

I belong to the fourth generation of modern architects in Japan. The first, ushered in by the Meiji Restoration of 1867, responded to efforts to raise the curtain shrouding Japan by welcoming the architectural styles of the West with open arms. Reacting to the ensuing proliferation of Baroque banks and Renaissance offices, the second generation infused its buildings with traditional, highly nationalistic Japanese styles. These were then exported to the Asia that Japan was busily colonizing, a chapter abruptly terminated by her defeat in 1945. The post-war period was characterized by the introduction of the work of Le Corbusier and CIAM by such third generation luminaries as Kunio Maekawa and Kenzo Tange. But it was up to my generation, those of us who began building in the late fifties, to synthesize the best of both worlds—the quintessence of our Japanese cultural history and the more pragmatic functionally rational modern architecture.

The Japanese Tradition of Wood Architecture

The Metabolism that we first proposed 20 years ago at the World Design Conference in Tokyo is neither a form nor a style. Rather it is an attempt to create a character for Japanese design responding to our particular social and cultural history, a history rooted in the fact that we build in wood and have always done so. In contrast with the willful monumentality of the stone-based architecture of the West, a wood architecture is temporary, since wood rots and is subject to the whims of the elements. Since we are faced with the inevitable mortality of all our constructions, the physical form becomes only the intermediary conveying the poetic essence of nature. Every other decade, for instance, in a ritual that has been repeated for centuries, the ancient wood Shinto shrines have been replaced with exact replicas. Man-made things are looked upon as an extension of nature; they are frequently left unfinished to afford the user the pleasure of completing the beauty created by the artist. This Japanese philosophy of continuity among architecture, society, and nature has inspired me to develop a concept of the intermediary space, the space between (in Japanese, *engawa* or *en-space*), which is an empty space viewed positively. Translated into built form, it becomes a semipublic space, circumventing the schizophrenic duality, or inside/outside of the West. Traditionally, these spaces are found in Japanese streets, which merge nature outside with private living accommodation within.

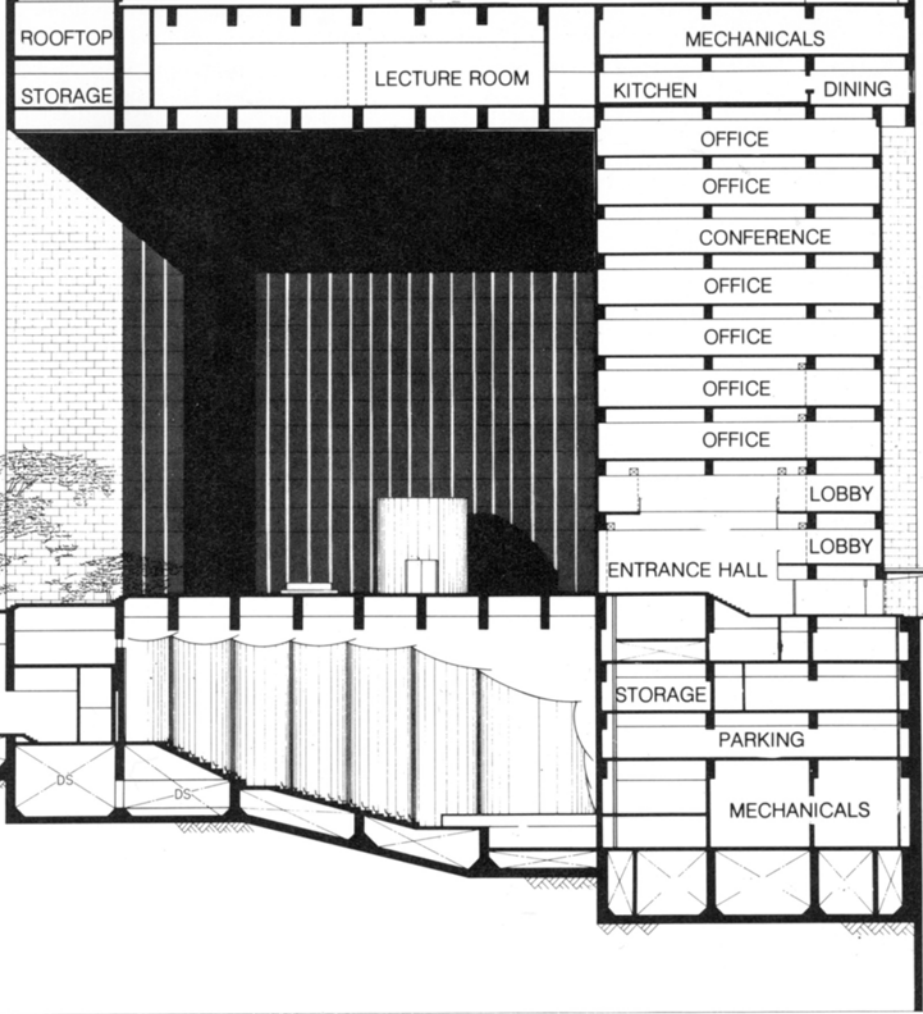
An example of this continuity is the covered outdoor plaza of the Fukuoka Bank—a building containing banking headquarters, ancillary offices, a banking hall, and an auditorium—which serves as the mediator interweaving what is internal with what is external in a way that hopefully enriches the quality of human experience. To preserve the continuity of the order of the city, the cornice lines of the surrounding buildings were maintained. The continuity of the environment was also reflected in the ambiguity of what is public and what is private. Street furniture is carried inside. So are the reflecting pools and greenery symbolic of nature. The interior corridors and waiting lounges front onto the plaza below, letting the whole building act as an external passage through the city. The exterior membrane itself was conceived as a tenuous boundary, the thinnest possible barrier to light (a characteristic admittedly in conflict with the issue of privacy). Uniformly clad in a shadowy-gray Angola granite skin, the monolithic walls evoke an impression of in-betweenness and scalelessness. For the windows, I turned to a heat-absorbing, semitransparent glass, which, unfortunately, effectively spoils the sense of vague boundary and interpenetration I struggled to achieve.

The Buddhist Tradition

This conception of continuity springs from the undercurrent of Buddhist thought pervading Japanese culture. Architecture is hardly immune from its profound spiritual and philosophical grip; nor, for that matter, should it be. Buddhism influences the way we perceive and compose space and the kinds of relationships we establish between nature and architecture and between technology and humanity. Nature is viewed as one continuous living process, with death but a part of it; it is considered noble to fulfill one's life and pass away beautifully. This means that human beings should not become too attached to any one particular place or idea, but should be aware of being in eternal time, a part of a greater life transcending time and space. Perhaps this qualifies us as the true inventors of the ecology movement. It also leads to the principle that architecture should change with time, with its attendant ideas about replaceability and interchangeability.

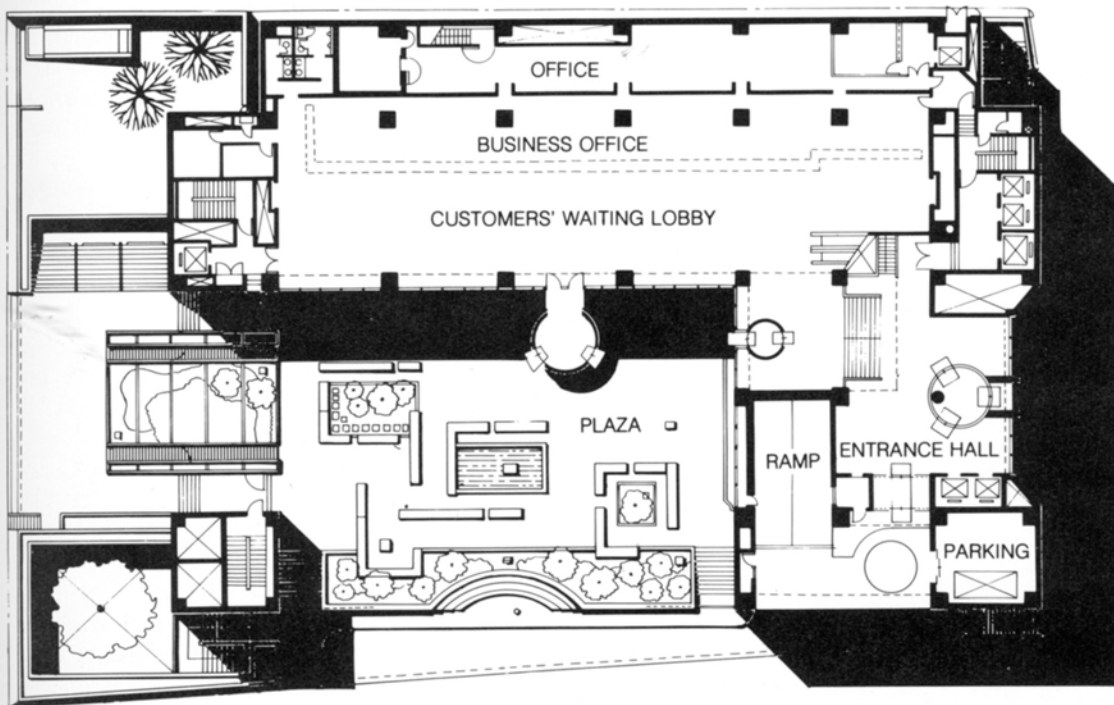
The issue of replacement was tantamount in the design for the head office of the Japanese Red Cross Society in Tokyo in 1977 as I was faced with the distasteful prospect of replacing an architectural masterpiece ravaged beyond repair. A

ROOFTOP



Top: The urban roof sheltering the outdoor plaza of the Fukuoka Bank is intended to create an intermediary zone similar in character to the semipublic covered spaces located in private areas of traditional Japanese buildings.

Bottom: The building wraps around the en-space in plan as well as in section.

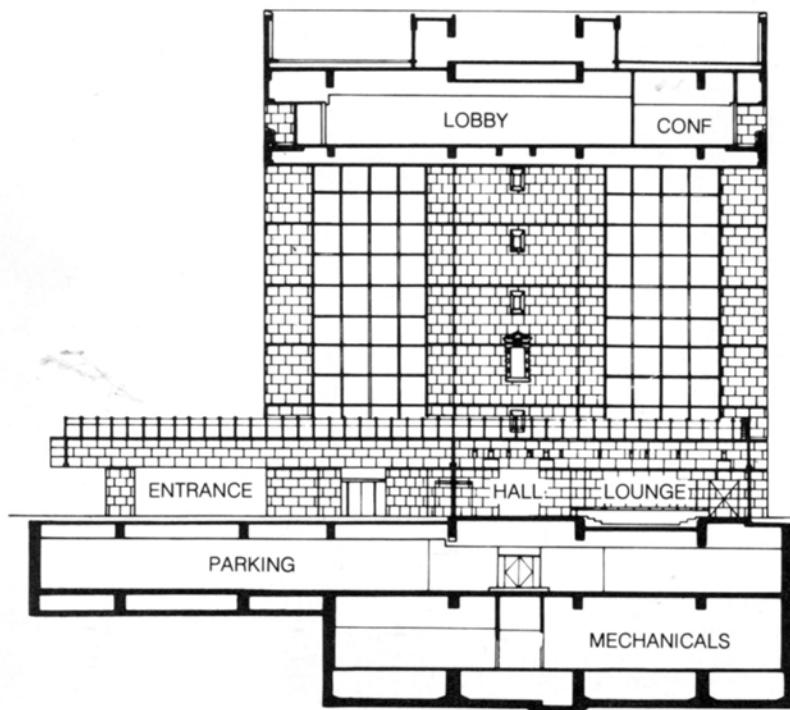


Right: A central crevice space in the Japanese Red Cross Building is an attempt to reduce the sense of oppression produced by vast wall surfaces.

Below: Part of the old structure has been incorporated into the new building; the granite window frames in the wall facing the crevice are reconstructions of the originals, which were too badly damaged to preserve.

perfect restoration and conservation of the whole building, which, of course, was my instinctive first wish in deference to the *chef d'oeuvre*, proved to be impossible due to economic considerations. As it was, we were forced to sell half the site to finance the construction of the new building. That meant that the only way Yorinaka Tsumaki's 1912 German-style building could be preserved at all would be to pick it up and move it to a new site, but nobody wanted to pay for that. The only course open to me was to capture the essence of the old headquarters and incorporate it into the new building, if indeed that is ever possible. I was also able to produce a record of the original construction and to include some of the original pieces such as windows, decor, and fixtures (or facsimilies) in the new design.

Central to this scheme is the Japanese concept of en-space bridging the gap between the two blocks. Here, I introduced the crevice, a device traditionally used in Japanese architecture to imply absence or surprise, similar perhaps to the role of the tower in medieval cities as the occasional element of surprise within a uniform urban fabric. It has the added attraction here of a purely functional rationale, as it splits the Red Cross building from the rental office space. The crack is at once the link between the twin towers, and the intermediary zone modulates the transition from outside to inside and from past to present. The jet-burner-finished Brazilian red granite facing the exterior wall is brought inside; the structural beams supporting the carport puncture the wall









Opposite page: The floor in the center of the Red Cross Building foyer was to have been a pond, but objections to the use of running water in this part of the building led us to treat it as a variation of the stone and sand gardens used in Zen temples as symbolic evocations of water.

Left: The Ishikawa Cultural Center attempts to bridge the temporal gap between modern technology and its older neighbors: Kanazawa castle, a traditional Japanese garden, and a religious shrine.

membrane; and the lobby is flooded with light, penetrating the vaulted skylight and reflecting the mood outside in the symbolic dry pond.

The pursuit of details in architectural design is a way of discovering a point of juncture, or coexistence between the structure and the materials, between technology and sensual perception. I have always been interested in the drama of the collision of two materials and have only recently begun to experiment with it. Not only do the granite-clad columns of the Red Cross facade slice directly through the mirror-glass surface (or at least appear to), but I also insert a third material or a breathing space between two clashing ones. Strips of marble restrain the carpet from hitting the wall surfaces in the special guest rooms. Traditional materials are combined with modern ones by using such techniques as inlay, bordering, and overlapping, a classic example of cultural coexistence created by the conjunction of alien elements.

I took the Buddhist notion of ambiguity and in-betweenness a stage further in my design for the Ishikawa Cultural Center in 1977. Housing an auditorium, banquet and conference facilities, and a small hotel, the building is sited adjacent to Kanazawa castle, the ancient cultural center of this part of Japan, on an abandoned baseball

diamond. Again, the issue of coexistence between history and modern technology predominated the design process. The center has a low profile in deference to the scale of the surrounding area, which meant that the bulky mass of the auditorium was placed in the center of the site. Conforming to the shape of the site, the building was sliced into two fragments, splitting the auditorium from the hotel, which are restitched by the thread of lobby/entry/restaurant, leaving a cleavage of unenclosed space. To blend the building into the site, I clothed the form with traditional Rikyu gray Japanese tiles; all visible surfaces within (except the floors) are faced in aluminum. There is also a fence and a moat circumscribing the building, a redefinition of some of the older aspects of the city in modern terms.

Japanese Tradition of Mobility

The concept of time is embodied in the Japanese tradition of mobility. Our modern nomadic, fluid society has its roots in the historical shift of the capital every few years, the custom of embarking on religious pilgrimages, and the seasonal migration of agricultural workers to jobs in the cities. Movement occurs at several scales. Daily, people



commute to and from work. Seasonally, they travel between permanent and temporary residences. Annually, at least 10 percent of the Japanese move their homes. There is also a macroscale drift to major urban centers, which ought to taper off in about 25 years as people begin moving back to regional cities. As it is, over half the population lives in cities linked by a highly sophisticated transportation/communication network. All this has led to the concept of a time community, a community of individuals based on the different activities any person might perform over time, as opposed to the usual determinant of place. Time communities are populated by *homo movens*, the people of the future who will not care overly much about owning possessions and stately homes, but will instead prefer to acquire the new status symbols of free movement and extensive credit.

This suggests an architecture of movement space, which also has traditional precursors in the Japanese street. Buildings typically are open to the street, which is simultaneously a traffic artery and a living room. Historically, this sort of arrangement has been convenient for festivals, which, in the East, were mostly processions in contrast with the mass assemblies of the West. As the mediator between public and private spaces,

the street itself could be transformed into an architecture within which day-to-day living proceeds.

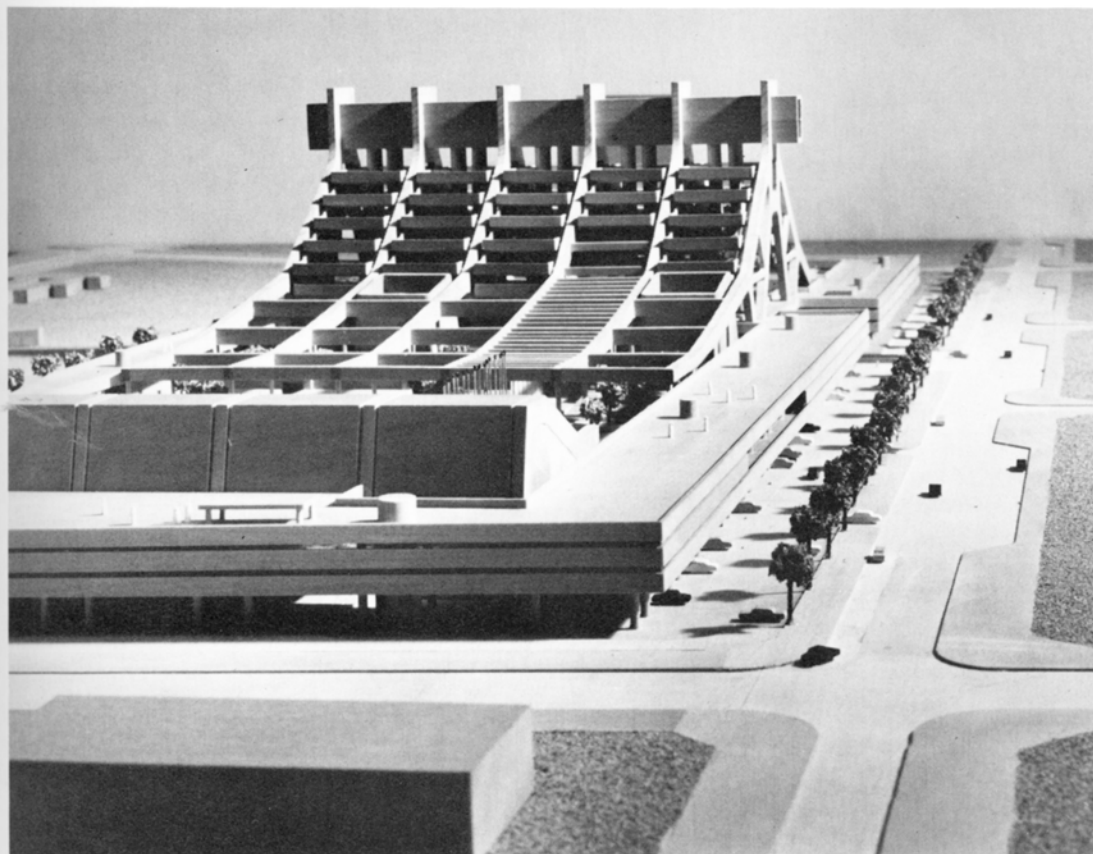
The interior street is the nucleus of my scheme for the Tanzania National Headquarters Building designed for Dodoma, Tanzania, in 1972. Strung along it are the national assembly, party headquarters, and cultural center. The pedestrian spine encourages social interaction; it provides screening from the brutal African sun while permitting cross-ventilation, an organic connection between interior and exterior.

The Importance of Technology to Japan

In addition to its identification with traditional Japanese culture and religion, metabolism is inextricably bound to technology. For technology is everything to the Japanese. It is our only resource, as we have to import over 30 percent of our food and over 95 percent of our energy. The mountainous terrain accounts for four-fifths of the land, leaving precious little for human habitation. Our land is easily the most costly in the world, with plots in Tokyo averaging \$10 million an acre. We

Opposite page: The exterior of the Ishikawa Cultural Center is blended into the site by cladding it with traditional Japanese tiles in a shadowy Rikyu gray tone.

Below: The roof grid of the Tanzania National Headquarters Building project is an A-frame structure which supports the offices and the assembly hall. At the vertex of the A is a large mechanical duct serving the space below and defining the interior pedestrian street.





are desperately short of housing to shelter our large, ever-increasing populace, forcing us to turn to industrialized building as a possible solution.

The Japanese very willingly imported Western technology. What they neglected to do, however, was adopt the philosophy and individualism that accompanied it. What we have achieved has been a bizarre mix of East and West. The planned obsolescence on which industry is based is a very quick, efficient, and profitable concept, unless you take into account the social and aesthetic significance of spaces and how that affects the relationship between humanity and technology. We tried to salvage what we could of this obsolescence, which was blighting the landscape with abandoned hulks of economically inefficient, but otherwise quite serviceable warehouses and factories. Taking our clues from biology, with its continual renewal and destruction of organic tissue, we conceived of a whole structure as a combination of many units with varying lifespans. It might be possible to distinguish between the fixed parts and those which would change. These could be further subdivided according to their degree of durability—how often they would need to be discarded. Then we would only have to replace the outdated parts and in this way contribute to the conservation of resources by using buildings longer, a concept that owes much to the Buddhist philosophy of cosmic change and eternal growth. We termed this “Metabolic Cycle Theory.”

According to the theory, the fixed parts in buildings would be the primary structural systems. Less permanent than that would be the primary mechanical systems—the supply and return ducts, main water lines, electrical lines, and so on. Even less permanent is the main circulation system—the stairs and elevators. And the capsule is the least permanent part. It was born out of the *jiga*, the oriental *individuum* which consists of a relationship in which the individual and society, while being contradictory, include each other. Likewise the capsule is independent of the building to which it is attached. It could be defined as a device like an airplane, spaceship, or submarine which allows a person to perform complicated functions beyond his physical capabilities as a living creature so that it becomes a “home away from home.” In other words, tools such as automobiles, trains, and aircraft function as dwellings and are capsulized. Or the converse could apply where the dwelling becomes a capsulized tool, as a mobile home does. The capsule, then, is the proper dwelling of *homo movens*. It is the true emancipation of the building from the land.

Systems are necessary for supporting human activities, but they are scarcely reasons for living.

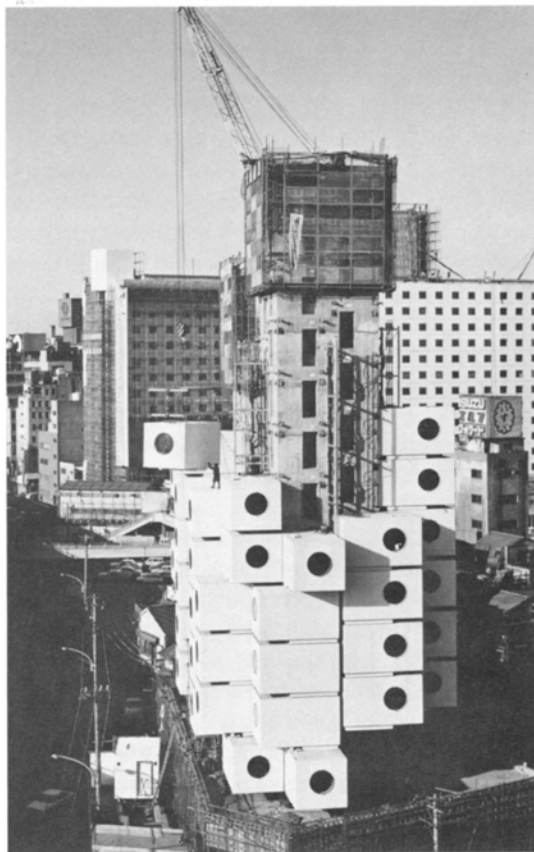
They merely establish the framework within which the inhabitants of capsules can do whatever they want. In this diversified society of the future, one can paint a picture of an entirely new conception of the family as a household based on the encounter of individuals abolishing the housing unit centered on the nuclear family. The housing capsule I designed for the Theme Pavilion of Expo '70 was intended to show what such a house might look like.

The capsule is the ultimate form of prefabricated building which will make qualitative conversion of the industrial production of buildings possible. Mass produced on a selective system which goes beyond the deadly dull industrialized buildings that are the current state-of-the-art, the capsule permits an interchangeability of parts. These parts, the functional units, can easily be replaced; proliferation is possible by simply adding additional components.

Our aim is to produce space which will sensitively react to the changes in people's lifestyles. In the future, building will be defined as the state of spatial-temporal docking of more than one capsule.

In a more pragmatic vein, the actual physical design and construction of capsules suggested a systems approach due to the high level of technological sophistication required of the end product. This implied that the building is dissolved into parts and capsulized as functional units; each particular functional unit was analyzed and split into its component elements, which were then checked for usefulness and acquirability. Working backwards, the parts were recombined to see if they could be assembled in a reasonable fashion, if the scheduling sequence was feasible, if it was possible to transport and attach them into their environmental context, and, foremost, if the package would be aesthetically pleasing and no more expensive than ordinary construction.

In planning capsules, as they are mixed systems, much effort went into varying the plan types and establishing the standard and optional equipment to be included. It turned out to be quite useful to define a dynamic module. In much the same way as an automobile is made of a myriad of pipes, screws, wiring, and other gadgetry, which nobody expects to conform to a standard module, a dynamic module enables a variety of possible modules and proportioning systems to be combined. The only place where everything has to fit together is at the point of joining. This makes it possible to replace parts and to mass produce freely. Or there could be a special connector designed to make the parts mesh by relating to both elements to be connected—philosophically simi-



Opposite page: Each capsule plugged into the Nakagin Capsule Tower is a completely equipped studio apartment.

Left: Erection of the capsules was fairly simple as they needed only to be hoisted into place, bolted to the shafts with four high-tension bolts, and connected to the servicing tubes.

lar to the mediating space. To date, there are two main structural types of capsules: the link such as the Capsule House in the Theme Pavilion at Expo '70 where the functional and spatial units are clipped onto their connector; and the cubic capsule which is a package such as the Nakagin Capsule Tower completed in Tokyo in 1972.

Designed as studio apartments or hotel rooms for itinerant business executives, the Tower is the first example of a true time community in that nearly a third of the condominiums were purchased by families as an extension to their houses as playrooms or studios. Here, I borrowed traditional Tatami proportions for the dimensions of the capsules (4 by 2.5 meters, or 13 by 8 feet) and juxtaposed them with a high-technology capsule structure based on a modified shipping container, an all-welded, lightweight steel box covered with slickly painted enamel panels. But the capsules were actually built conventionally due to their tight dimensions into which many parts and wet elements had to be put. Fitting the capsules together required extremely accurate measurements with frequent inspections of the work. Erection difficulties were exacerbated by the fact that the capsules were fabricated 450 kilometers (280 miles) away from Tokyo. Since there was no storage space on the site for them, they were

Right: The glazed elevator tower and the toilets are treated as capsules in the Sony Tower.

Opposite page, top: Since Sony's image is that of a communications developer, the building is conceived as an "information tree" embodying all the information of its urban surroundings.

Key:

1. Elevator
2. Service elevator
3. Escalator
4. Staircase
5. Toilet capsule
6. Air duct

Opposite page, bottom: Axonometric of toilet capsule.

stored a day's drive away and trucked into Tokyo at the crack of dawn on the day they were to be attached to the tower shafts.

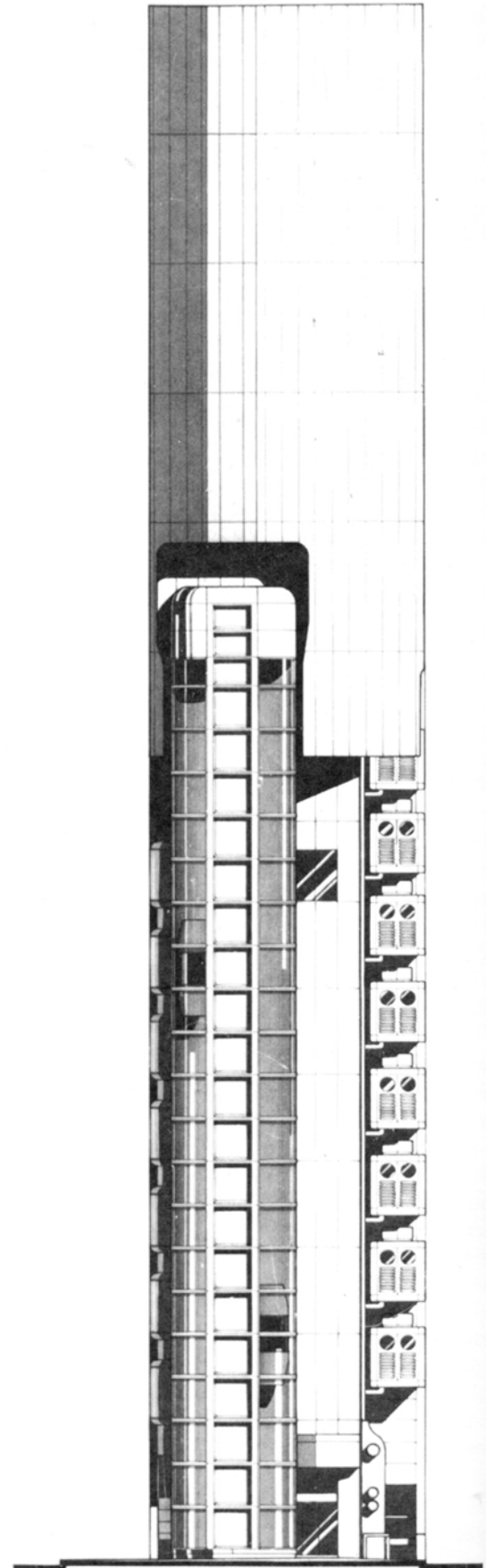
The building, then, is comprised of three elements: capsules, equipment, and tower shafts. Built on an artificial land base, the towers are rigid-frame structures containing circulation elements. The rack system for plumbing permits each unit to service three floors with flexible tubes making the connection between the pipes and the capsules; since solvent toilets were used, there are no vent pipes. The capsules are attached at four points to the towers with high-tension bolts so that they are in fact clipped on and plugged in.

Later, capsules were used for service and circulation elements in the Sony Tower erected in Osaka in 1975. Primarily a showcase for Sony products, this building was conceived as an information tree in harmony with Sony's image as a communications developer. The glazed escalators, elevators, and display showroom link the interior and exterior space as mediating elements.

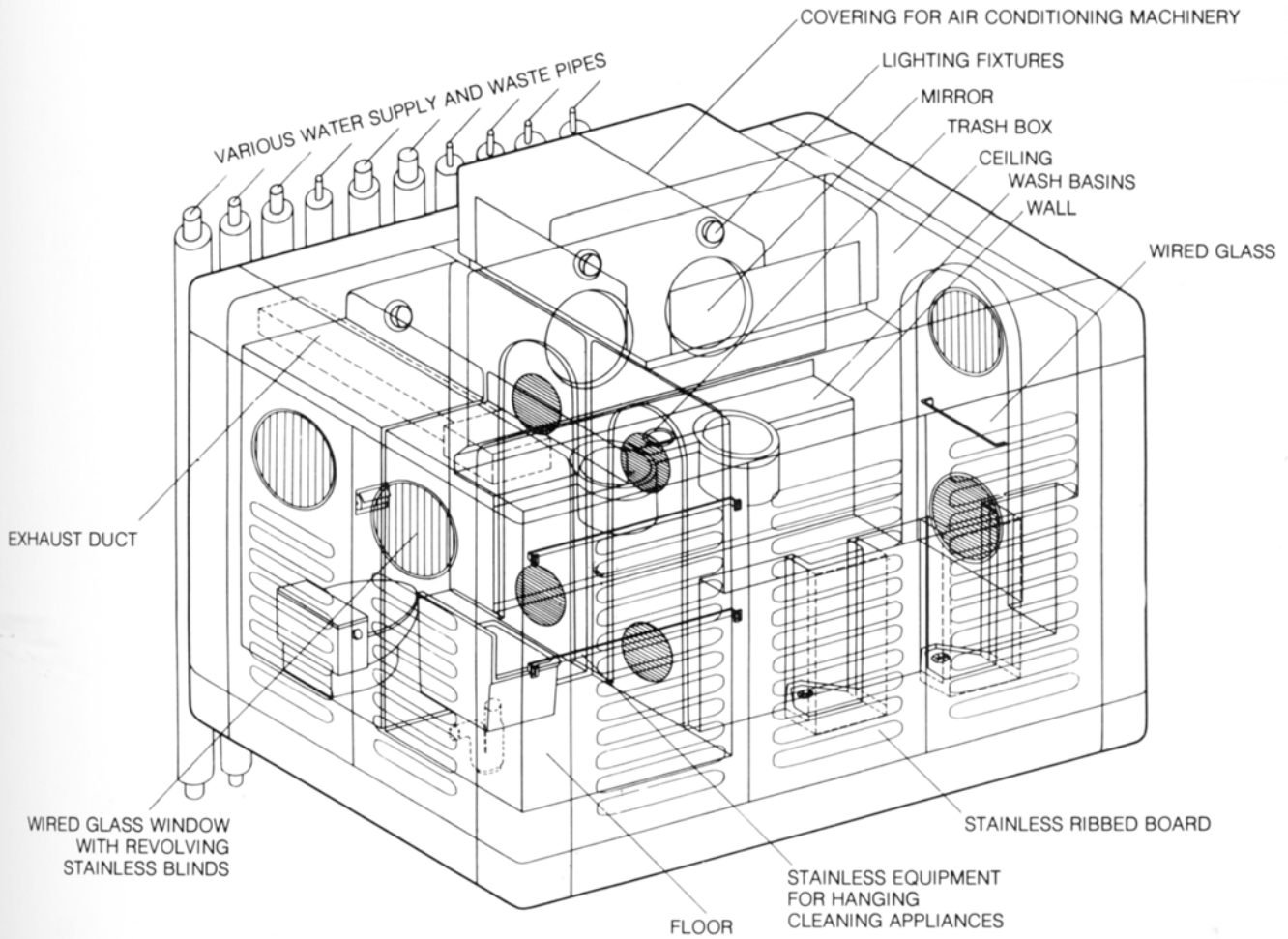
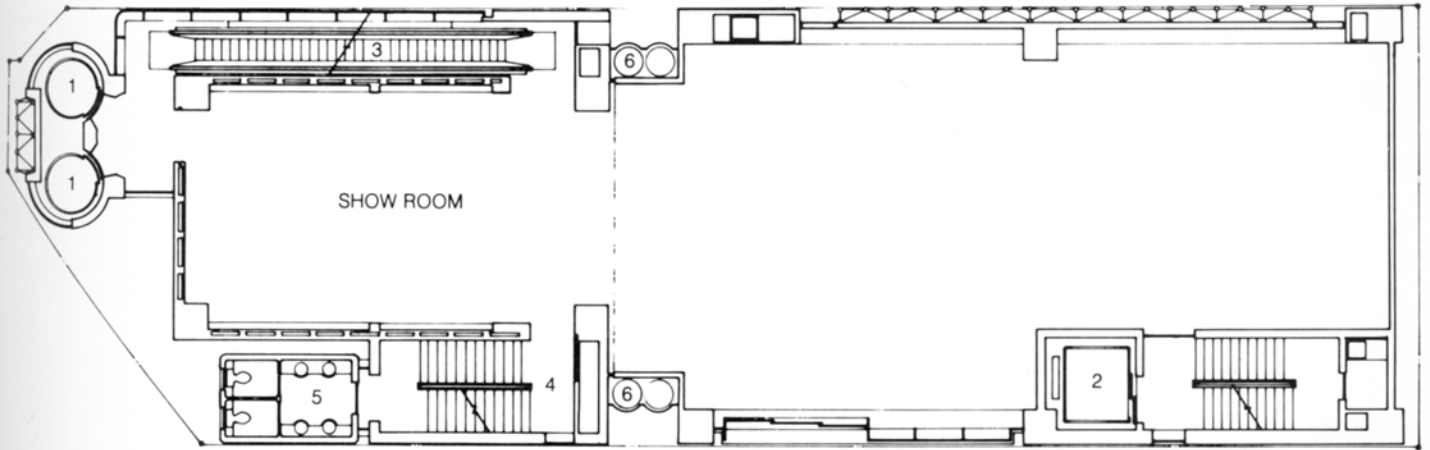
We have been considering the capsule entirely physically. Of great importance is the philosophical background to the concept. Capsules have been conceived as weapons with which man asserts his individuality and freedom in today's chaotic world. Words like "capsule" and "homo movens" may be nothing more than fragments of ideas. But they are like bullets as they move the age far more powerfully and impellingly than any magnificent system of thought.

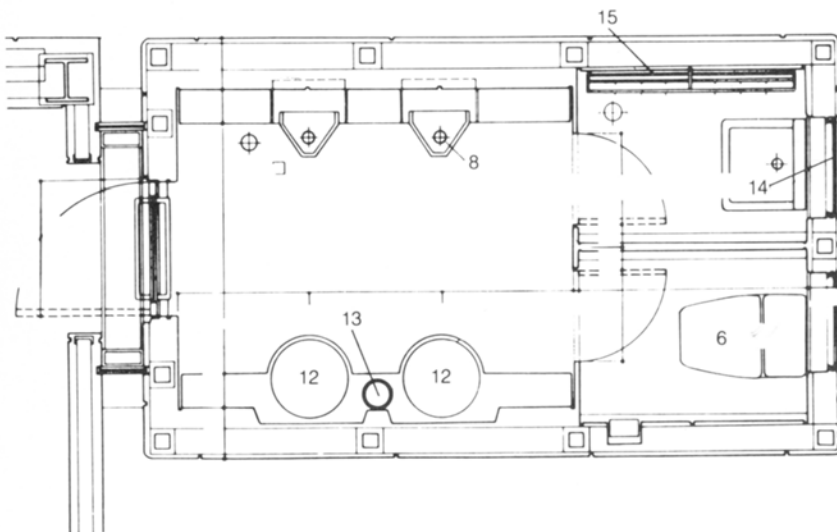
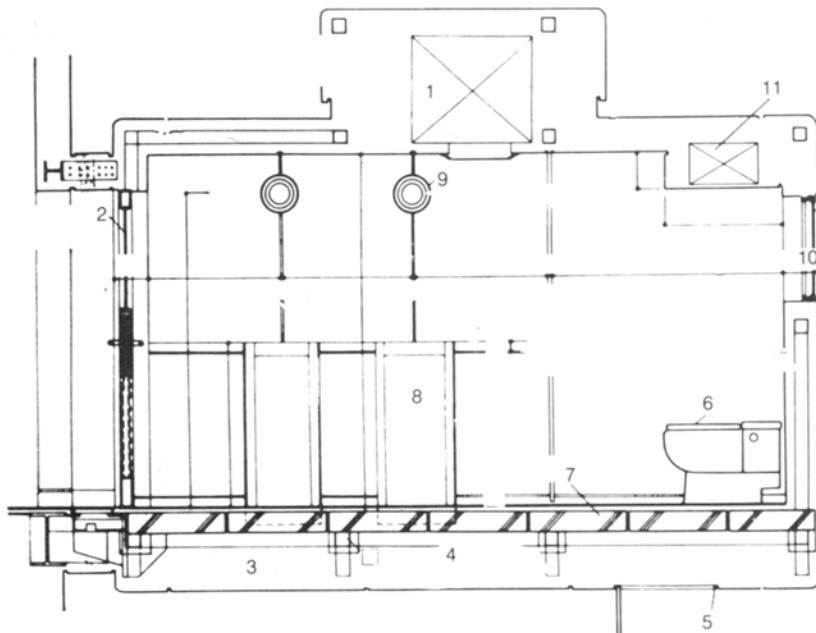
The Philosophy of Metabolism

In the past, design began in the realm of ideas, with the architect asking himself a question, for example: "What is a university?" It was considered the mission of an architect to establish an idea first and give a faithful expression to the total image. But no matter what the program, a panorama like the one obtained from the apex of a pyramid is completely meaningless if multipurpose and complex functions exist simultaneously, but without clarity. Architecture is nothing more or less than an aggregate of extremely capsulized and diverse functions; it may be defined as a group which comes into being when a number of capsules encounter each other. Accordingly, an architectural structure can be dissolved into many spaces, each with different functions. The spaces thus taken apart are capsulized, and the state where countless such capsules are conglomerated and docked in time and space can be defined as an architectural structure.



EXTENSION →





Above: Section and plan of Sony toilet capsule.

1. Air conditioning machinery/heating pumps
2. Connector to main structure
3. Plenum for pipes
4. Asbestos
5. Access panel
6. Toilet
7. Flooring
8. Urinal
9. Lighting
10. Revolving window
11. Exhaust fan
12. Wash basin
13. Trash box
14. Revolving stainless steel blind
15. Stainless steel equipment for handling cleaning appliances

Opposite page: Built for Expo '70 in Osaka, the Takara Beutillion synthesizes my philosophy of metabolism in that it was quickly assembled and dissembled from prefabricated components, high-technology capsules were inserted into the frame, displays were aligned along the circulation route, while the building is frayed at the edges to mediate between indoors and out.

Metabolism is best exemplified in the Takara Beutillion built for Expo '70 in Osaka. Constructed in less than a week by bolting together some 200 prefabricated steel framing units into a three-dimensional grid, the building was just as rapidly dismantled "like the falling petals of a cherry blossom tree" when its useful life as an exhibition pavilion was complete. Display panels and capsules simply slip into the interstices of the frame. There is also, of course, the possibility of adding more elements, a fact only hampered by the structural limitations inherent in an unbraced frame which are particularly consequential in earthquake-prone Japan.

The spiky frame intentionally reaches its arms out to vaguely define the outside boundary of the building. In the same way, the mediating space encompasses the plaza area with its periscopes jutting out of the ground, letting the people on the plaza glimpse the auditorium below while bringing it natural light. And people wait on the large staircase elements, a partially enclosed outside space, to penetrate within. When they finally get inside, they move along a circulation path lined with displays: an architecture of the street.

This is a high-technology building composed completely of prefabricated elements. It is a kind of architecture of the part where each element (staircase, structure, or mechanicals) is established on its own module which is best suited for its function and then interwoven. Capsules were also used for displays and for the foyer.

Metabolism, then, is a philosophy which values the preservation of relationships among architecture, society, and nature, while constantly changing with the passage of time. The basic kinetic form in which space develops is metabolism and its process is expressed as an increasing entropy. Metabolism does not presuppose any system of thought previously established and built up. It rejects all primary conceptual definition. Its effectiveness and the attention given it depend upon its relevance to the problems facing contemporary architecture and planning.

