedded in the earth and inscribed with the names of property owners. What stands on the property, traditional elevated wooden houses, temples, or other structures, may be ephemeral and floating, but the boundary markers are likely to stay there forever.(Fig. 58,59)

Even for large public projects such as widening a street sponsored by the city government, land speculation is extremely difficult. The city has to negotiate with individual land owners and buy up properties one by one, then pile the former property owners on top of one another in pencil buildings aligning the widened street. If someone refuses to sell the project has to change its course, either physically or metaphorically.

Some isolated boulevards in Tokyo, such as Aoyama Dori, are enchanting results of this painstaking endeavor achieved during the preparation for the Tokyo Olympic. But it has been estimated that if a four-lane street were to be built today in Tokyo, one hundred meters of it would probably cost one trillion Yen, or roughly one hundred billion US dollars. Very often the degree of speculation is so thorny that the government has to give up. Therefore the city has elevated its expressways on concrete stilts and run them on top of canals and over existing roads, while it continues to reclaim lands from the already ecologically endangered Tokyo Bay.(Fig.60)

This matrix of private land ownership has had a number of impacts on the urban pattern of Tokyo. First, it has motivated the vitality of Tokyo's street life. Since land speculation is extraordinarily difficult, and these difficulties are compounded by earthquake concerns, large scale high rise construction is unlikely to take place in downtown areas. So the city is filled with tiny parcels of low rise small scale

buildings. As a result, the density close to the street level is extremely high; streets have to remain narrow while the buildings facing streets as well as underground malls are tightly packed with tiny shops, restaurants, entertainment and service facilities and so on. The space allotted to each of these businesses is very small; even large corporations have to break up into pieces and fit into different parcels of lands. The direct result is that rather than dispersing the population upwards, the high density close to the street level has promoted a cozy, diverse, and extremely lively street life.

Second, local communities with their customs and folklore are largely preserved. This is in sharp contrast with most big American cities which have been plagued by the destruction of their urban communities due to the relentless commercial exploitation of their centers. The contrast is also strong with most cities which evolved under the former communist system, in which governments, with their monopolized ownership of entire city properties, could exercise their arbitrary power to impose their grand plans upon urban centers, regardless of any community issue.

Third, public works such as traffic infrastructure, drainage and utility facilities are very difficult to implement and improve. As a result, there still remain the unbalanced development between a strong economy and the poorly prepared basic infrastructure of the city. Nowadays there are still utility poles everywhere in Tokyo. In a city constantly facing hazardous catastrophes such as serious earthquakes, the inability to implement effective public works such as evacuation facilities could be disastrous, not only unpleasant. Three days before the completion of this thesis, shocking news came from Japan: at 5:46 a.m., January 17, 1995, a devastating earthquake of 7.2 magnitude hit the densely populated Kobe-Osaka area, which is built in much the same way as Tokyo. Elevated expressways were turned over; flimsy houses throughout the city caught fire. Till now, over 2,300 people have been killed, and the death toll is still growing...

How to achieve a sound balance between guaranteeing the basic rights of individuals and retaining enough government interference for the sake of the common good will be a major challenge for Tokyo in the 21st century.

Cyberspace

How to "own" a piece of land in cyberspace? In this new landscape, space is analogous to bits. To "own" a space means to have access to a certain number of bits and be able to retain them – in other words, to prevent them from being accessed by others without the owner's permission. So two issues are put to question:

(i) accessibility: should there be universal access to cyberspace or should people pay for bits one way or the other, such as purchasing a personal computer and getting on line, or belonging to some big institution? In Tokyo the ownership of land is entirely commercially and historically determined. This is also true of cyberspace at present stage. But the difference is that the amount of land is limited whereas the number of bits is producible and information can be propagated. As production costs continue to go down and connectiveness continues to mount, universal access will not be an unattainable goal. However, certain information or networks may be accessible to some privileged people while remaining closed to others – there will still be the information-rich and the information-poor.

(ii) privacy: Should one have the absolute right to do whatever he/she likes in his/her own fief on the net, no matter how amoral or sinful it might be – virus distribution, drug dealing, or child seduction? Should governments be able to tap in on all private spaces to surveille what goes on? In Tokyo the government has a limited say about the content of each piece of land. To what extent should government lay down limits in cyberspace?

(2) Matrix of Corporate Conglomeration

Tokyo

The partition of Tokyo's economic landscape by giant corporate conglomerates is another layer in the matrix of Tokyo. These conglomerates have a significant power of control over urban development as well as over the daily life of ordinary people. The most influential corporations are the private railway groups, such as Tokyu, Seibu, Odakyu, Keio, etc. Aside from developing and operating railway lines, these companies engage in operating department stores, supermarkets, hotels, real

estate development and management, construction, travel agencies, advertising, resort management and so on. For instance, Tokyu corporation has 382 group companies engaging in the above businesses with over 100,000 employees[8].

This is the development strategy of such conglomerates: In one of Tokyo's subcenters on the Yamanote loop line, this company has built a large department store and cultural/entertainment facilities; right under the store the firm has built a railway line which runs deep into the hinterlands of exurban areas; then Tokyu's real estate agency has developed residential areas along its line; at the end of the line in the suburbs the company has developed a themepark.

The impact of such development on the city form is obvious:

(i) Developing bedtowns

For instance, Tokyu Group developed the Den-en Chofu residential community in 1923 and has been developing Tama New Town since 1953, a comprehensive residential satellite city covering 5,000 ha and housing 400,000 residents.

(ii) Vitalizing Tokyo's subcenters and further the city's polemic character

Odakyu and Keio are two dominant department stores in Shinjuku; in Ikebukuro passengers have to walk through the department stores of Tobu and Seibu to get out of the station complex; Shibuya is a subcenter of commerce and culture solely promoted by the Tokyu Group with no government investment.

(iii) Promoting lobotomy

Aside from its department store, Tokyu Group has constructed a variety of commercial and entertainment facilities; an example of these is Bunkamura (Culture Village) which contains two cinemas, an art museum gallery, recording studios, bookstore, and a symphony hall called Orchard Hall. All of these facilities are housed in one huge building and connected to Tokyu's main store at different levels (Fig. 61). This huge lobotomy involving diverse activities contains an urban atmosphere in one giant box; it symbolizes the control in the hands of Tokyu. (In fact, Tokyu does have a big store named Tokyu Hands!)

[8]Kurata, Naomichi. "Spatial Competition: Private Railway and Urban Development." *Casabella* 608-609, January-February 1994.pp.125

(iv) Dominating urban center development

Stimulated by fierce competition with Seibu Group, the hands of Tokyu in Shibuya are omnipresent. Not far from the station, combating Seibu's LOFT Tokyu Hands can be found: a 24-story block owned by Tokyu, selling gift articles and articles for daily use. Around Shibuya Station Square there are two fashion store buildings both named Fashion Community 109; one of them has a huge TV screen on the facade. In Japanese, "10" is read as "To" and "9" as "Kyu", so "109" stands for "Tokyu". 109s are Tokyu's counterparts of Seibu's fashion stores called PARCOs which dot several locations in Shibuya. Along with its huge department stores mounted on top of Shibuya Station and other blocks, there are, among others, Tokyu Bunka Mura (Tokyu Cultural Village), Tokyu Bunka Kaikan (Tokyu Cultural Hall) containing four movie theaters, Shibuya Tokyu Inn (a nation-wide hotel chain), Tokyu Plaza. The hands of Tokyu reach into every corner of Shibuya.(Fig.62)

(v) Controlling local people

Local people fall completely under the control of such financial giants. As Naomichi Kurata put it:

"Here is an interesting but somewhat cynical episode which describes the business strategies of a typical private railway conglomerate aiming at the synergy or vertical integration of business activities among the group companies under the concept of 'Total Living Industry'. An employee of the conglomerate is living in a condominium sold by a real estate company within the group, traveling to and from work on trains and buses run and owned by companies in the group, shopping in their supper markets and department stores and spending weekends at museums, amusement parks and golf links owned by the group. Needless to say, he is cheering the baseball team owned by the group. In other words, most of the money he earns is returned to the conglomerate. The lifestyles of typical residents along the private railways are analogous to this model."[9]

Surprisingly, this model is uncannily similar to what had been attempted and desperately preserved by big enterprises in the communist world. The result has

[9]ibid.pp.126

been that now these enterprises are either struggling with the loss of productivity and increasing debt, or are endorsing dismantlement and embracing privatization. However, what seems to have failed in one world has stealthily found ground in a totally different climate. In this case Japan has been their destination.

Cyberspace

Just like Tokyo's private railway companies, carriers of cyberspace such as telephone companies and cable companies have provided the basic infrastructure, and they are also inclined to step beyond their original business fief and become business monopolies in cyberspace. Given the fact that cyber-shopping, cybermalls, cyber-service, digi-cash, and all the rest are becoming extraordinarily popular and almost an indispensable part of everyday life, it is not unlikely that such "railway companies" in cyberspace will develop their "estate" at strategic locations and eventually dominate the whole sphere along their "routes". For instance, advertisements for certain products of the conglomerate may be periodically posted on your computer screen by the phone company your computer is connected to; you may find you have to step through a cybermall owned by your carrier whenever you start riding a network; even worse, empowered carriers may be able to influence public opinion by promoting or suppressing what is being carried on their lines.

How can corporations be encouraged to construct their infrastructure while limiting their capability to control what is carried? Dynamic competition seems to be the answer – the greater the number of carriers, the less likely it is that monopolies will develop. Carriers can be redundant – telephone companies, cable companies, satellite networks, wireless networks can all be utilized together. Carriers can also be fragmented – each is only allowed to provide a limited scope of services in the region.

(3) Matrix in the sky

Tokyo

This layer of the matrix is laid down by the city government by legal means to control the total volume of space on the property.

First, by imposing the zoning law, parcels are differentiated as residential use, commercial use, industrial use and so forth. In each category there are several levels, each of which is subjected to a different set of regulations as to floor area rate, height, diagonal line restriction, and taxation.

Second, height control puts a limit on property. For residential areas no point is allowed to exceed 10 meters.

Third, Diagonal Line Restriction (DLR) is strictly imposed to allow necessary natural light and ventilation in densely built neighborhoods. According to this restriction it is not permitted to build beyond certain oblique lines. Since property owners always demand the largest possible floor area, they push the design to the limit. As a result, buildings simply become rectangular blocks with part of their tops sliced away diagonally, "in a manner butcher dresses meat," as Peter Popham describes. In this sense the city has acquired a degree of consistency in its street image and in the uniqueness of its urban form.

Since penthouses do not count as buildings, providing they are less than 1/8 of the building area, in Tokyo's streets it is common to see numerous shed-like penthouses jutting out from tops of buildings, giving the already ephemeral city an even more temporal look.

These legal regulations, along with others such as shadow control, form a membrane that defines the maximum buildable space on any given site. This matrix in the sky prescribes the form of Tokyo's skyline today.(Fig.63)

Cyberspace

What is government's role in shaping cyberspace? Government should promotes competition and diversity and control monopolies by regulations. Some function zoning in cyberspace might be necessary. For instance, some networks should be preserved for academic purposes and commercials or advertisements should not be allowed to step in; the space allocated to kids should not have access to violent scenes and pornography; space related to national security should have limited access and check points...

By examining these layers of the matrix it can be seen that Tokyo is a strictly ordered and extremely circumscribed city. But these layers seem isolated from one another; each has a large degree of autonomy and shapes the city in its own way. A certain degree of coordination of these layers is urgently needed to achieve maximum benefits for society at large. A comprehensive approach will create a new equilibrium and therefore, render to Tokyo a whole new cityscape. And the author believes, this is the approach which the political economy of cyberspace ought to take.

Chapter 4

Conclusion

"Already the Great Khan was leafing through his atlas, over the maps of the cities that menace in nightmares and maledictions: Enoch, Babylon, Yahooland, Butua, Brave New World.

He said:'It is all useless, if the last landing place can only be the infernal city, and it is there that, in ever-narrowing circles, the current is drawing us.'

And Polo said:'The inferno of the living is not something that will be; if there is one, it is what is already here, the inferno where we live everyday, that we form by being together. There are two ways to escape suffering it. The first is easy for many: accept the inferno and become such a part of it that you can no longer see it. The second is risky and demands constant vigilance and apprehension: seek and learn to recognize who and what, in the midst of the inferno, are not inferno, then make themendure, give them space.'"

– *Italo Calvino, Invisible Cities*

According to Marco Polo's reply, in order to answer the question of which direction the megalopolis called Tokyo is heading, and eventually, to what extent control can be exerted to alter its trajectory, two tedious tasks need to be accomplished: first, there is a need to discern what peculiarities might exist that, fermented in the midst of this infinite homogeneous sprawl, distinguish themselves and make suggestions for the future; second, there is a need to make a value judgment to determine whether such unique features, identified in the first step, are not inferno and are thus to be given life, to be made to endure.

In this dissertation, the first task has been systematically accomplished, though not exhausting or all-encompassingly. Through the analogy with cyberspace, peculiarities of the city of Tokyo are peeled layer by layer, from the visible to the invisible, and most of them can be attributed to the unique Japanese-style culture of congestion.

The second task is more tedious and more challenging; it will be attempted at the last part of this chapter in the following way: since it is unlikely to be possible to provide an over-simplified, yes-or-no answer to the question "whether this culture of congestion is inferno or not", given the intricacy of today's social, cultural, political, economical and technological situation, different answers to this question will be tested in two different scenarios. Although it is still difficult to tell which scenario is more bleak, or more pleasant, than the other, at least, the author believes, this is a promising approach to the answer – there is every reason to take incremental steps on a slippery path.

4.1 Conclusion

Tokyo is a city of two faces: one chaotic, paranoid, and unbridled; the other ordered, solemn, and restrained. These two cities live with each other, rely on each other, yet never meet with each other, "...like a sheet of paper, with a figure on either side, which can neither be separated nor look at each other."[1]

Maybe Japanese people are used to living with paradoxes – their cliche "tatemai" and "honne", which literally refer to the duplicity of "the surface, the show" and "the real feeling, real intention" respectively, are universally applied to all social situations; only the dose of real feeling delivered within the polarity is carefully calculated from time to time. Cities are no exception; the two cities exist always and everywhere. The only difference is that there is no way to tell which city is "tatemai", which is "honne", and which city is truer than the other.

[1] Calvino, Italo. *Invisible Cities.* Translated by William Weaver. Harcourt Brace Jovanovich, New York, 1974. pp.105

The chaotic Tokyo celebrates its ephemerality, giving more importance to time than to space; it considers buildings as furniture, and the city as a theater. The chaotic Tokyo embraces virtual reality, putting on other cities' dresses and pretending not to be itself; the schizophrenia doesn't bother it at all. In fact, the city is amplifying its vitality via the latest version of schizophrenia – telepresence. The chaotic Tokyo enjoys a double life; it severs minds of its residents from their bodies, and gives minds back to its machines; it blurs the boundary between human and machine, and transforms this relationship into its ubiquitous animism. The chaotic Tokyo has no other means to orient itself but to rely on signs, which give life and form back to the city. Signs blur the distinctions among all signified items, obliterate all the old hierarchies, and replace Euclidean geometry of the city with topology. The chaotic Tokyo is a child of Japanese-style culture of congestion. This culture of congestion distinguishes itself from those of others by its unique cultural trait – its spiritual attachment to virtually everything, its attitude towards life, nature, signs, machines...

The ordered Tokyo resembles a biosystem: on macro-scale it grows with a decentralized spontaneous pattern, following its own rhythm and rule; on micro-scale each place is a kaleidoscope of the whole city – part equals the whole; the greyness of all its places is the result of an additive process of all colors. The ordered Tokyo is a culture on rail and a culture on wire – a city congested with hyperlinks which promotes a simultaneous process of concentration and deconcentration of the city, and highlights connectivity as the single most vital factor of a place. The ordered Tokyo has layers of control matrices that prescribe the affordances and constraints of the city, giving form and life to the visible chaotic city. The invisible ordered Tokyo is the twin sister of the visible chaotic Tokyo – both are the offspring of this culture of congestion colored with Japanese traits.

Here, two propositions need be made clear: first, Tokyo is NOT cyberspace. Although the city of Tokyo is highly analogous to cyberspace in many aspects, their resemblances are purely fortuitous. Even though the deep structure of the two also bear tremendous similarities, as has been elaborated in the "Hidden City" part, there is no logical linkage binding the two together. In Katsura, the detached palace in

Kyoto, Bruno Taut found in a building the absolute proof of his theory, which he "regarded as a valid base for modern architecture", but there is no means to say that the building in Katsura IS a modern architecture. The same argument is equally valid in this dissertation: cyberspace is only a reference, an extraordinarily effective tool to help understanding.

The second proposition is that Tokyo is NOT the only city that possesses cyberspatial qualities. Similar qualities also can be found in most giant cities in today's world, such as New York City, Los Angeles, London, Shanghai, Bangkok, Rio de Janeiro and so forth. There are three reasons to choose Tokyo as the target of investigation. First, Tokyo is an extremely congested city in terms of its population, its products, and its information; second, within an extremely short period of time this city has undergone a fundamental change caused by technological and economical development; and third, Tokyo is an unabashed accumulation of all sorts of ideas and wonders from across the world. In other words, Tokyo is an accumulation of world megalopolis, though in the least artistic way. Therefore, cyberspatial qualities in this city is most perceptible and most intense – Tokyo is the case to study.

4.2 Scenario 1

Suppose it is Tokyo's culture of congestion that grants the city its vitality, safety and charm; suppose "in the midst of the inferno" of this city, its culture of congestion is not "inferno"; and suppose this culture of congestion is preserved, made to endure, and further enhanced, then what will this city look like? Since what will be the future is already an embryo at present, extracting signs from the current congestion may help to render a larger picture of the future.

Control and Chaos:

The intensification of congestion will motivate more visual chaos, and consequently, a tighter hidden control. Eventually, the intensified control and chaos will be pasted back to back, with no thickness in between. What might happen will be

more or less analogous to Ameyoko, a flea market under and along the railway viaducts, running the entire way between Ueno Station and Okachimachi Station.

Below the railway tracks is a continuum of chaos: food and fashion stores of no more than 7 feet frontage each packed tightly next to one another, forming multiple parallel strips of shopping malls beneath lanes of railway tracks, with a thirsty mob roving through.

Above the chaos is the exclusive landscape of relentless control: multiple lanes of railway lines lay down the form and limit for the chaos beneath. Control and chaos do not meet one another, but they cannot escape from one another, either. (Fig.64,65)

Street:

Intensified fragmentation of streetscape, together with the exposed electric poles, at least will promote a twisted aesthetic, if that is the only option left. (Fig.66)

Nature:

Not much nature will be left. However, a second nature will be created as its replacement for people to escape suffocation. Nature is cultured; technology is naturalized. Calculators are peddled the same way as dried fish.(Fig.67)

Cyborg:

Cyborgs in Tokyo's trains will be equipped with tele-books (light-weight, large memory, multi-media), and will eventually bid farewell to mangas. The new toy makes train-riding endurable (enjoyable?) (Fig.68). In the not-so-far-future, electronic wonders will let cyborgs shop, bank, library, museum, office, and perhaps pachinko, from trains (When all such nouns are transformed into verbs by telecommunication wonders, as envisioned by Karrie Jacobs).

Sign:

Everything and everyone will become signs. Signs on computer screens link directly to signs in streets, and perform the same functions. Studio Alta will become interactive – people can shop or museum with it. People will be more likely to deal directly with signs rather than with real persons. Signs will proliferate in the whole city and dominate people's social life.

4.3 Scenario 2

Suppose Tokyo's culture of congestion is the source of the inferno of suffocation, the very reason for the deterioration of Tokyoites' living environment; suppose this culture of congestion is the very thing Tokyo needs to get rid of in order to make the city livable, and the very thing people want to escape from. Then what might happen?

For better or worse, advanced information technology is providing a means to realize this dream. Information networks and telepresence will make offices virtual. Millions of "sarariman", or white collar office workers, won't have to commute everyday to their offices downtown and remain there until late at night. Instead, they will be able to conduct their jobs in spacious suburban houses, enjoying luxuriant greenery, sunshine and fresh air, while taking care of their aged parents – given the fact that the rapidly aging society is plaguing today's Japanese society at large, and the construction of three-generation houses is proceeding apace.

"Bedtowns" will become an alien concept, since they will be repopulated during daytime and transformed into lively communities. The significant loss of time, money and energy on trains will be eliminated. Rush hours disappear. Train pushers, unknown.

Is this picture really that rosy? Will homes, however, be transformed into another type of sweatshop, supposing fax, phone-calls (perhaps video-phone call), and electronic mail pour in 24 hours a day, and supposing employees' jobs can be measured digitally, with no more "window idling" counted as working hours? Will this mode of working eventually enable companies to exert their ubiquitous control over their employees? Will people finally lose their last stronghold of privacy – homes?

Given the current business culture in Japan, will the all-too-important social glue – day-to-day, face-to-face contact and its derivative consensus through non-verbal context – within and among businesses, be altogether diluted by the hyper-media? Will the income and social equilibrium among employees be disturbed by the digitized performance measurement and its consequent intensified competition? What will

happen to those business dinners and drinks where real deals are made, and which function as social lubricant? Can they really afford to go virtual? What is the gain and what is the loss, and for whom?

As for the built environment, the significant loss of population on commuter lines and in the inner city will dramatically reduce the significance of sakariba. Gone together with businesses are restaurants, bars, entertainments, services, boutiques...an endless list. Worst of all, tax money that is so vital to sustaining the prosperity of the central city, will be dispersed altogether. Since Tokyo doesn't have much to boast of about its built environment except for its dynamic street life, if those businesses are gone, everything is gone. What is left is unattended, densely but cheaply built, underpopulated shanty towns. These towns will be inhabited by the economically-deprived, the informationally-lagged-out, blue collar workers, illegal aliens.

Is this picture really that lousy? Is it necessarily a nightmare? Not really. Historically, Tokyo has always been a separated city of upper classes and lower classes. During the Edo era, feudal aristocrats occupied the high city (the western hilly part), while the plebeian lived in the low city (the eastern swampy part); in modern time this hasn't changed much – the educated white collars live in the high city, while most blue collar laborers remain in the low city; in recent history the center of gravity of the city is steadily moving westwards, led by the migration of white collars into western bedtowns (Fig.69).

In the forthcoming information age if, as we assumed in this scenario, the information-rich can afford to move to the scenic mountains and seaside, the information-poor will have to cluster in what used to be the center of the city – what is left there is a jumble of concrete. HOWEVER, the magic, secluded Edo for 300 hundred years promoted in its low city the uniquely refined folk culture – Edo Culture: Ukiyoe (wood-cut prints), Kabuki (folk dance), literature, folklore, and a harmonious townscape totally different from elsewhere. It may yet work again. In the low city, shielded from the swelling profusion of bits, a unique culture will take its form, much more distinct than any previous folk cultures.

Neither of the scenarios is necessarily desirable, and neither is more necessarily bleak than the other. Will there be a middle ground lying somewhere in between these two extremes of the spectrum? We can only hope so.

Appendix A

Figures

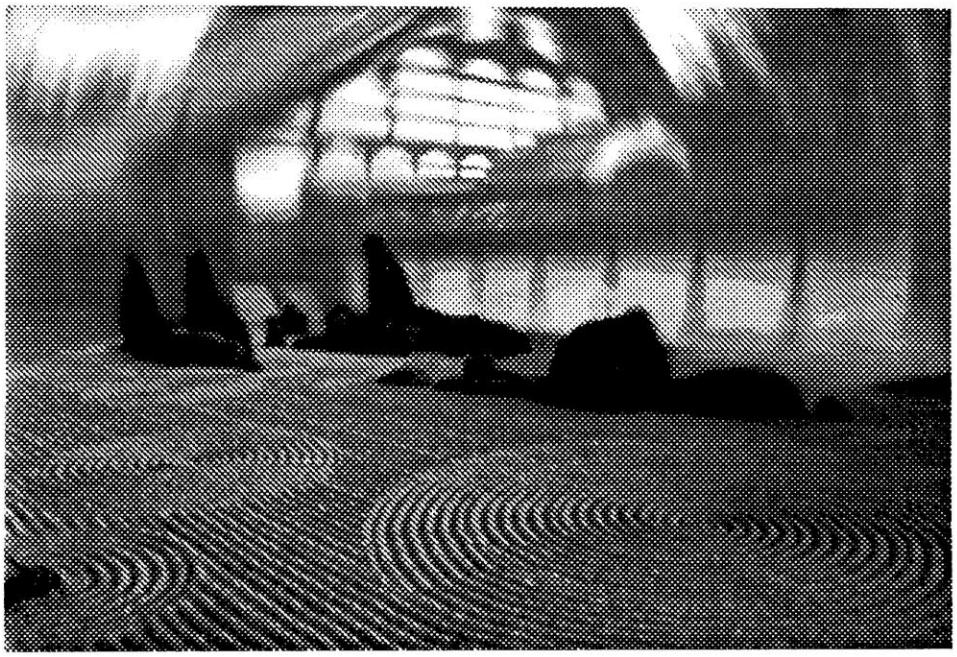
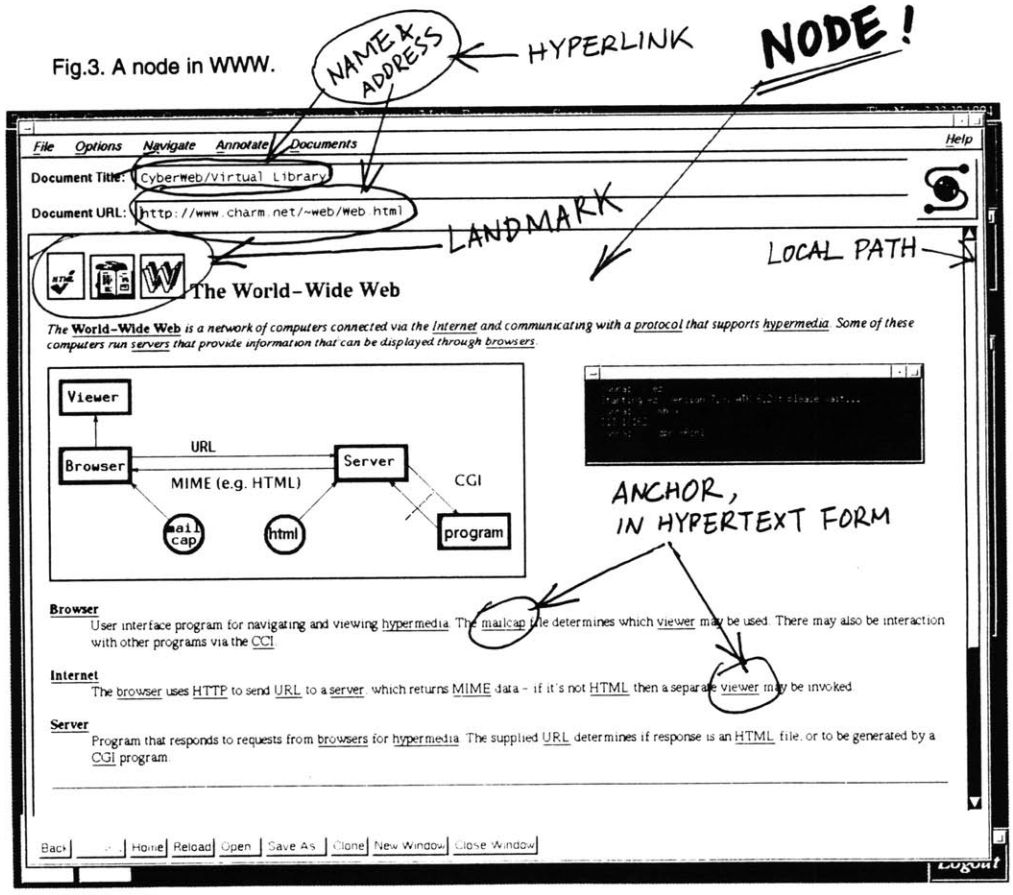


Fig.1. Methodology: cognition through analogy and association. Zen garden, Tofukuji, Kyoto.

Fig.2. World Wide Web on the Internet: the universe of network-accessible human knowledge.

Fig.3. A node in WWW.



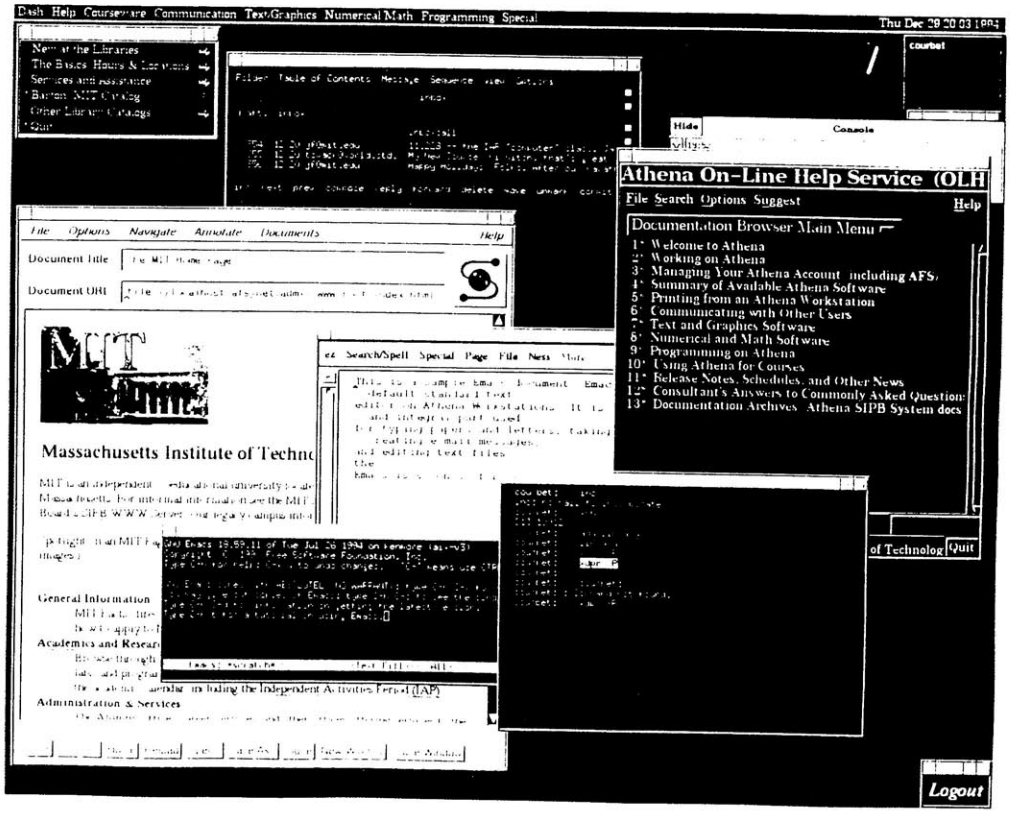


Fig.4. Convertible spaces in cyberspace.

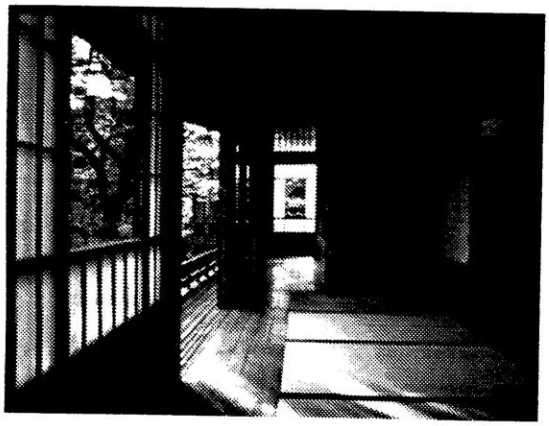


Fig.5. Convertible spaces in a Japanese house.

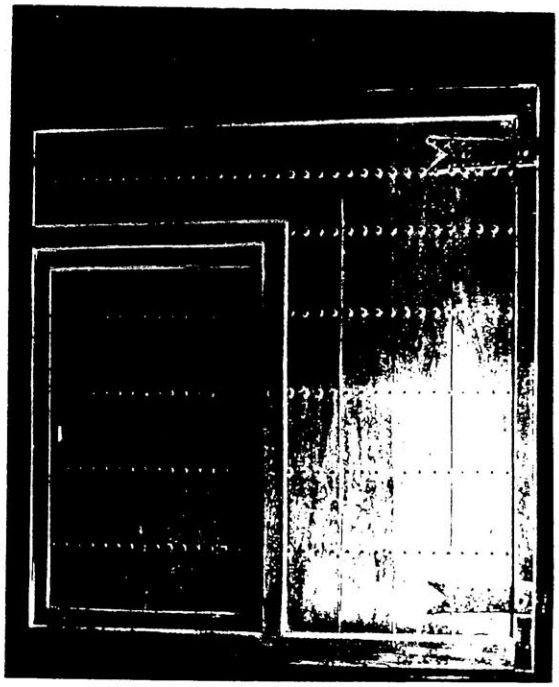


Fig.6. Nested doors of a vernacular house. Kitake. Ishikawa-Ken.

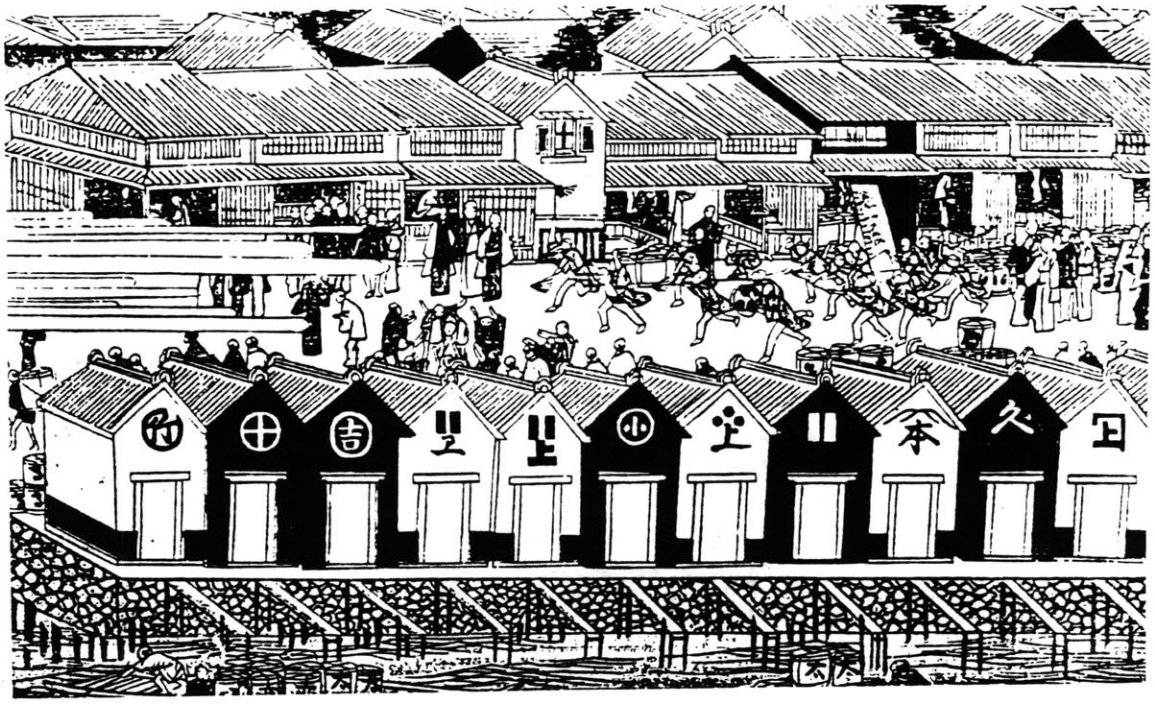
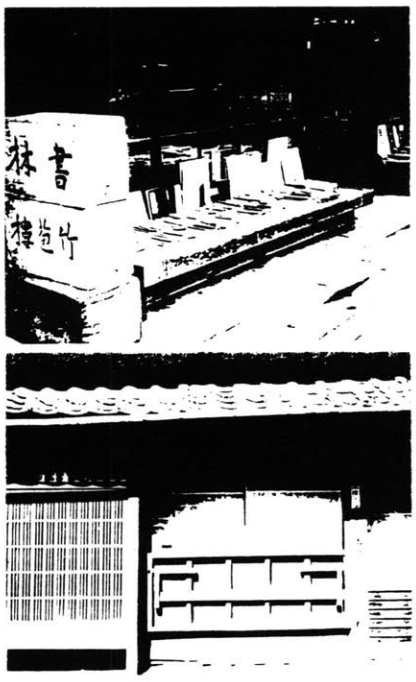


Fig.9. City as theater: Edo City. 1862.



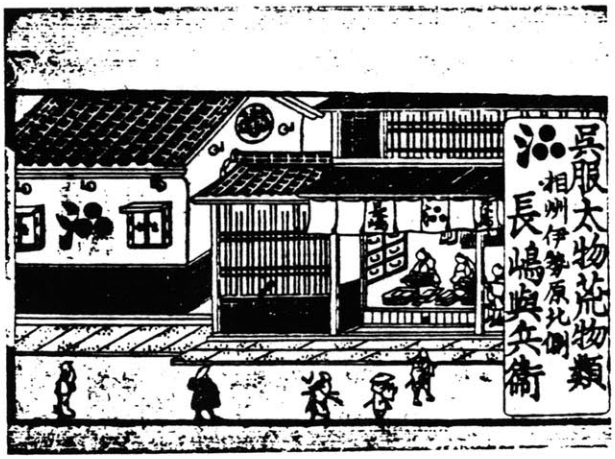


Fig.8. Integration of indoor activities with street life: Kimono store.

Fig.7. Architecture as furniture. Bookstore and farmhouse.

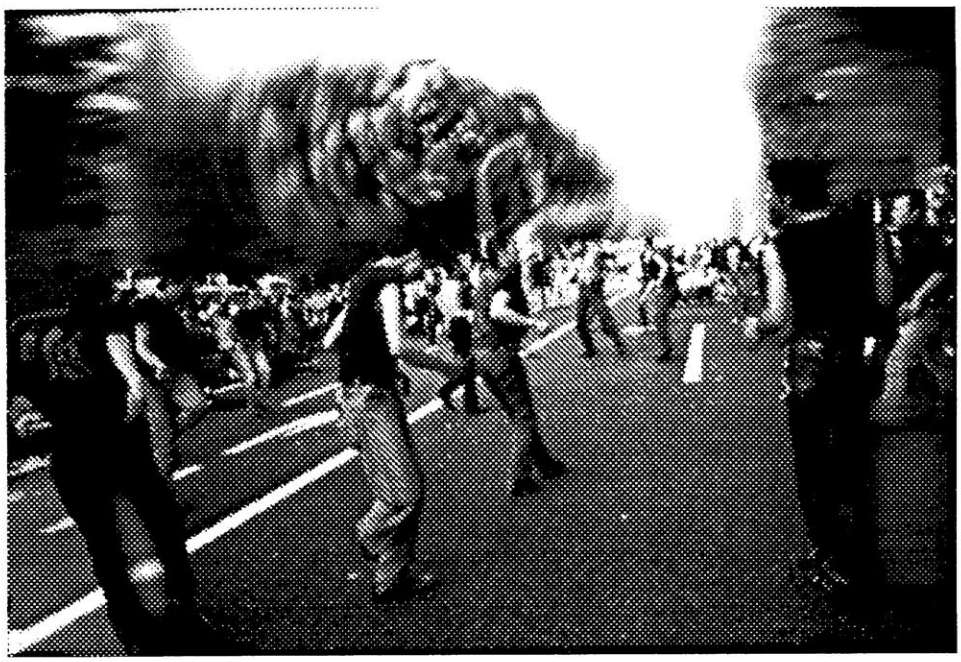


Fig.10. Street as theater: Yoyogi

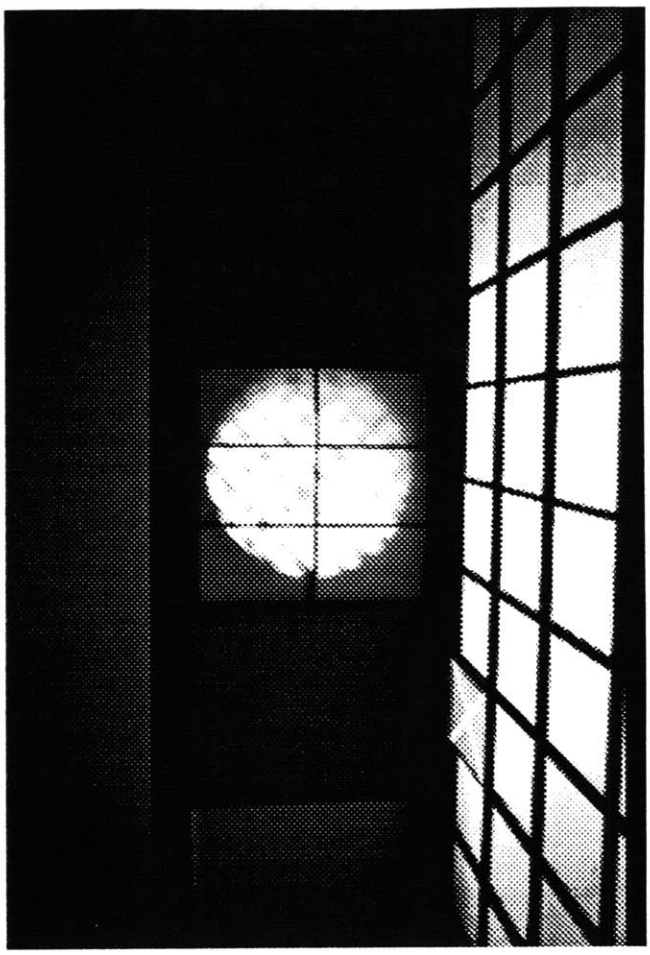


Fig.11. Transient mood: Tea-house. Ueno.

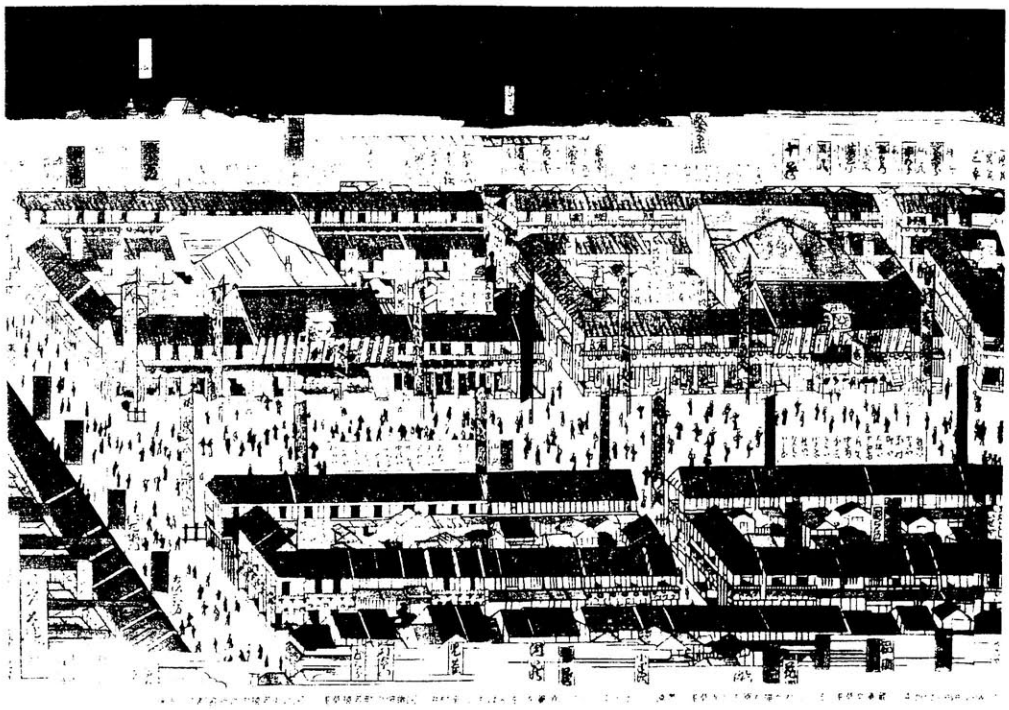


Fig.12. Theatrical character of Japanese cities: Saruwada-cho. Edo Period.

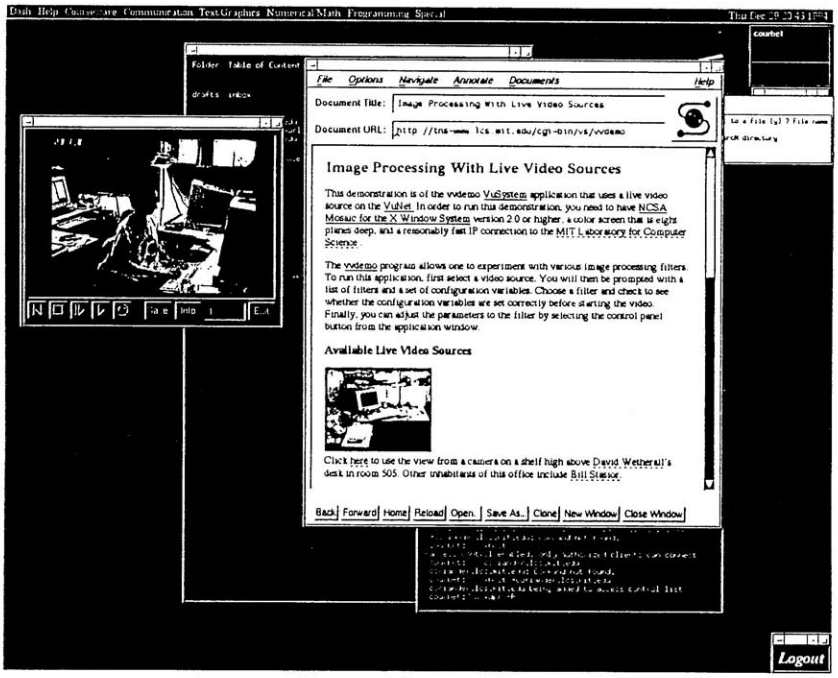


Fig.13. Dynamic of the web: real-time video.

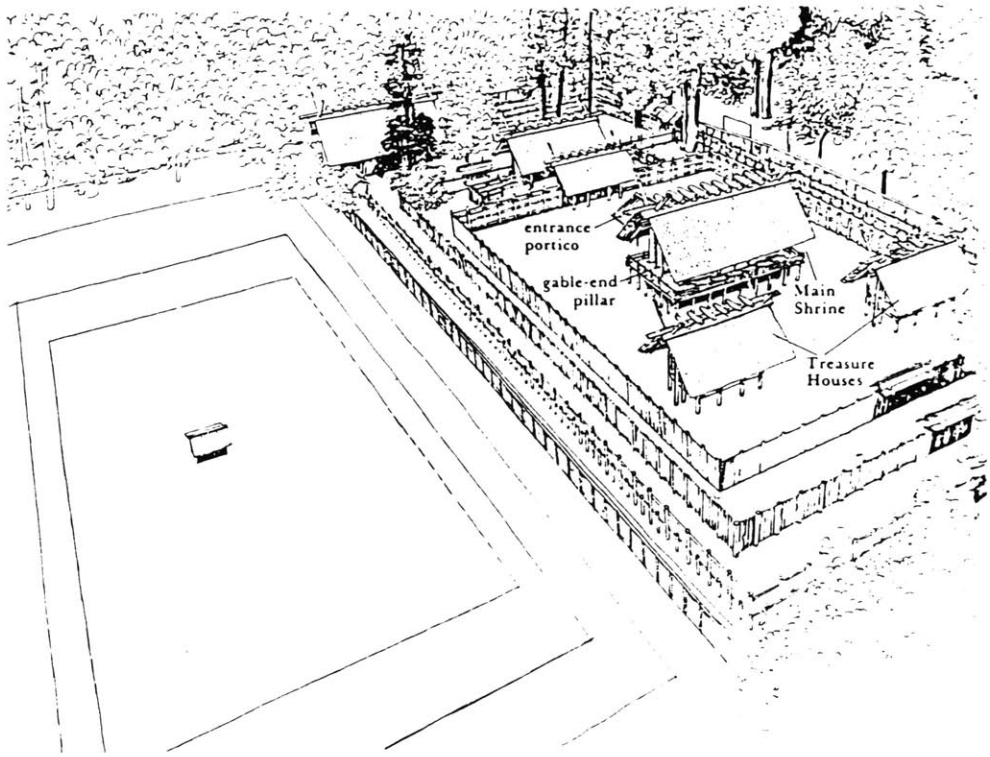


Fig.14. Ise Shrine and the site for its reincarnation.

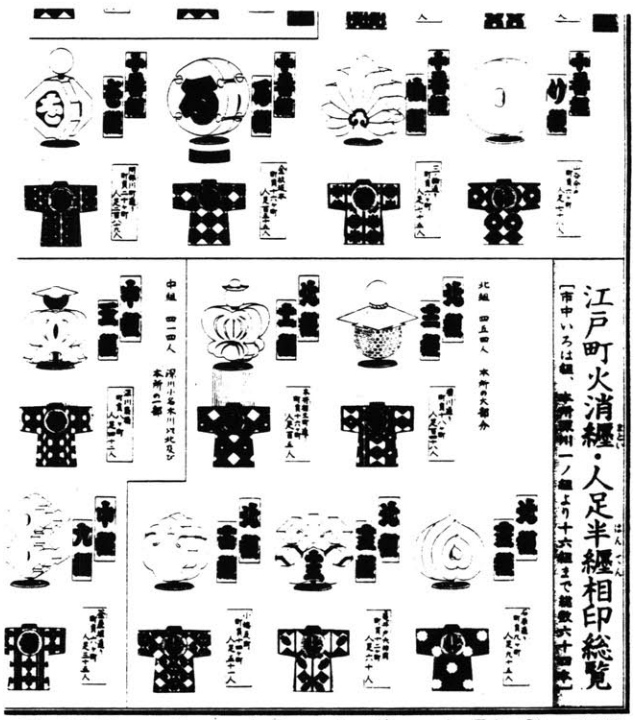


Fig.15. Firemen's standards and uniforms in Edo City. 1719.

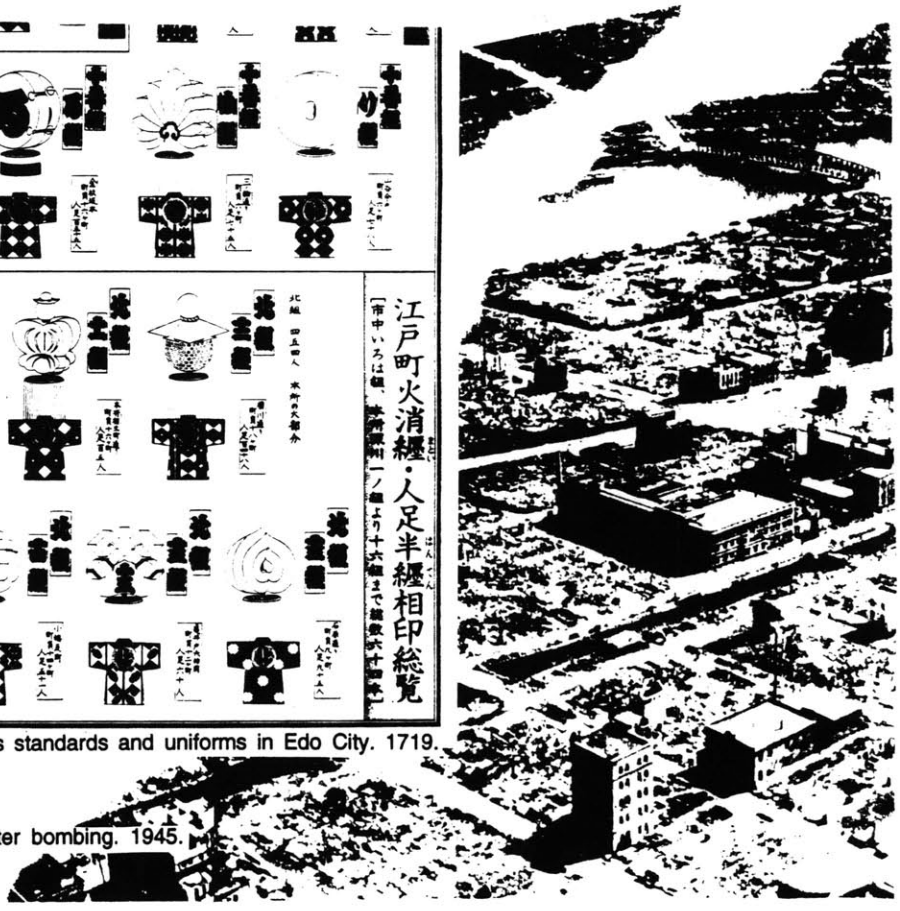


Fig.16. Tokyo after bombing. 1945.

Fig.17. Ephemerality promoted by signs. Shinjuku.

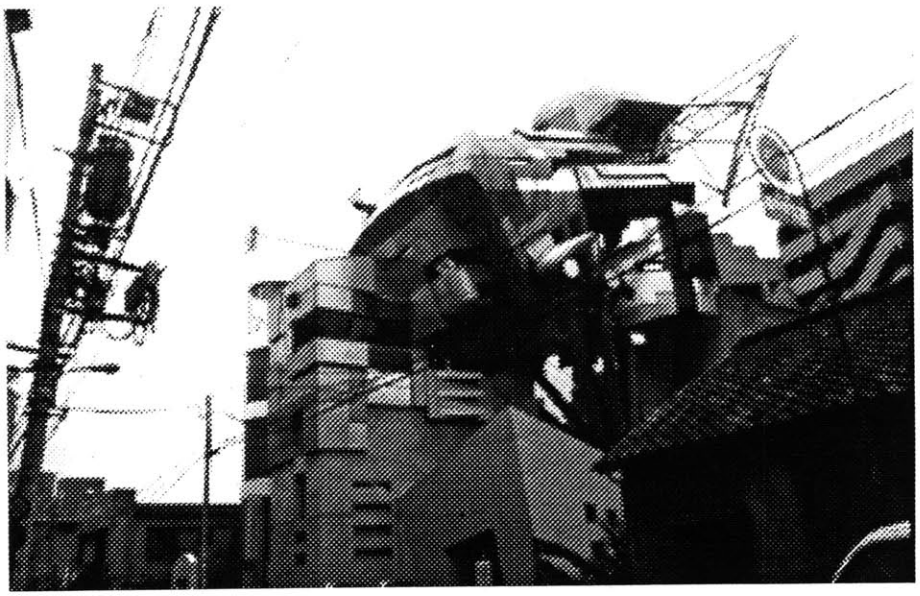


Fig.18. Ephemerality in architecture: Aoyama Drafting School, Bldg. No.1.
M. Watanabe. Tokyo. 1990.

Fig.19. Tokyo Metropolitan Gymnasium. F. Maki.
Tokyo. 1990.

Fig.20. Egg of Wind. T.Ito. Tokyo. 1986.

Fig.21. Role playing: a typical Habitat scene.

Fig.22. Role playing in Tokyo: Spain Dori.

Fig.23. Gaudi? Road of Four Seasons. Horinouchi. 1990.

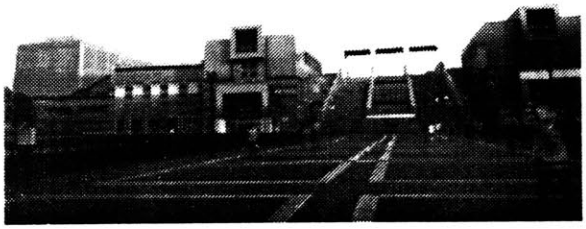


Fig.24. Parthenon? Parthenon Tama.
Tama New Town. 1987.

Fig.25. Venice? La Villa. Tokyo. 1991.

Fig.26. Studio ALTA.

Fig.27. Studio ALTA.

Fig.28. Night view.

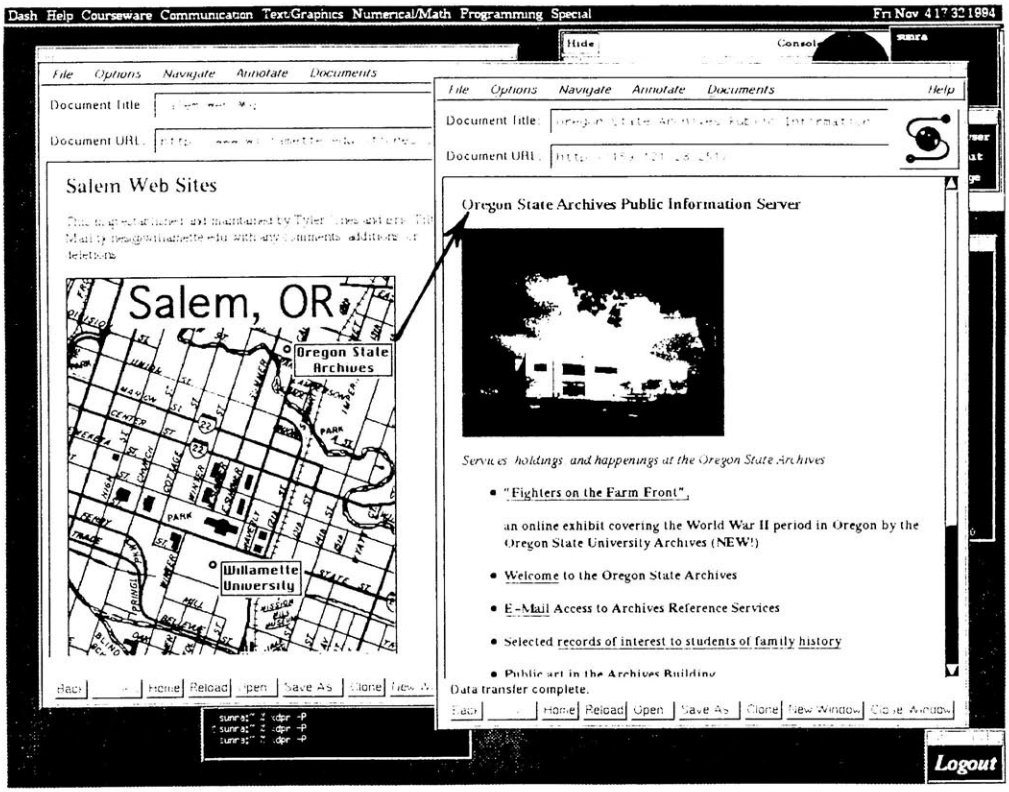


Fig.29. Signs for representation: in WWW anchors are signifiers.

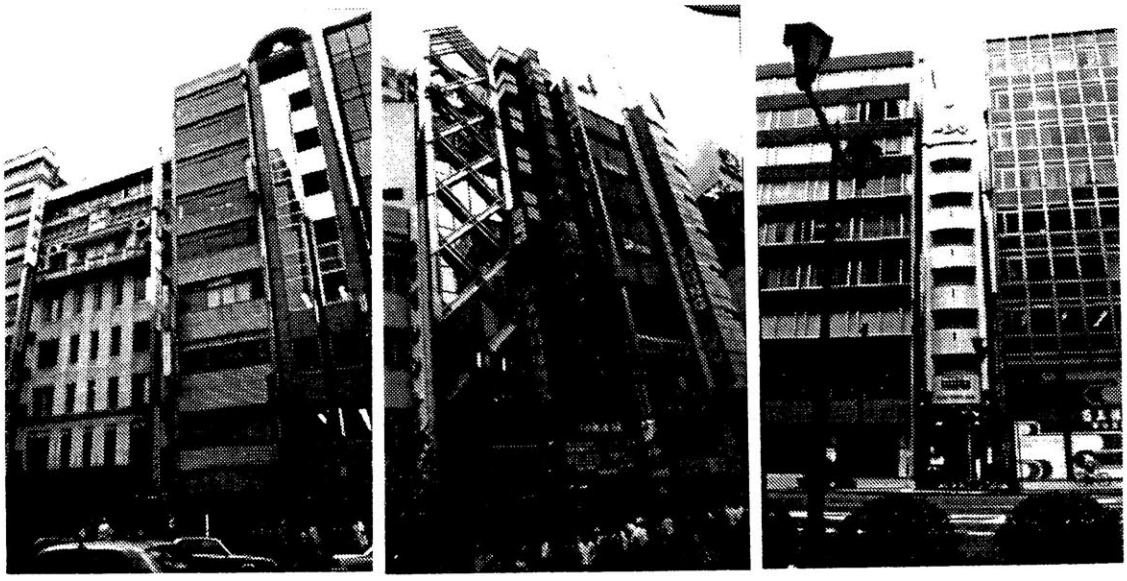


Fig.30. Pencil buildings.

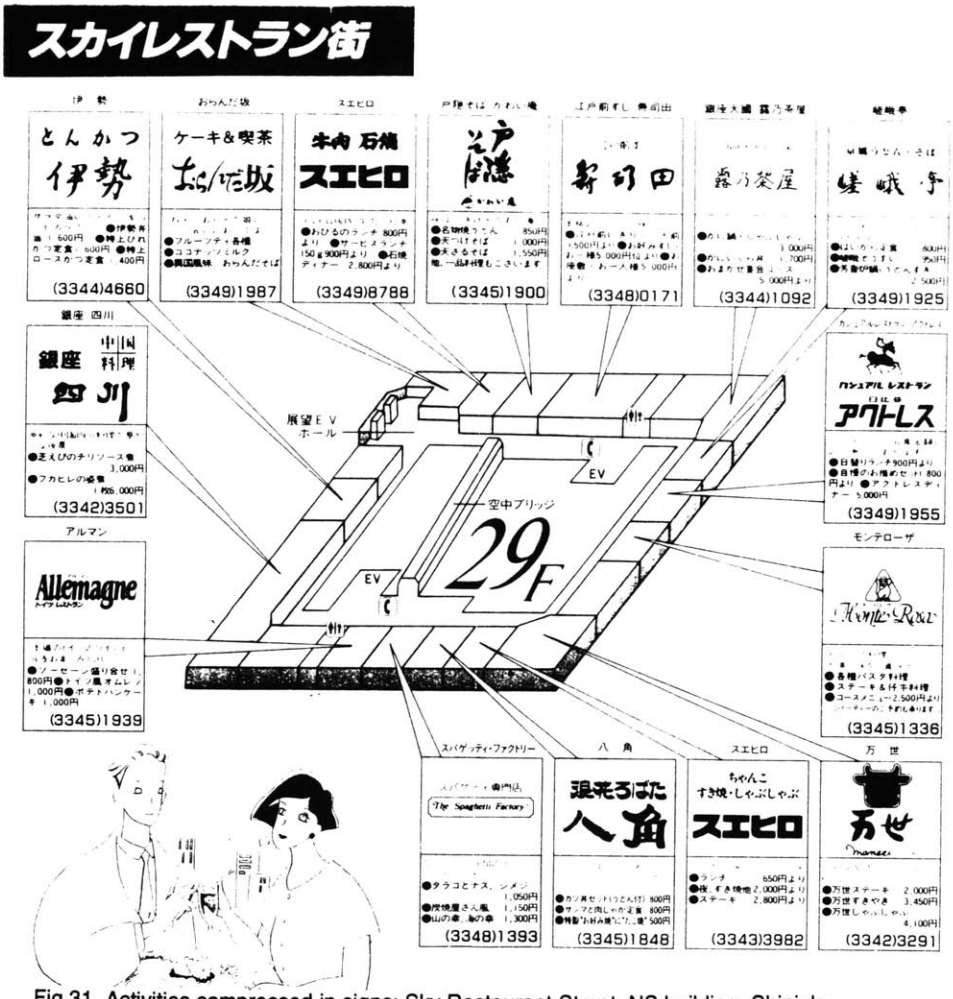


Fig.31. Activities compressed in signs: Sky Restaurant Street. NS building. Shinjuku.

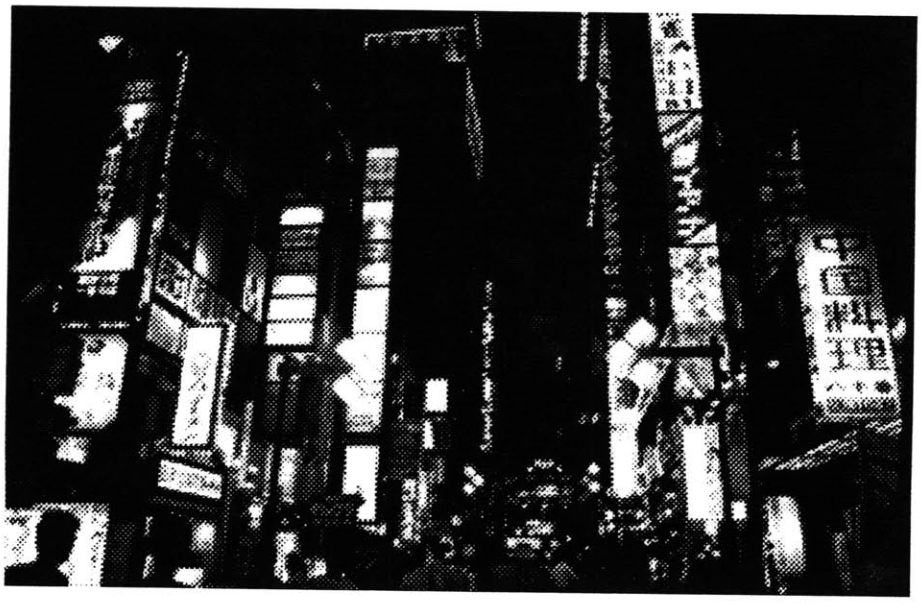


Fig.32. Kabukicho. Shinjuku.

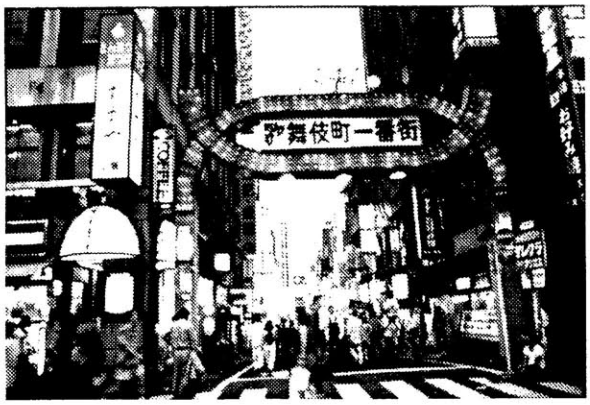


Fig.33. Signs for representation: signs in Shinjuku and Shibuya.

Fig.34. Signs in Shinjuku and Shibuya.

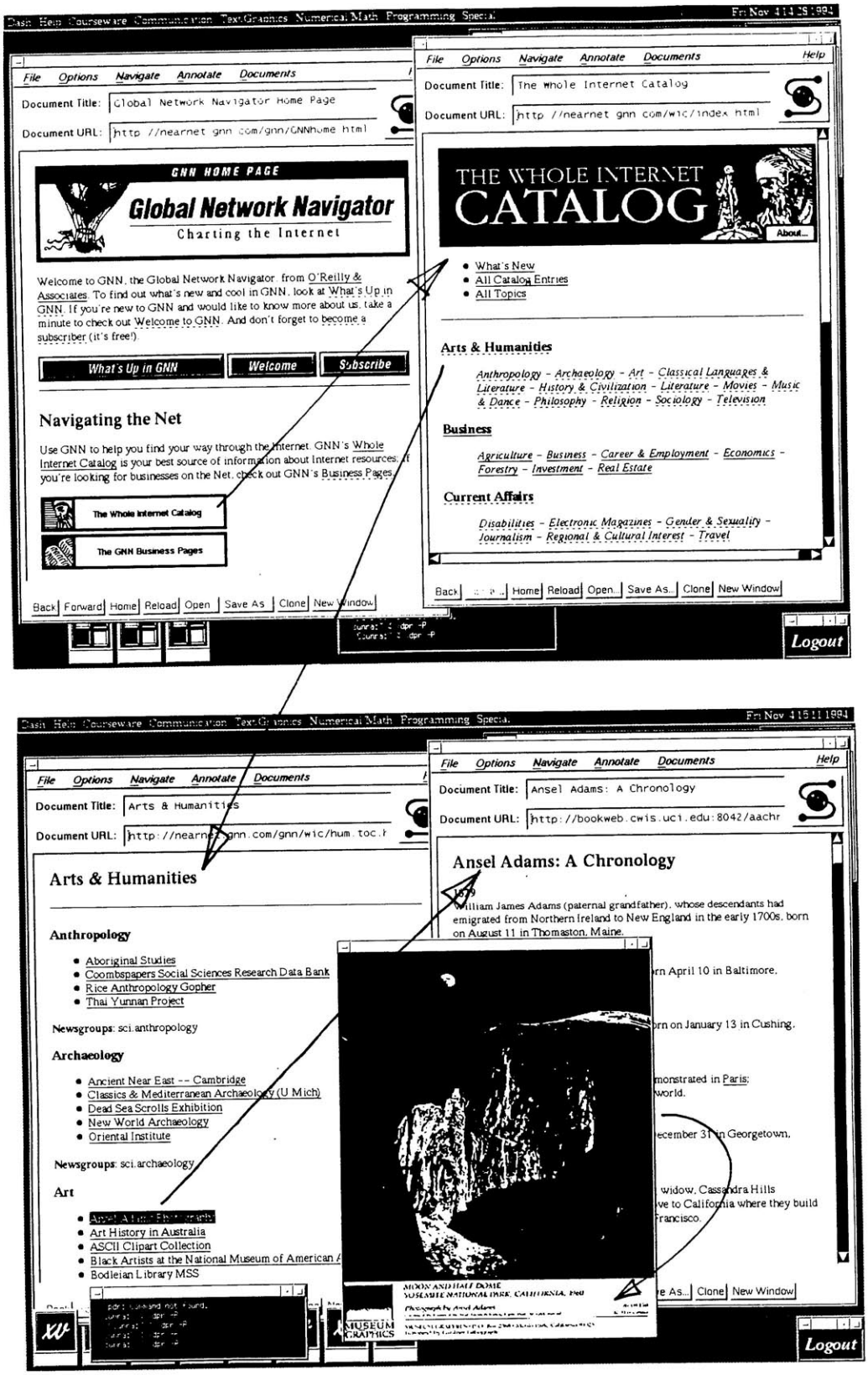


Fig.35. Signs for direction: layers of indices.

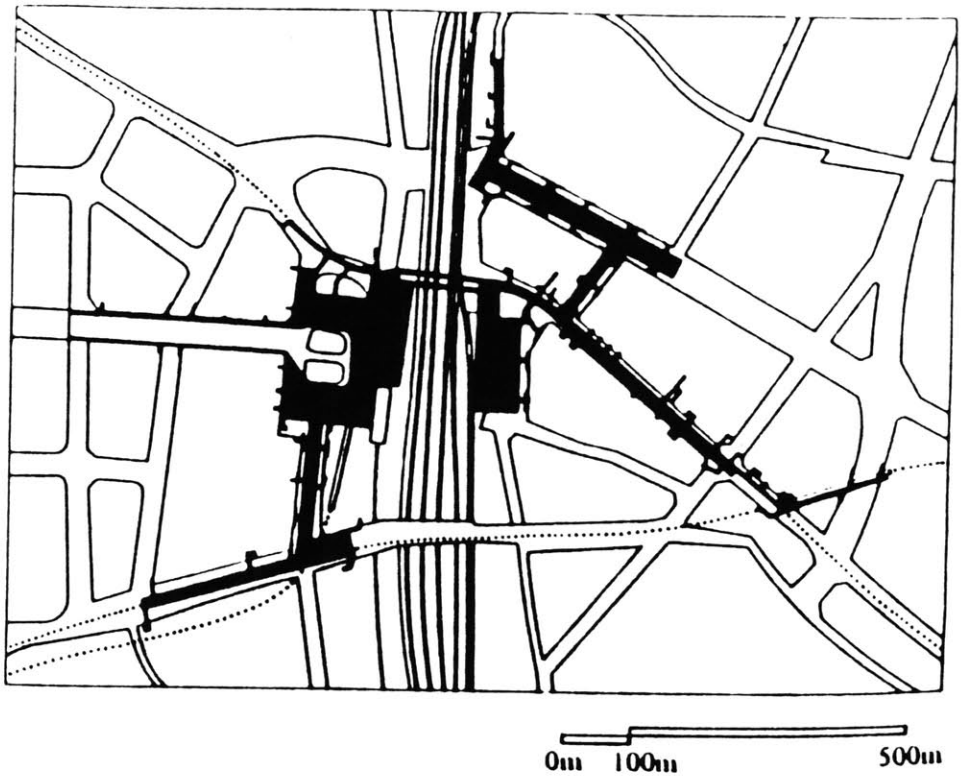


Fig.36. The subterranean city under Shinjuku Station.

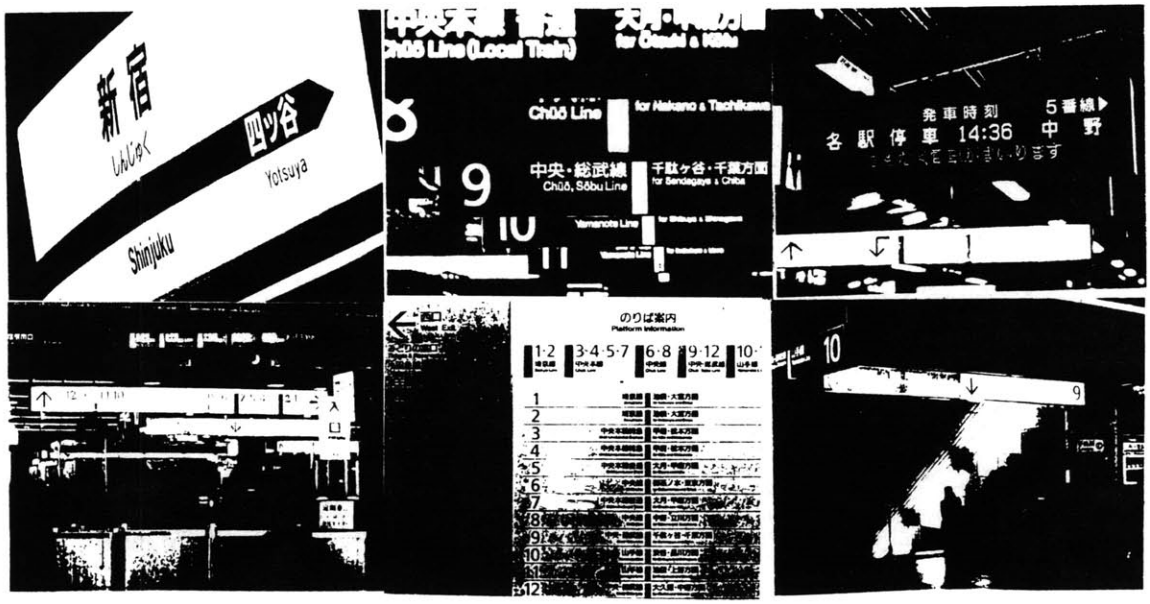


Fig.37. Signs for direction in Shinjuku Station.

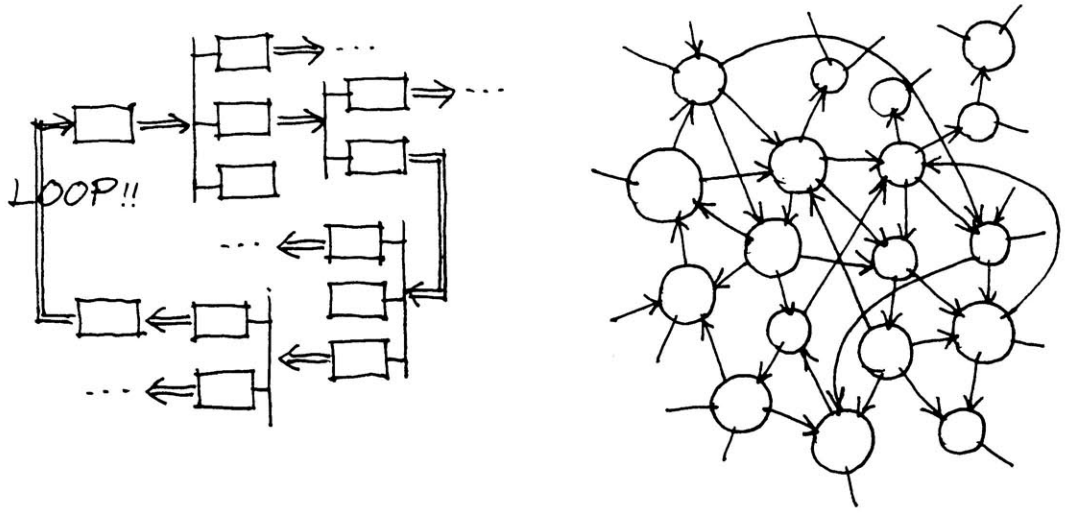


Fig.38. Signs neutralize significance and eliminate hierarchies.

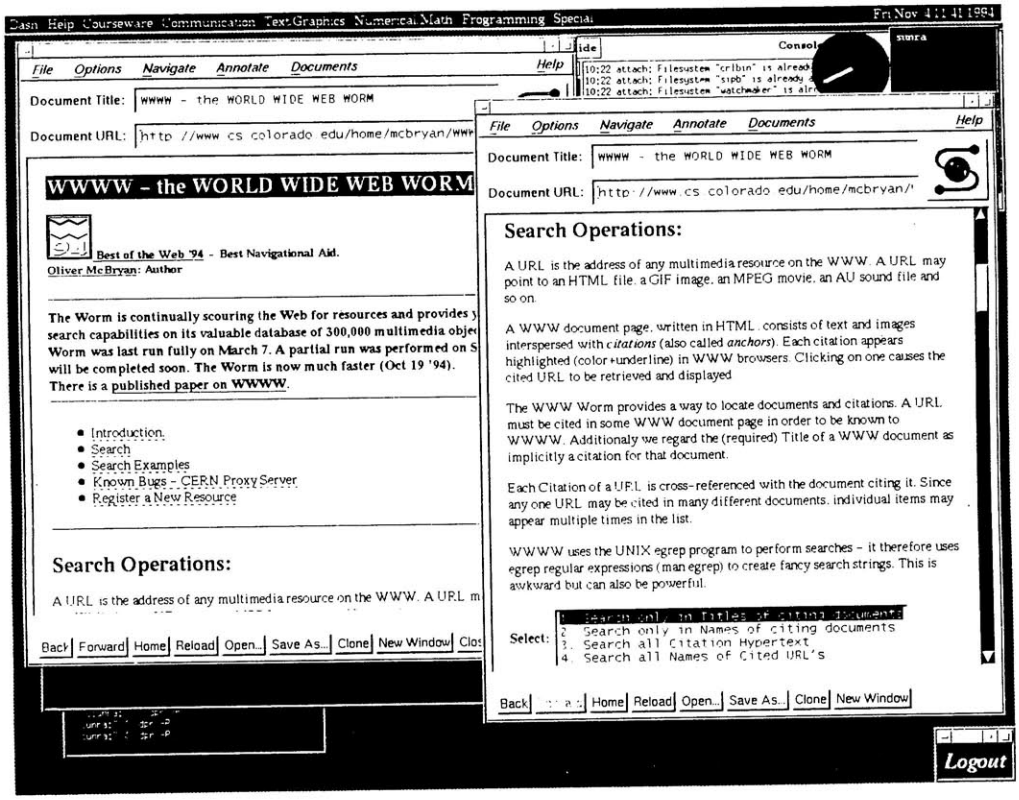


Fig.39. Instant access: World Wide Web Worm, a web-searching program.

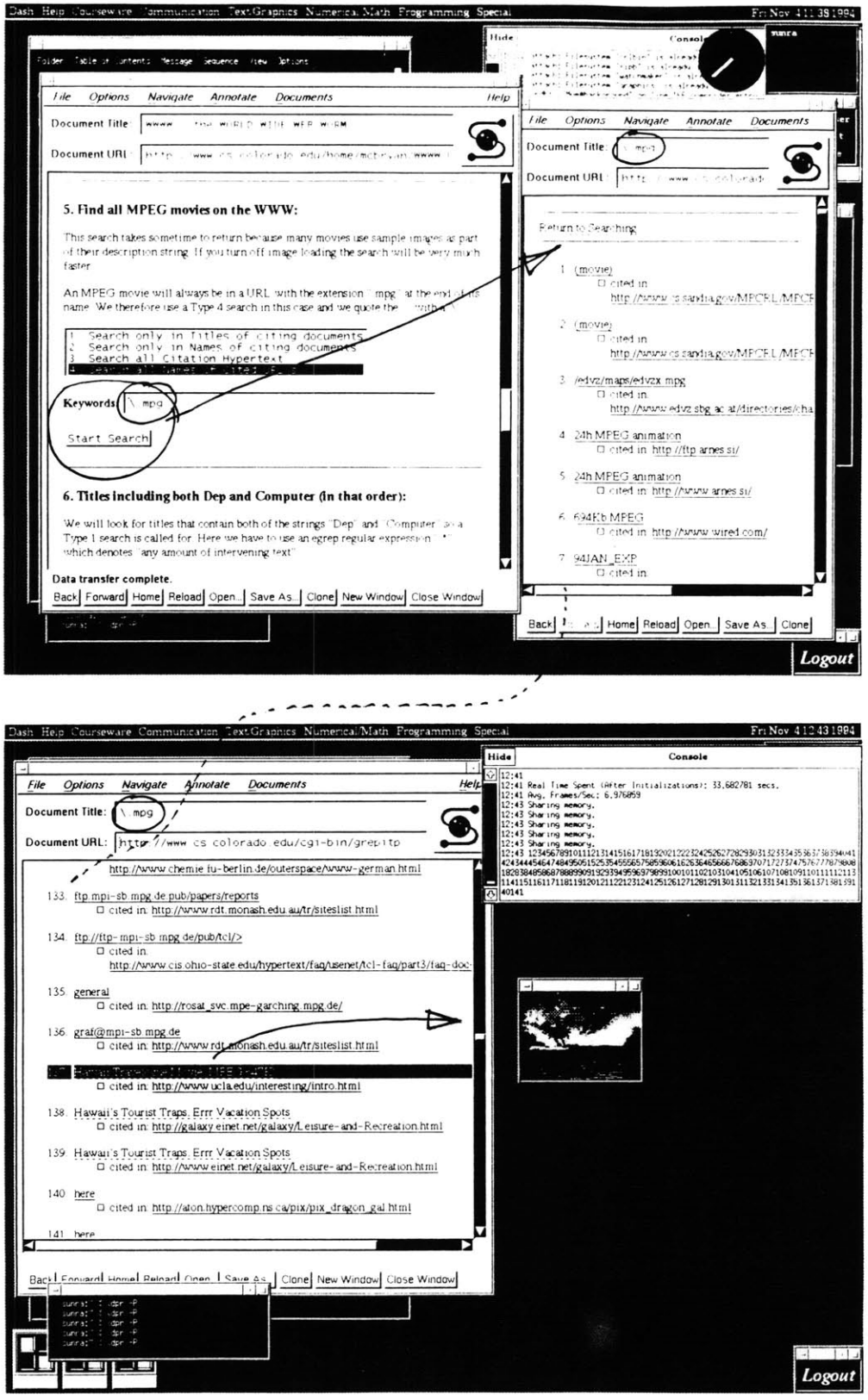


Fig.40. Searching process: keywords ⟶ (indices) ⟶ target.

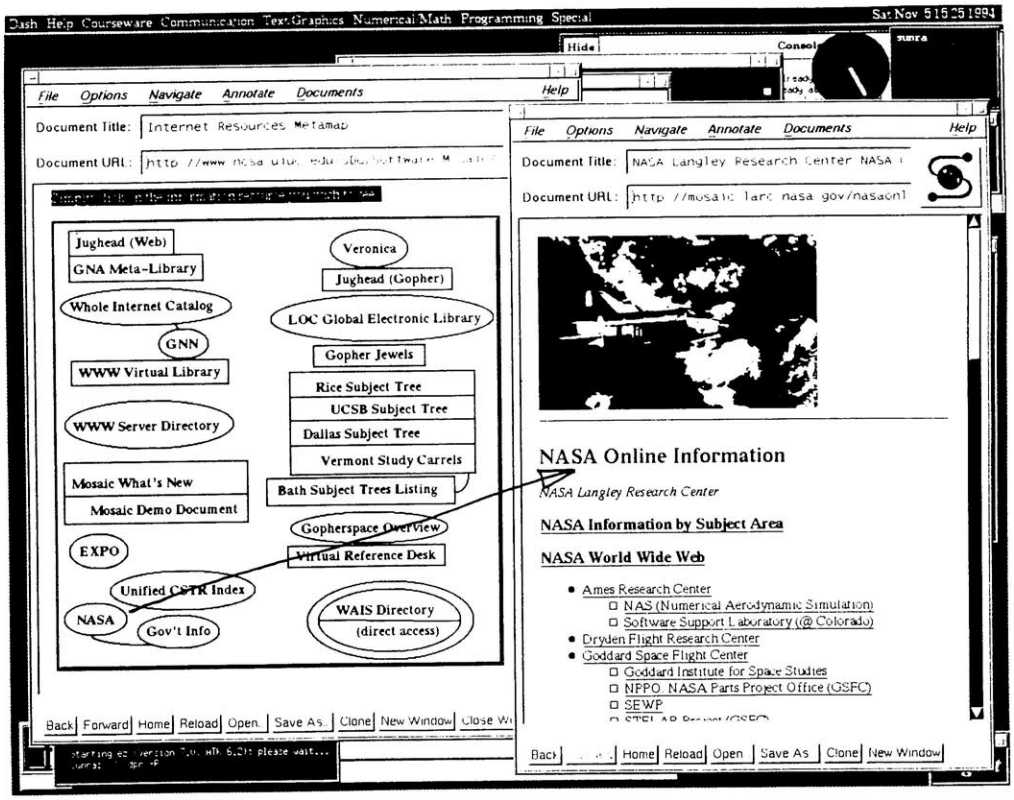


Fig.42. A never-complete map for the Internet: Internet Resources Metamap.

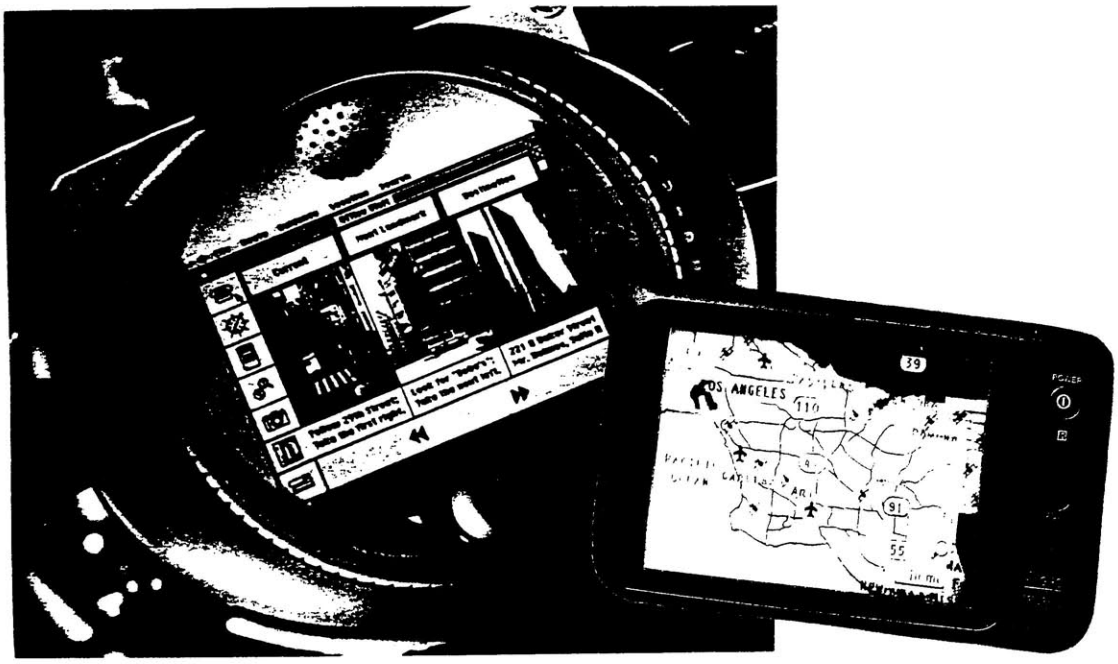


Fig.41. Instant access: telemaps.

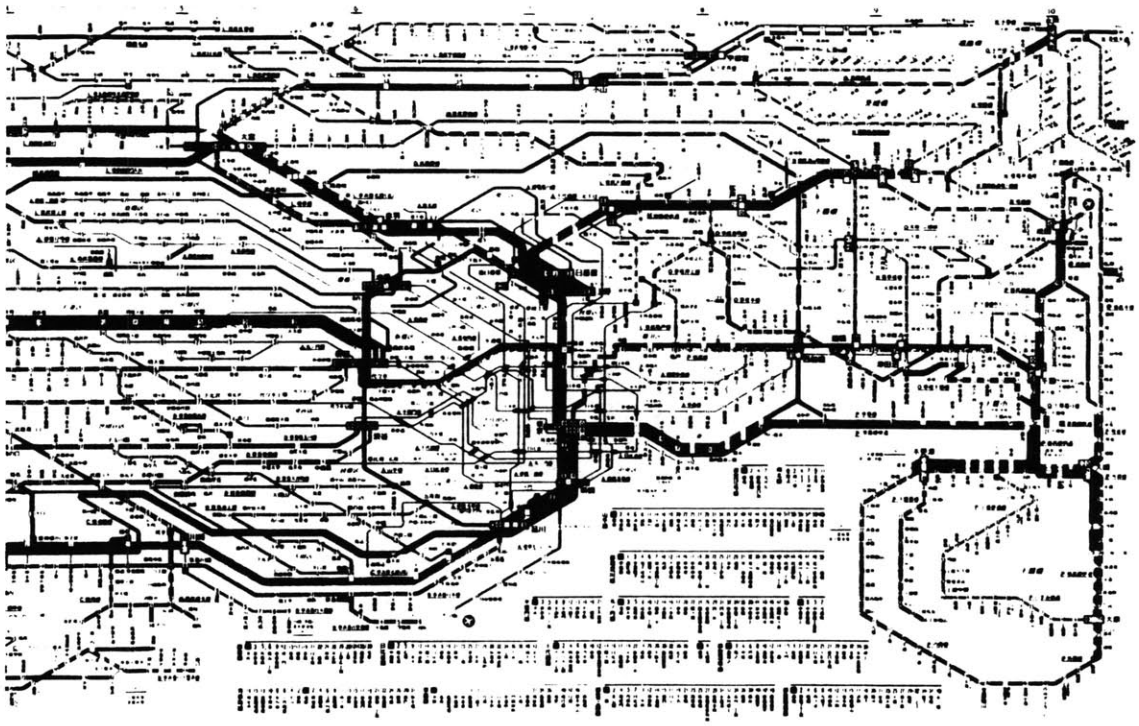


Fig.43. Maps in Tokyo: (up) railway/subway map;
(lower left) local map: from train station to home;
(lower right) railway time map.

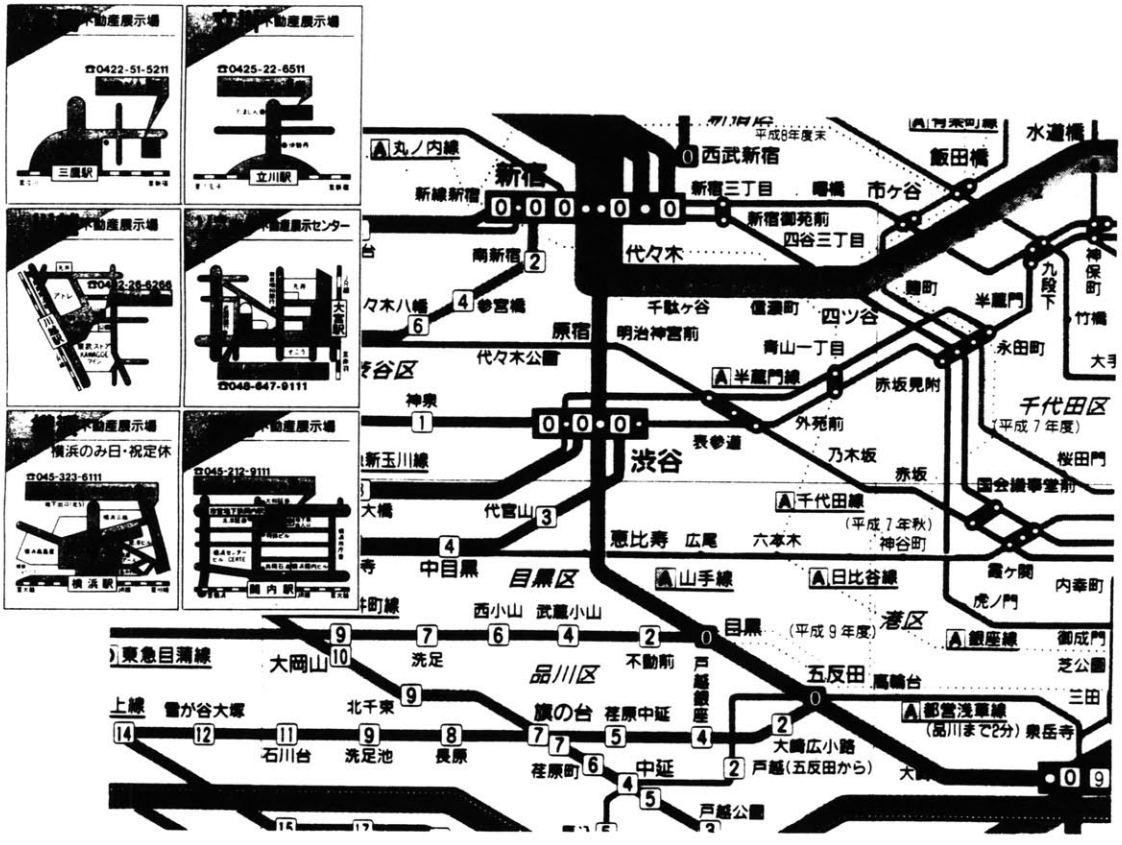


Fig.44. Internet, Bitnet and E-mail connectivity global chart. November 1994.

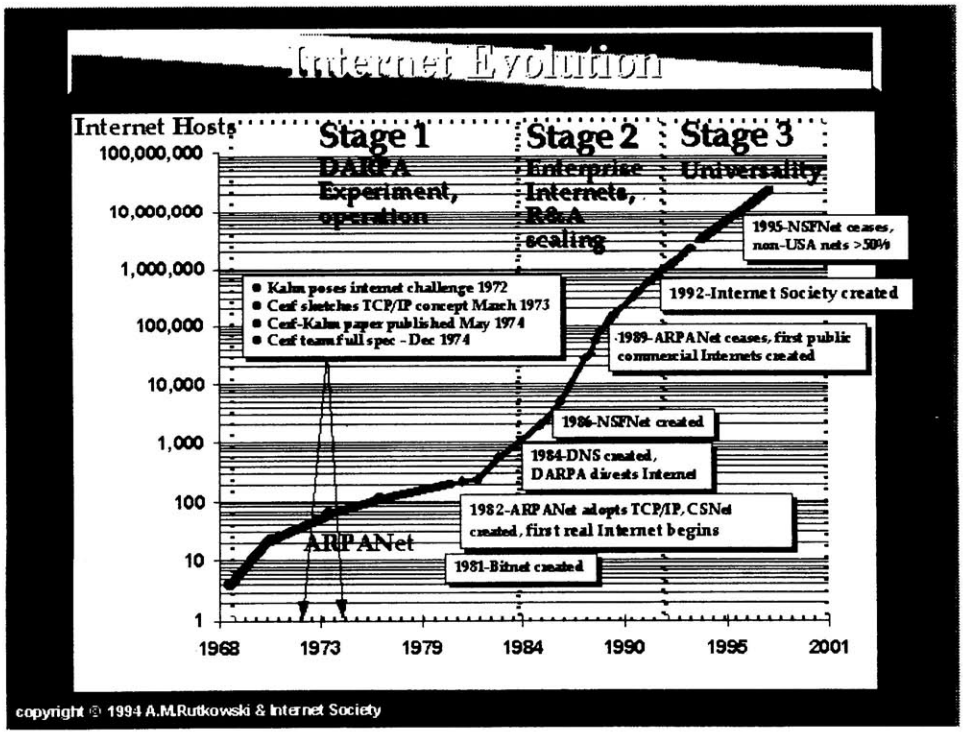


Fig.45. Internet Evolution.

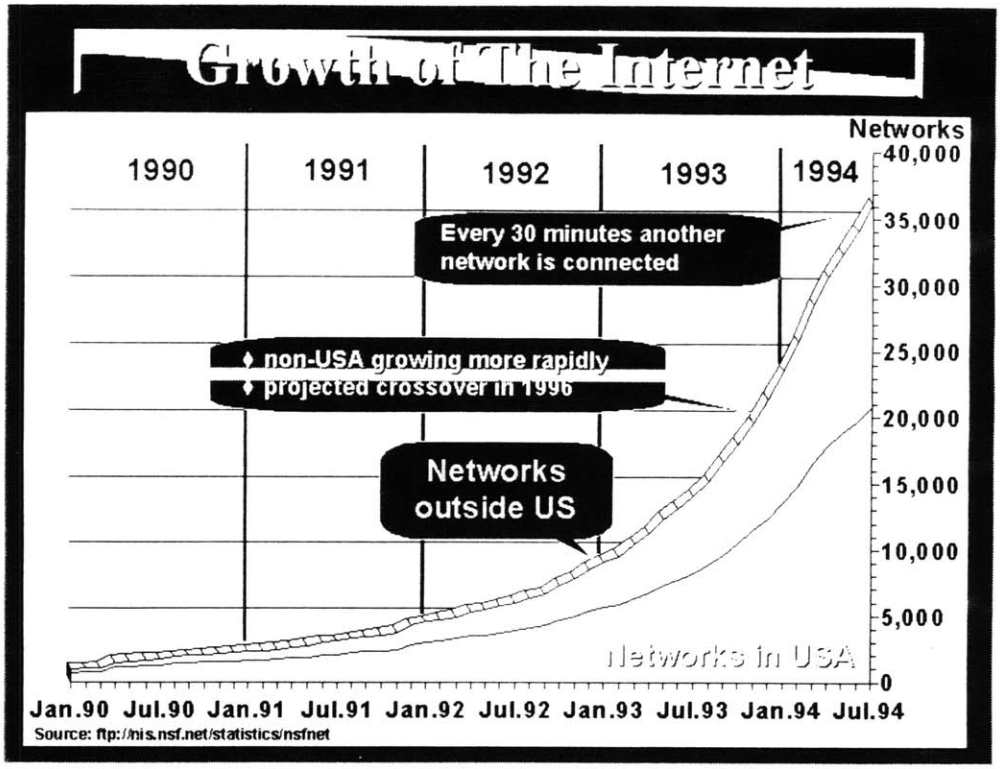


Fig.46. Growth of the Internet.

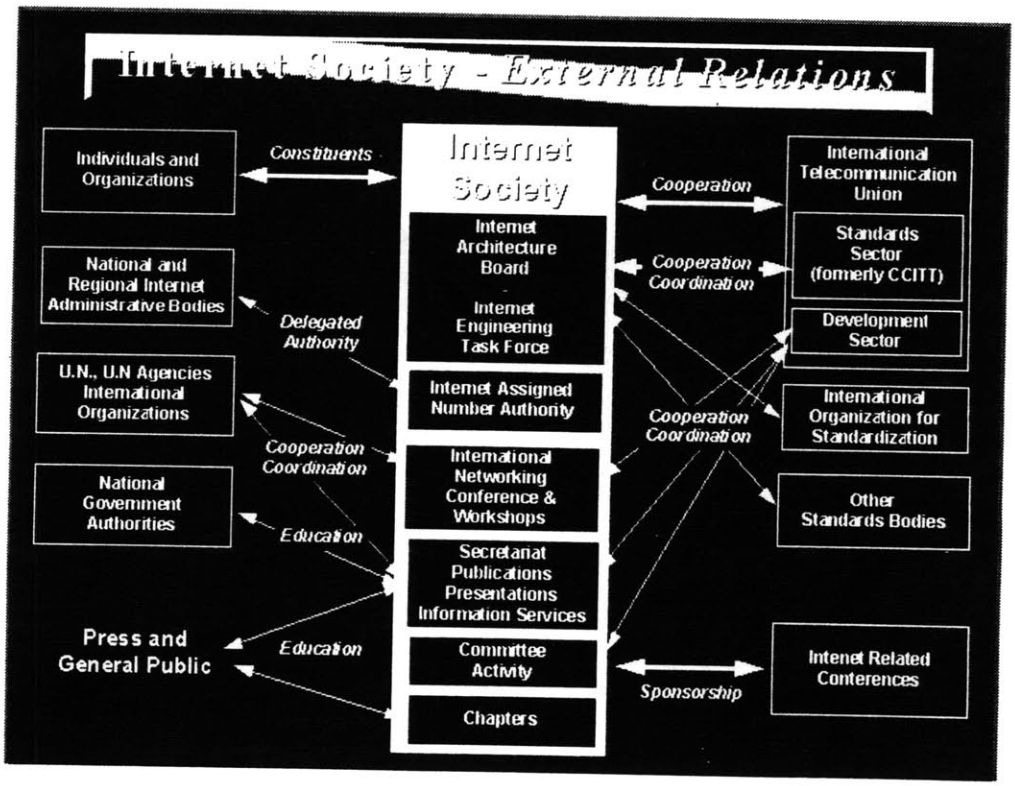


Fig.47. Internet Society -- External Relations.

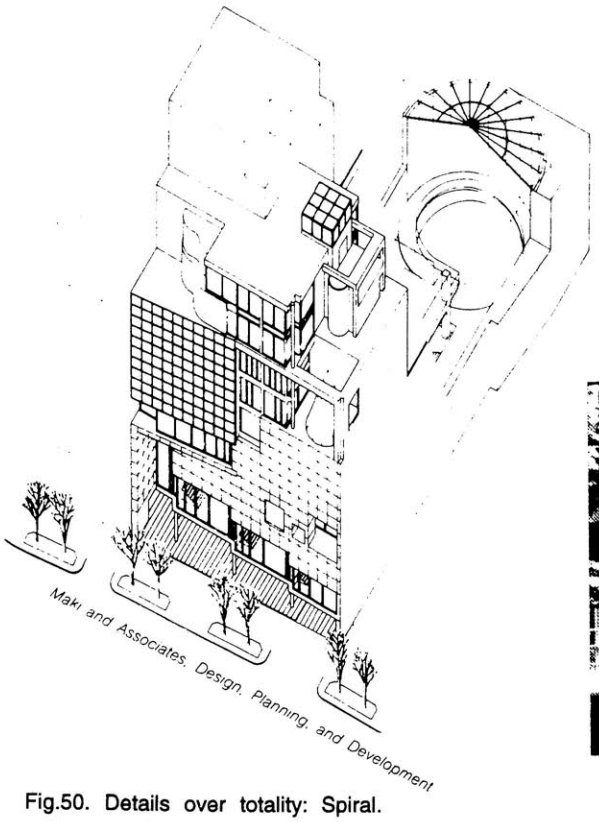


Fig.50. Details over totality: Spiral. Maki and Associates. 1985.

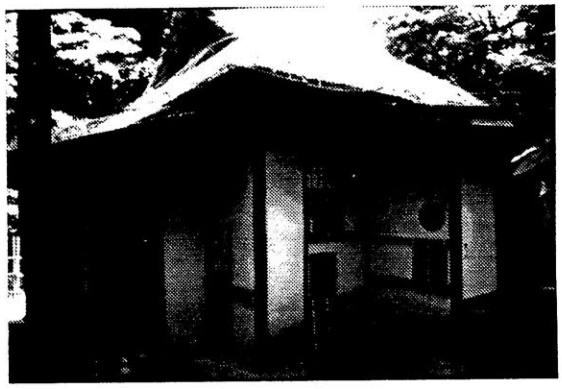


Fig.49. Details over totality: tea-house. Ueno.

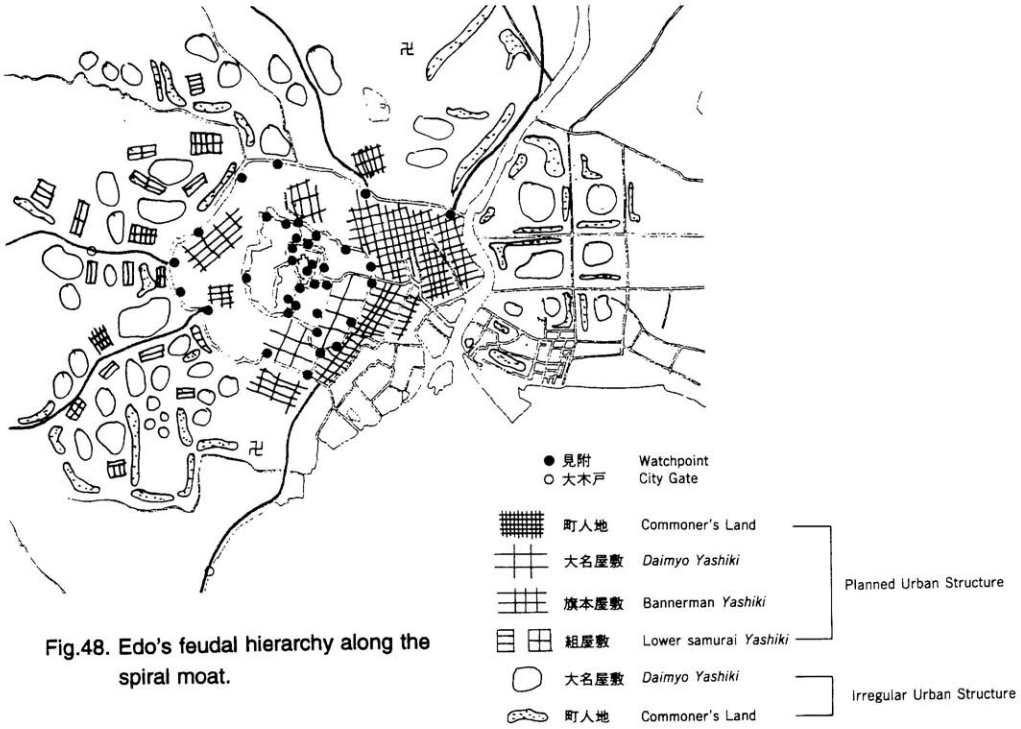


Fig.48. Edo's feudal hierarchy along the spiral moat.

Fig.51. Each node is a kaleidoscope of the city.

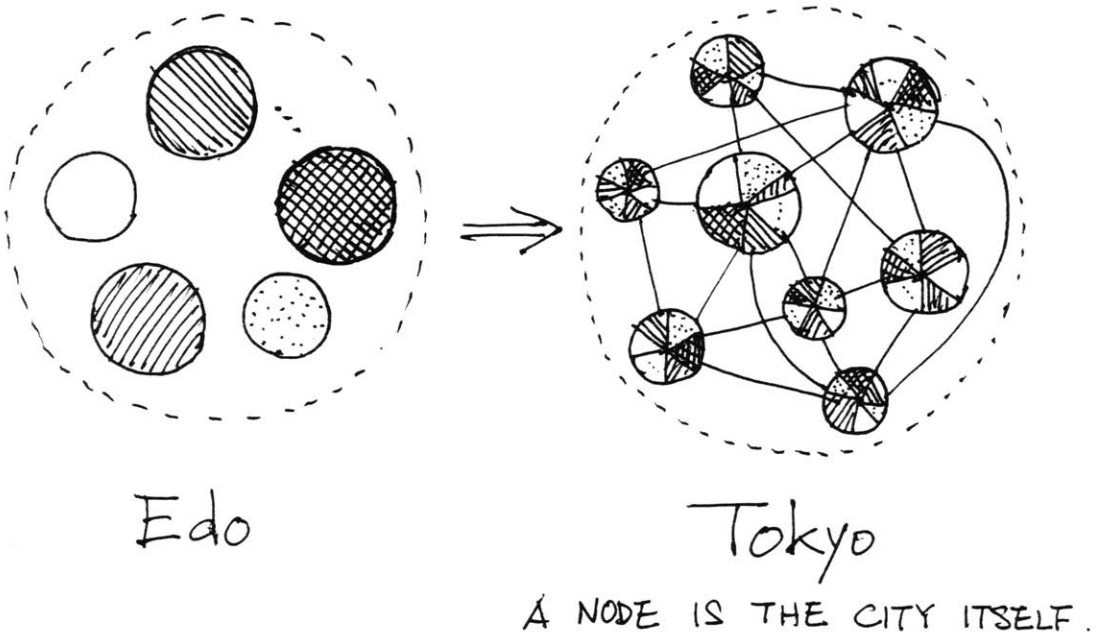


Fig.52. Result of the additive process: being a cell of the city, a node contains all its information.

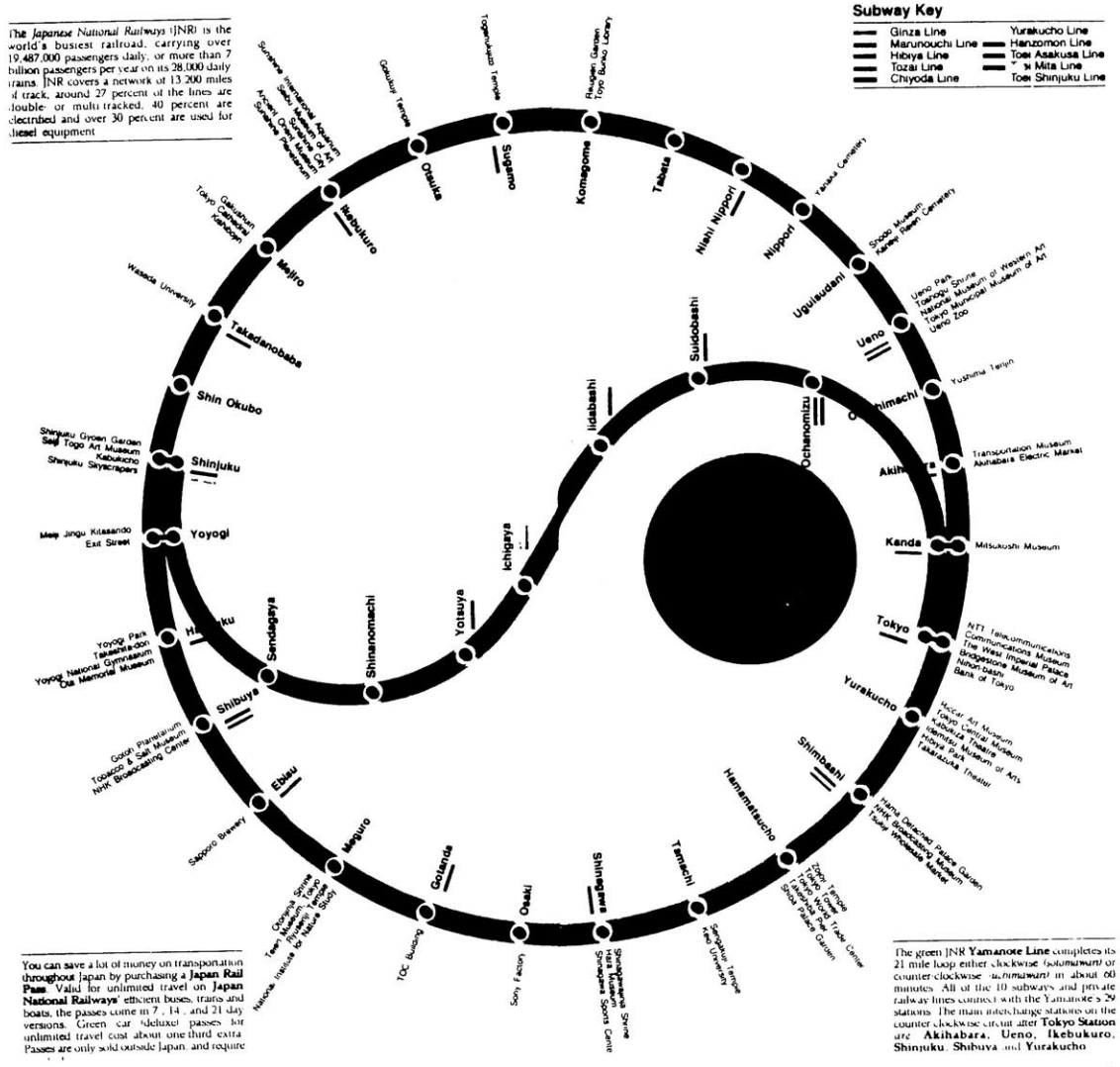


Fig.53. Yamanote Loop Line with Chuo Line running through, and the entrenched palace.

Fig.54. Trains on JR Lines and subways; JR East Japan Company campaign poster for its safety, punctuality and comfort.

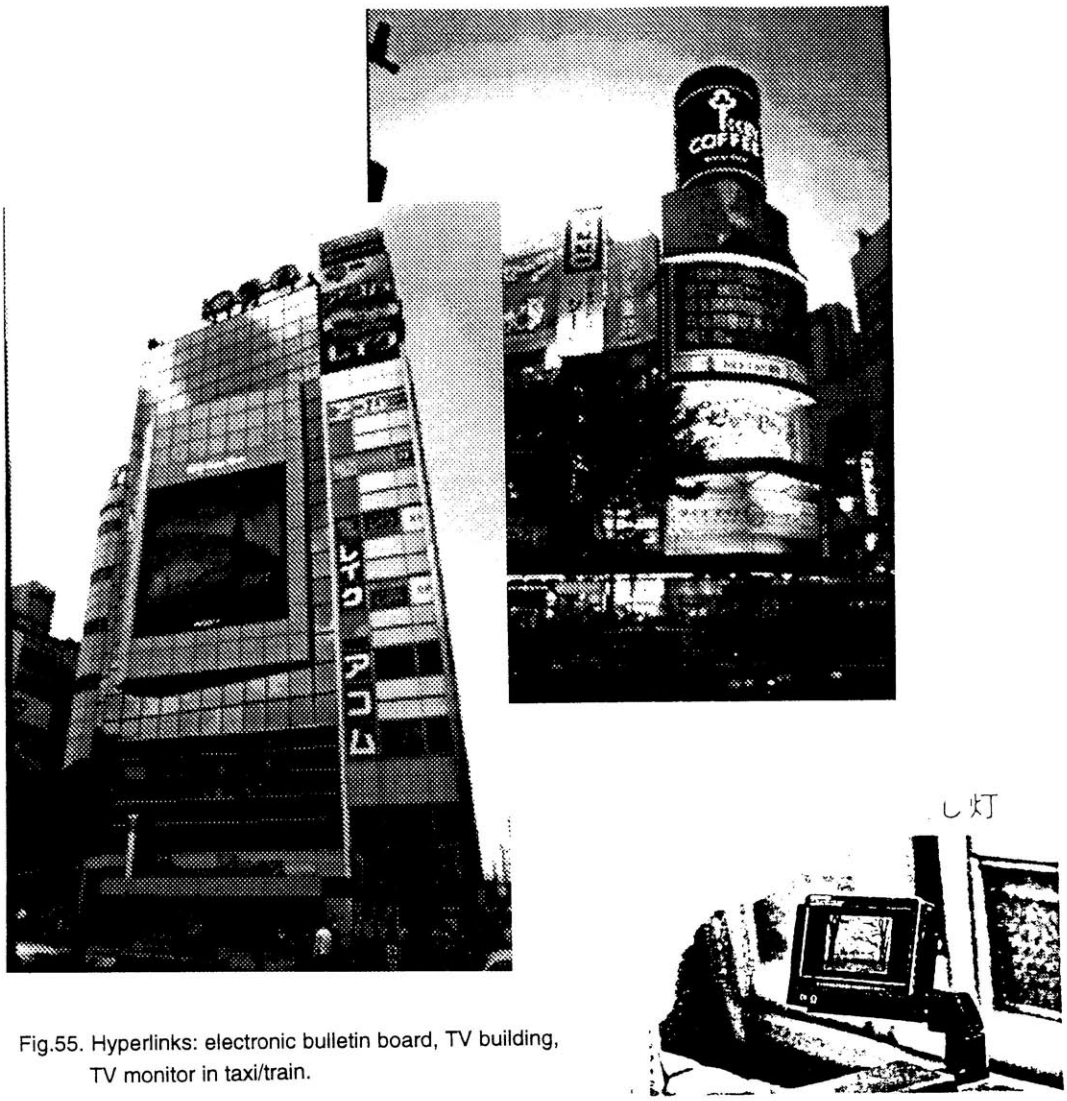


Fig.55. Hyperlinks: electronic bulletin board, TV building, TV monitor in taxi/train.

Fig.56. A Pachinko parlor.

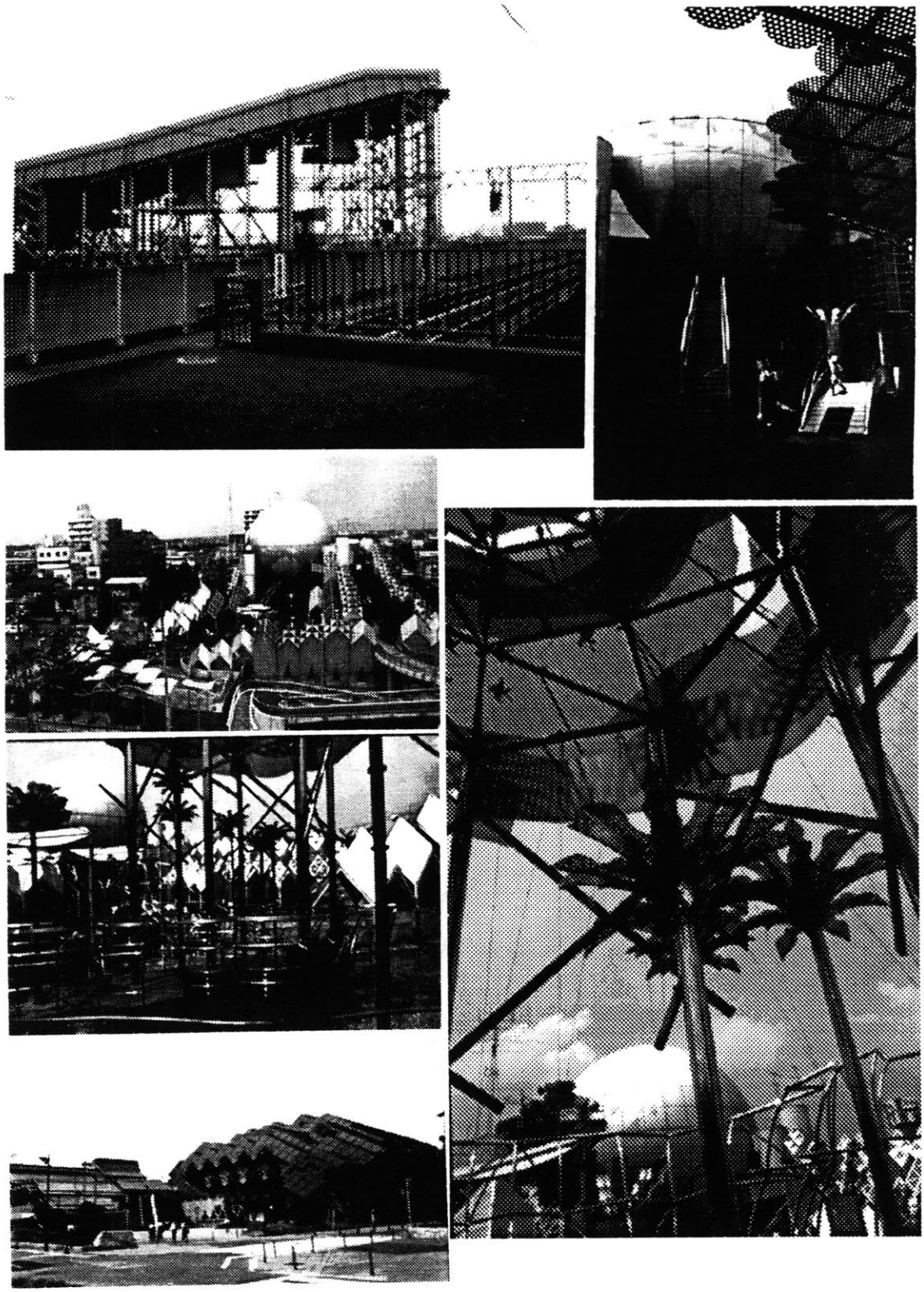


Fig.57. Artificial nature: Ski Dome (upper left), Tokyo Martial Art Hall (lower left), Shonandai Cultural Center (rest).

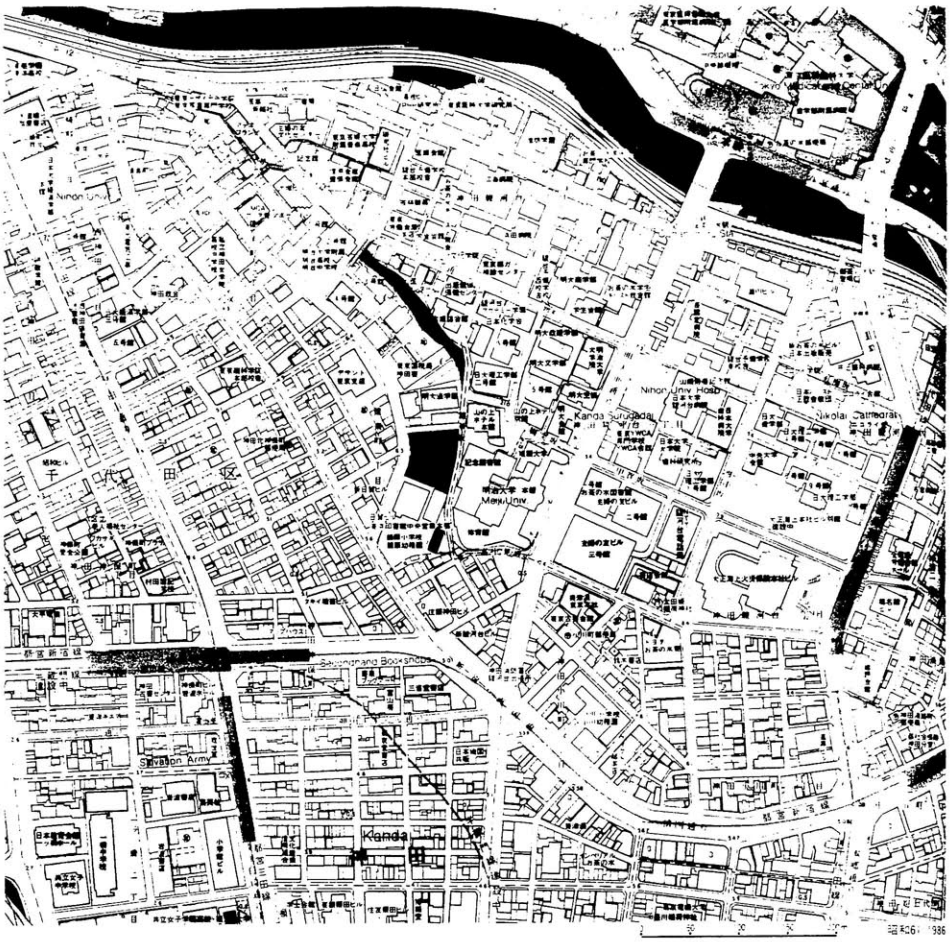


Fig.58. Matrix on the land: land patterns rarely change.
Surugadai, Ochanomizu. 1986.

Fig.59. Surugadai, Ochanomizu. 1850.

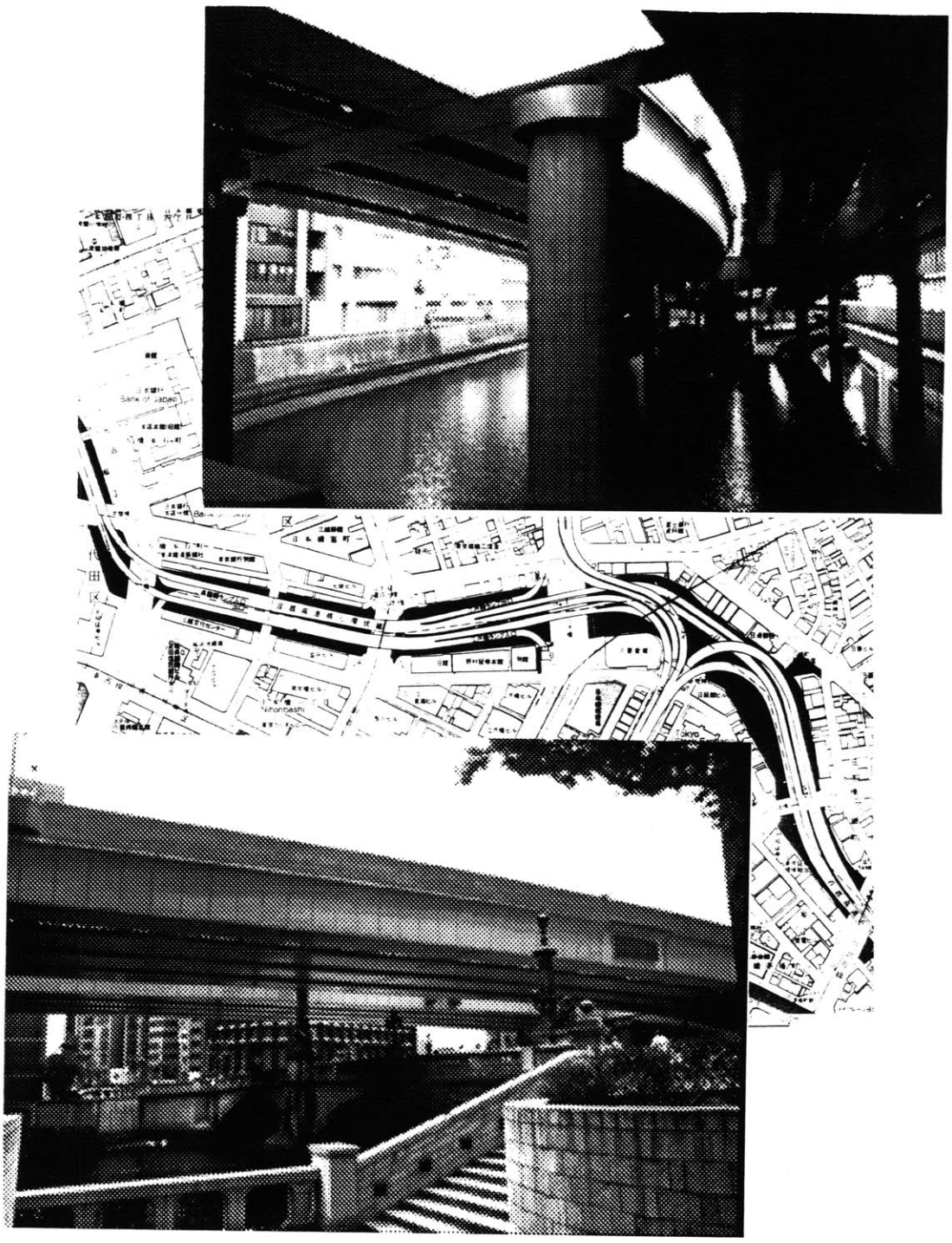
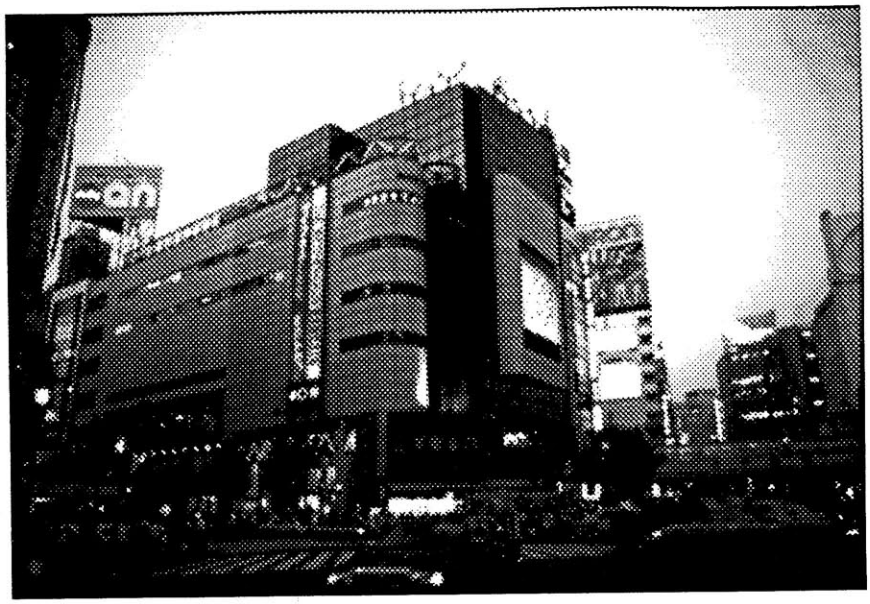


Fig.60. The city built expressway on top of canals. Only option?



CREATIVE LIFE STORE

TOKYU HANDS

Store. Originally set
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8 東急ハンズ渋谷店

Fig.62. Invisible hands of Tokyu: 109 Buildings.

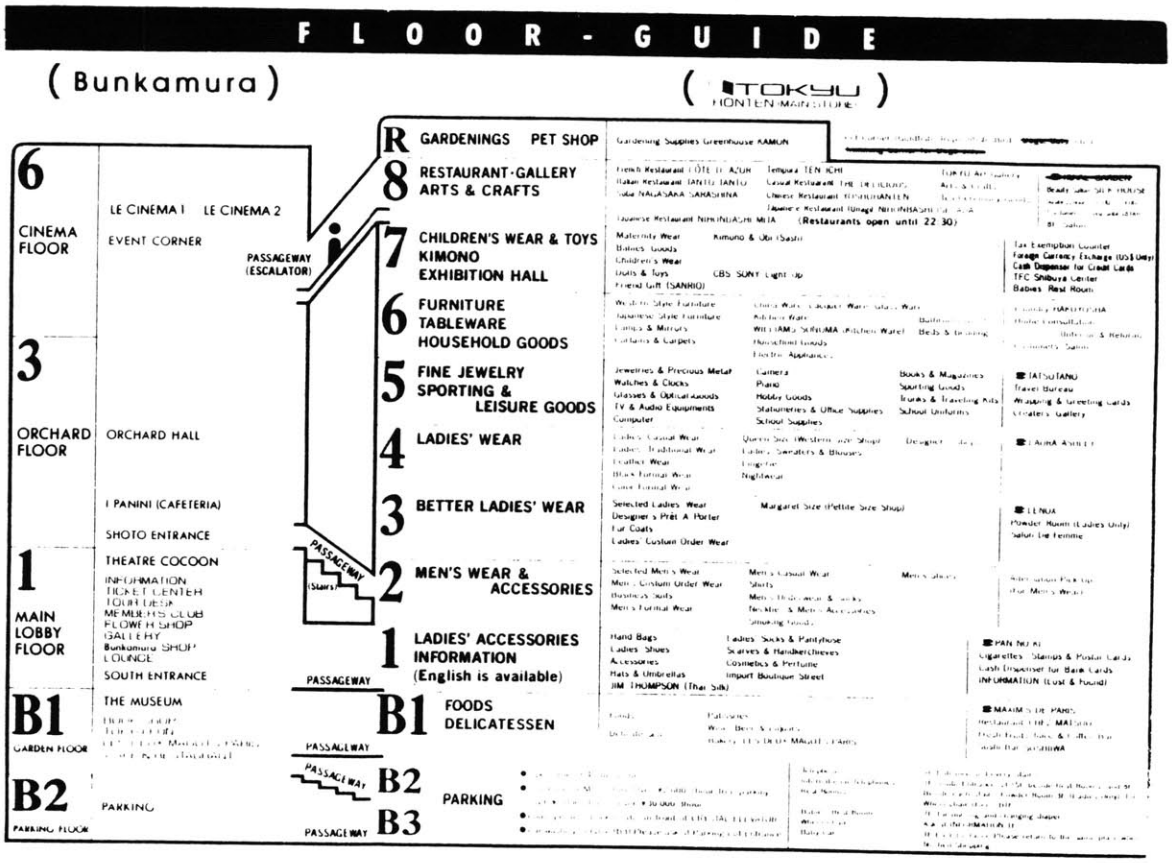

Fig.61. Lobotomy: Tokyu Bunkamura and Tokyu Main Store.

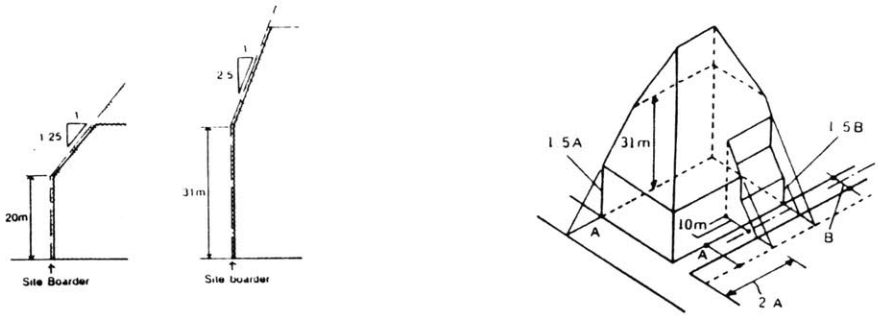

Fig.63. Matrix in the sky: Diagonal Line Restriction.

Fig.64. Control and Chaos: Ameyoko.

Fig.65. Control and Chaos: Ameyoko.

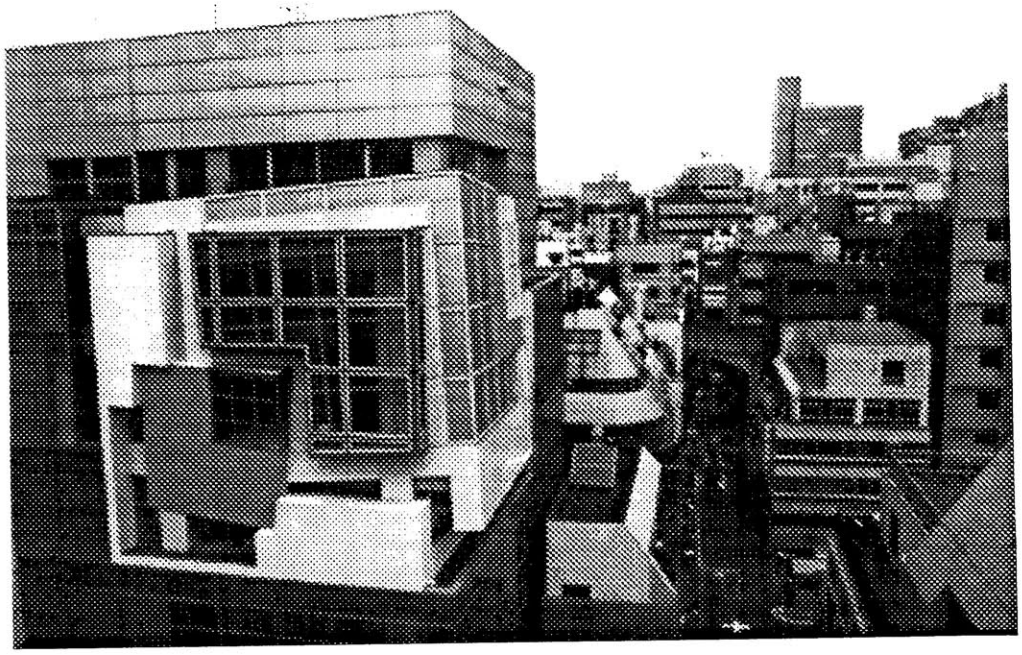

Fig.66. New aesthetic for Tokyo? Koizumi Lighting Theater.

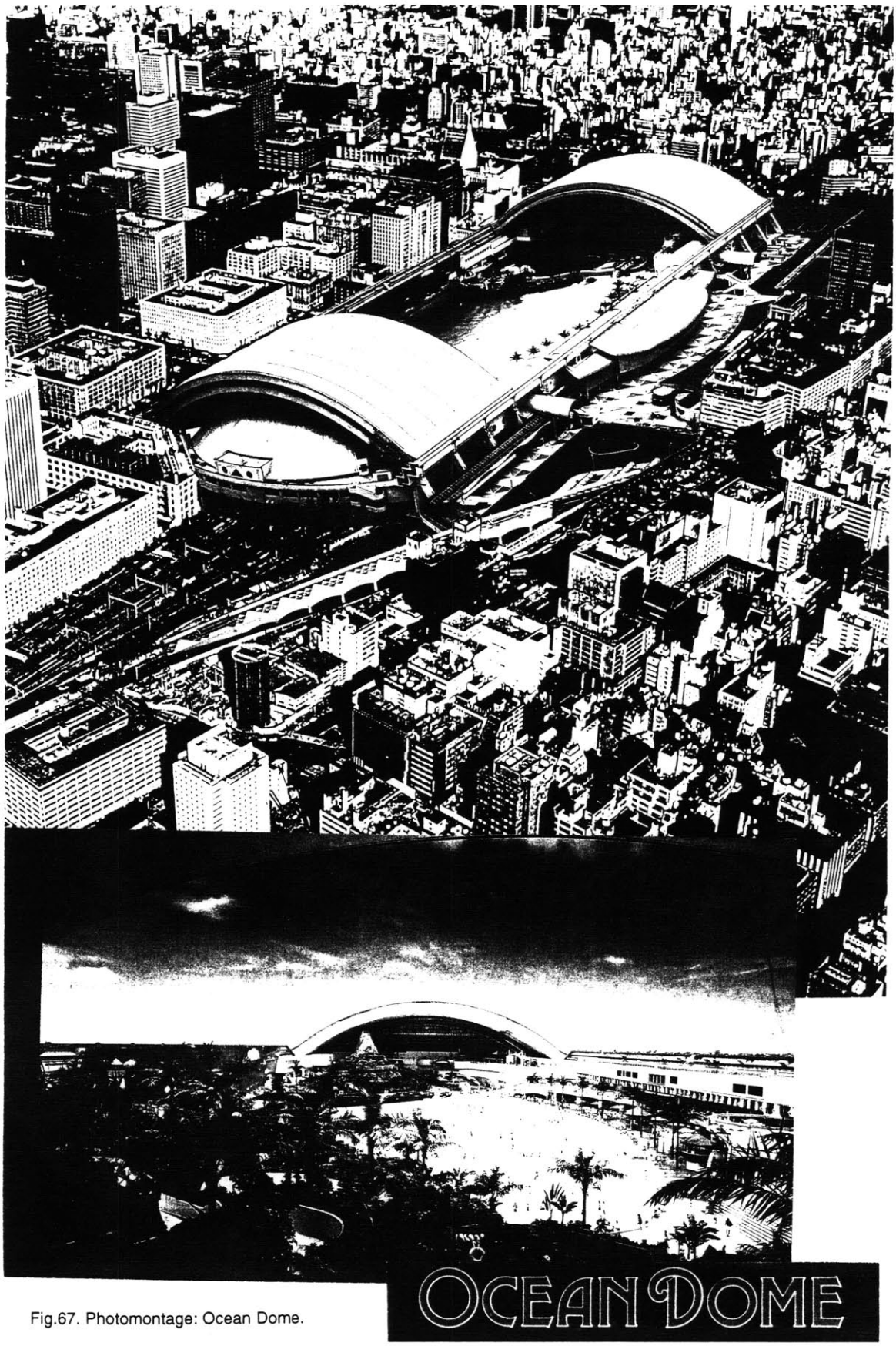

Fig.67. Photomontage: Ocean Dome.

– 512 kbytes worth will set you back about ¥ 88200 at current prices – but light and energy-efficient. And, as Fujitsu points out, you just need one card for your reader: They envisage downloading (probably via Nifty-Serve, a local, Fujitsu-sponsored version of CompuServe) books onto cards.

The other difference between the two ...ers is the interface. Fujitsu's player fea- ... just two buttons plus an on/off switch. ...nly need one thumb to operate it. NEC's ...r forces you to contend with ten twid- ...ons.

...urse, electronic book readers, being ...rgely from off-the-shelf components ...ntaining little in the way of proprietary ...logy, will be kid's stuff to clone. The money is going to be in the books – just ... the subway commuters who tear through ...ifferent 300-page *manga* (Japanese comic ...) every day on their way home from ...

NEC Corp: +81 3 3798 6511; Fujitsu ...

...76 – *Bob Johnstone*

Fig.68. Electronic books make train-riding endurable.

Fig.69. Low City, High City: distribution of white and blue collar workers. 1975.

List of Figures

Fig.21. Role playing: a typical Habitat scene. Source: Benedikt, Michael et al. *Cyberspace: First Steps.* The MIT Press, Cambridge, 1992.
Fig.22. Role playing in Tokyo: Spain Dori.
Fig.23. Gaudi? Road of Four Seasons. Horinouchi. 1990.
Fig.24. Parthenon? Parthenon Tama. Tama New Town. 1987.
Fig.25. Venice? La Villa. Tokyo. 1991.
Fig.26. Studio ALTA.
Fig.27. Studio ALTA.
Fig.28. Night view.
Fig.29. Signs for representation: in WWW anchors are signifiers.
Fig.30. Pencil buildings.
Fig.31. Activities compressed in signs: Sky Restaurant Street. NS building. Shinjuku.
Fig.32. Kabukicho. Shinjuku.
Fig.33. Signs for representation: signs in Shinjuku and Shibuya.
Fig.34. Signs in Shinjuku and Shibuya.
Fig.35. Signs for direction: layers of indices.
Fig.36. The subterranean city under Shinjuku Station. Source: Tardits, Manuel C. "Fatal Attraction." *Arquitectura* 294, December 1992. pp.100.
Fig.37. Signs for direction in Shinjuku Station. Source: Higashi Nihon Ryokaku Tetsudoo Ltd. Co., *Tetsudoo Renaissance.*
Fig.38. Signs neutralize significance and eliminate hierarchies.
Fig.39. Instant access: World Wide Web Worm, a web-searching program.
Fig.40. Searching process: keywords $\Longrightarrow$ (indices) $\Longrightarrow$ target.
Fig.41. Instant access: telemaps. Source: *Wired.* April/June 1994.
Fig.42. A never-complete map for the Internet: Internet Resources Metamap. Sources: available through e-mail: mosaic@ncsa.uiuc.edu.
Fig.43. Maps in Tokyo: (up) railway/subway map; (lower left) local map: from train station to home; (lower right) railway time map. Sources: Housing Information Department and Community & Communication (Design) Co. Ltd. Tokyo.
Fig.44. Internet, Bitnet and E-mail connectivity global chart. November 1994. Source: L. Landweber and The Internet Society. 1994. ftp.cs.wisc.edu.
Fig.45. Internet Evolution. Source: A.M.Rutkowski and The Internet Society. 1994.
Fig.46. Growth of the Internet. Source: ftp://nis.nsf.net/statistics/nsfnet.
Fig.47. Internet Society – External Relations. Source: available through e-mail: isoc@isoc.org.
Fig.48. Edo's feudal hierarchy along the spiral moat. Source: Jinnai, Hidenobu. "Ethnic Tokyo." *Process Architecture* 72. Process Architecture, Tokyo, 01/1987. pp.35.
Fig.49. Details over totality: tea-house. Ueno.
Fig.50. Details over totality: Spiral. Maki and Associates. 1985. Source: Wurman, Richard Saul. *Tokyo Access.* ACCESSPRESS Ltd., 1984. pp.99
Fig.51. Each node is a kaleidoscope of the city.

Fig.52. Result of the additive process: being a cell of the city, a node contains all its information.
Fig.53. Yamanote Loop Line with Chuo Line running through, and the entrenched palace. Source: Wurman, Richard Saul. *Tokyo Access.* ACCESSPRESS Ltd., 1984. pp.220,221.
Fig.54. Trains on JR Lines and subways; JR East Japan Company campaign poster for its safety, punctuality and comfort. Source: Wurman, Richard Saul. *Tokyo Access.* ACCESSPRESS Ltd., 1984; Higashi Nihon Ryokaku Tetsudoo Ltd. Co., *Tetsudoo Renaissance.*
Fig.55. Hyperlinks: electronic bulletin board, TV building, TV monitor in taxi/train.
Fig.56. A Pachinko parlor.
Fig.57. Artificial nature: Ski Dome (upper left), Tokyo Martial Art Hall (lower left), Shonandai Cultural Center (rest).
Fig.58. Matrix on the land: land patterns rarely change. Surugadai, Ochanomizu. 1986. Source: Yasuo, Masai. *Edo/Tokyo Trough Maps: Atlas Tokyo.* Heibonsha Ltd., Publishers. Tokyo, 1986.
Fig.59. Surugadai, Ochanomizu. 1850. Source: Yasuo, Masai. *Edo/Tokyo Trough Maps: Atlas Tokyo.* Heibonsha Ltd., Publishers. Tokyo, 1986.
Fig.60. The city built expressway on top of canals. Only option?
Fig.61. Lobotomy: Tokyu Bunkamura and Tokyu Main Store.
Fig.62. Invisible hands of Tokyu: 109 Buildings.
Fig.63. Matrix in the sky: Diagonal Line Restriction. Source: Nakamura, Kenichi. "Townscape of Tokyo: The Influence of the Building Code and of Culture." *Arquitectura* 294, December 1992. pp.84,85.
Fig.64. Control and Chaos: Ameyoko.
Fig.65. Control and Chaos: Ameyoko.
Fig.66. New aesthetic for Tokyo? Koizumi Lighting Theater. Eisenman and Kitayama. 1990.
Fig.67. Photomontage: Ocean Dome.
Fig.68. Electronic books make train-riding endurable. Source: *Wired.* June 1994. pp. 38.
Fig.69. Low City, High City: distribution of white and blue collar workers. 1975. Source: Department of Urban Planning, the University of Tokyo. *Atlas Tokyo.* Tokyo, 1986.

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