architecture and electronics
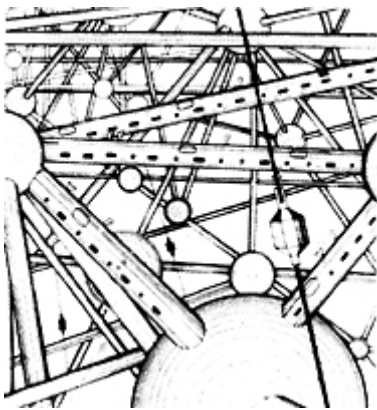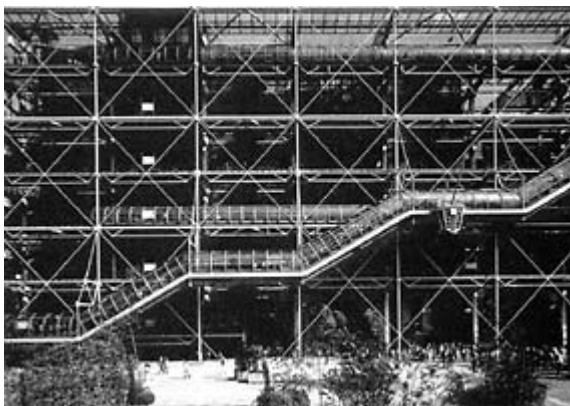## KATHARINA GSÖLLPOINTNER

Jean Nouvel: Tour Sans Fins. Projekt für Paris, La Défense

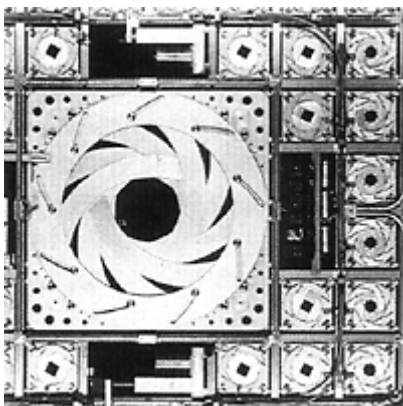Archigram: Under Water City, 1964

Richard Rogers & Renzo Piano: Centre Pompidou, 1971-77

Buckminster Fuller und Norman Forster: Geodätische Kuppel, 1983

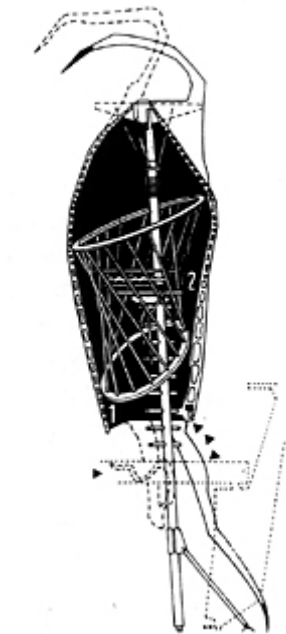Jean Nouvel: Institute du Monde Arabe, Paris 1981-87

Geometrische Elemente aus der Südfassade des Institute du Monde Arabe

Jan Kaplicky & Amanda Levete (Future Systems): Green Building
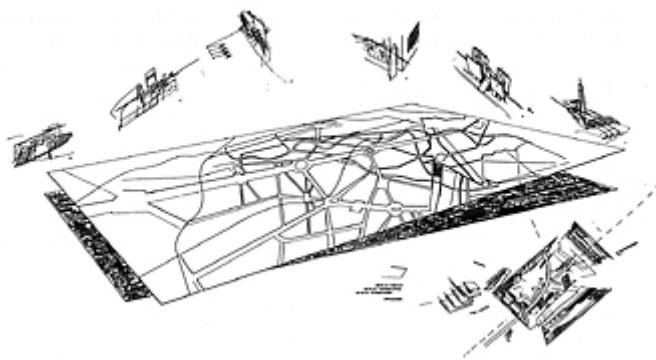
Toyo Ito: Turm der Winde, Yokohama

Peter L. Wilson: Electronic Shadows, Yokohama

Frank Gehry: Walt Disney Concert Hall, Los Angeles, 1992 (Modell)

Coop Himmelblau: Open House, Malibu, 1983-88 (Modell)

Dagmar Richter: Projekt für Berlin. Denkmal oder Denkmodell, 1988

Utopias

For certain people, a city should exist solely in the rudimentary form of a Disneyland, which utilizes the material structures available as a post-modern backdrop for its theme parks and shopping malls.[1] Whether Vienna or Williamsburg[2], such cities find their identity in a past which is known only as a background in films. In fact, the cities on this planet are at present defined by the networks of roads (the "Autobahn" in Germany and Austria, the freeway and highway in America) and by the electronic communication that makes the global village a true village. Transportation, architecture and electronic environments therefore make up the actual identities of cities and are the areas in which communication takes place. The type of communication that is to be understood here is the coding and decoding of texts in visual, acoustic, written or linguistic form, manifested spatially in three-dimensions in architecture and urban planning (in as much as projects do not remain theoretical manifestos on paper or in the computer) or non-materially and meta-spatial as a part of the media reality.

The way in which architecture behaves with regard to the electronic, virtual world can be determined by examining the manifold realizations of virtual reality (VR). It will be possible to find the specific architecture and environment through the depiction of utopian cities in theme park rides, the representation of metropolitan structures in films and on television, and in the utilization of VR applications in architecture.

In this case, the question of the electronic culture's reflection in the contemporary architecture of the so-called real reality or the "non-virtual reality" is much more interesting. Architecture as the representative of social and political structures can mean, on the one hand, depicting the affirmation of these kinds of relationships (e.g. representatives of postmodern architecture, such as Michael Graves as Disney World's signature architect with the Swan and Dolphin hotels. Or the unspeakable architectural programs of the Prince of Wales, which exert a very real influence on the possibilities of British architects). These kinds of architecture accept the traditional language without interruption and without question, and often cement (in the literal

sense of the word) historical squabbling with a reactionary attitude. Or, architecture can unmask and deconstruct such products and their prerequisites.

The fragmentation, questioning, dissolution and the production of new relationships of a constructed and coincidental environment can, however, appear only simultaneously with the knowledge of urban and trans-global (electronic) communication. A critical reflection of social reality can take place only in connection with the idea of an experimental and visionary alternative in the field of architecture and urban planning which not only foresees changes in our environment, but also implies them in artistic designs.

Virtual reality in film, for instance, has contributed more to this development since Fritz Lang's "Metropolis" at the latest than is realized by the present creators of VR. "Some of the most imaginative architecture of the last several decades, which is of course overwhelmingly technological in nature, has been constructed for film … These movies make us believe that technology will liberate us completely from earth, gravity, scale and any traditional patterns of social bonding."[3] Ridley Scott's "Blade Runner", which has since become a legend, or Wim Wender's "Far Away So Close" (which depicts the "Tour Sans Fins" by Jean Nouvel in Paris, which was never built), are only two examples which demonstrate the various applications of architecture as a utopian element in film. Both works are deeply involved with the themes of the dissolution of time, space and therefore identity within an environment controlled by media.

On the basis of the utopian architectural designs of the early 60's, many different focuses of architecture and architectural theory which deal with the design of real and virtual environments in consideration of the electronic and media environments can be found. Archigram, a group of English architects, was founded in London in 1964 by Peter Cook, Ron Herron, Warren Chalk, Dennis Crompton and David Greene. This group worked with the phenomena of mass communication in consideration of its pop culture background. Their architectural designs were rarely realized, being primarily utopian manifestos dealing with the theme of advanced technologies, mobility and, above all, the city as a living space. Peter Cook's "Plug-in City", or Ron Herron's "Walking City", are possibly the most famous drafts of that time showing the potential effects — both positive and negative — effects of technological achievements on our environment. Almost at the same time as Archigram, other groups of architects occupied with urban and environmental utopias were born. Among them, especially the Austrian associations HausRucker-Co (Laurids Ortner, Klaus Pinter, Günter Zamp Kelp), Coop Himmelblau (Wolf D. Prix and Helmut Swizcinsky) and Missing Link (Angela Hareiter, Otto Kapfinger, Adolf Krischanitz) should be mentioned.

As early as 1976, Cedric Price, for example, developed the project "Generator" in which the building can be changed completely in accordance with the wishes of the respective user. Lacking a specific intended use, it could serve any purpose. The building is controlled by a central computer, which advises the user "like an eternal architect". The walls and height of the building can be changed permanently. "The computer program is the building's actual architecture."[4] With his designs, e.g. the one for an underground Berlin or a Zagreb Free Zone, Lebbeus Woods follows the lead of the earlier utopian designs, thereby discussing the "networking of autonomous individuals, free of monumentalized institutions of culture".[5]

Intelligent Architecture

In the 70's, a jump in the development of hightechnology construction, such as that advocated by Richard Rogers and Renzo Piano (whose design won the contest for the Centre Pompidou

in 1972), manifested itself. This development was also one of the main features of the visions of groups such as Archigram, the orientation of which was the technology and construction. Rogers and Piano constructed a building, which not only displayed its technical functions to the outside; its construction consisted solely of these functions: no walls, no outer skin dividing the interior from the exterior, solely information on the function. If the beginnings of high technology can still be recognized in the Centre Pompidou's construction and language of forms, which is mechanically and technologically oriented, Norman Foster, for example, utilized more meticulous aesthetic methods in his Hong Kong Bank in 1985. And Thom Mayne and Michael Rotondi of Morphosis describe their way of dealing with architecture and technology as "representational systems that describe the act of construction and the act of representation itself. This self-reflective form of technomorphism seeks to dissolve the making of buildings into the act of architecture as it articulates technology."[6]

Today, intelligent buildings can be imagined in various categories. In the one, one can observe those efforts which work with the so-called "smart materials and structures", i.e. with materials that react to changes in the environment in the molecular sphere and even make superordinate control units (such as computer-controlled heating systems) superfluous. This affects the utilization of supporting structures in the face of stresses which change quickly (traffic, wind, etc.), facade materials, glass technologies and much more. On the other hand, the cooperation of architects with engineers who make statics calculations, environmental engineers and CAD experts has become an essential factor in modern construction. With his geodesic dome or the aerodynamic investigations of his buildings, Buckminster Fuller had been a pioneer in this respect as early as the 30's. Together with Norman Foster, he developed the "Autonomous Dwelling" in 1983 consisting of two independently rotating geodesic domes which open and close according to the sun's position and time of day or night, thereby constantly creating an ideal climate inside the building.

The Siemens pavilion for the Expo in Seville, which is equipped with a movable sun shield, or the "Jufo" by Peter Hübner and Siegfried Gag with its self-supporting "sun eye", can be mentioned as recent examples of intelligent buildings, as can Jean Nouvel's Institute du Monde Arabe in Paris. This building is decorated with a photosensitive facade controlled by sunlight and combines technological function with Arabic forms, thereby displaying the building's subject and functions to the exterior.

Just as the construction of skyscrapers was made possible by the invention of steel construction and the elevator, a new architectural form will be created through the use of computers in the areas of design, material development and construction, and the use of contemporary architecture. This new form will also change cities to a large extent. Cooperation with environmental engineers is likely to be one of the most exciting fields for architects today. Computer programs can examine and optimize the climatic behavior of buildings; Richard Roger's design for the K-One headquarters in Tomigaya, a part of Tokyo, became the starting point for a research study comprising wind-tunnel investigations aided by a computer. The headquarters, which was built with the cooperation of Ove Arup, was intended to create its own energy by means of a wind turbine located in a gap between two building complexes.

A second milestone in the history of the construction of intelligent buildings is the Green Building by Future Systems (Jan Kaplicky and Amanda Levete), that was also constructed with the assistance of Ove Arup's environmental engineers. In addition to its high-tech and ecological features, this building also possesses a quality with regard to architecture and urban planning which demonstrates experimental vision and functional aesthetics. In the case of this

structure also, computer simulation was utilized as early as the design phase to examine and optimize the energy concept (natural lighting, warmth and ventilation).

In comparison, Ken Sakamura's Tron House can almost be considered a form of combining architecture and technology and integrating the ubiquitous computer into a building, which is already obsolete. The architectural design, the projection and the shell remain traditional. This one-family house represents not only the social status quo of the small family, but also the traditional approach to architecture and urban planning: the unreflected manifestation of houses with four walls and a roof that, placed in the (urban) landscape, are a mixture of eastern and western consumer habits.

Media Ships and Electronic Shadows

In 1992, the Japanese architect Toyo Ito gave his entry for the Japanese Maison de la Culture in Paris the following title: "Media ships sailing on the Seine". The building's facade consists of electronically controlled glass, behind which the individual functional areas almost float. "The design is based on the idea of a spaceship which arrives at the Seine from Tokyo carrying information and culture. One could regard this spaceship as an electronic mechanism or a living organism … Images can be projected onto the glass facade. The building's floors and walls also are a 'screen' which imparts information. All the spaces are created through information and are therefore temporary. The complex superimposing of these spaces and the flow of the information are expressions of our present day, borderless culture."[7]

Peter L. Wilson reacts to, for example, Toyo Ito's "Tower of the Winds", with an architectural style which he terms "Electronic Shadow": "The modern city is no longer physical, but invisible and ephemeral, ubiquitous in electronic impulses. Comfort is being able to flee this bombardment of electronic stimuli — into a 'zone of the least electronic interference'. Architecture is not yet ready for these contemporary conditions. Cartesian geometry is not suitable for electronics … The building is a black hole, an electronic shadow, a 'Ninja architecture'. In the interior of the black object, invisible from the outside, can be found a protective hiding place from electronic radiation … The 'Tower of the Winds' is an uncommon, ephemeral object. The building exists as its shadow, respectful, fearful, optimistic."[8]

Deconstruction

The artist Gordon Matta-Clark, who cut apart buildings, and the architect Frank O. Gehry, who destroyed and put back together the "box" in a new way, made a name for themselves next to the philosopher Jacques Derrida as the founders of an architectural style called Deconstructivist Architecture. (Phil Johnson was the first to use this term at an exhibition of the New York Museum of Modern Art in 1988.) This genre's present exponents, in addition to Gehry, include Zaha M. Hadid, Coop Himmelblau, Bernhard Tschumi, Daniel Libeskind, Rem Koolhaas and Peter Eisenman. They occupy themselves with the invisible, hidden structures of social facts and their representation in architecture.

For Derrida, who introduced the concept of deconstruction in connection with his linguistic philosophy, Grammatology, the importance of this concept is not only its role as an architectural metaphor, but its deconstruction of tradition. A deconstructive process takes place whenever the external hegemony of traditional values (aesthetics, functionality) are dismantled, examined, criticized or, above all, "inscribed" (into architecture) anew.[9] This characterizes one of the projects realized by Coop Himmelblau, the Open House (1983, 1989)

in Malibu, which represents the vision of open architecture as an indicator of an open society. Architecture as the art of the next century? - "That is a theoretical approach. When one proceeds from the theory that architecture should be 'right for the time' and always express what the society, the world has available in terms of intellectual reception, then one should not be surprised that architecture looks the way it does today. We simply think that tension and complexity are important statements of the modern time, and for this reason, architecture should reflect tension and complexity. This is not possible, however, when one approaches architecture with additive thinking."[10]

The borders between interior and exterior have been lifted; that which was exterior has become interior and vice versa. Nothing has remained in its usual place. The dissolution of the concept of a three-dimensional space with its traditional physical laws such as gravity and substance takes place as a transformation into the movement which is brought to a standstill for a split second, into a still image from a motion picture. Speed, dissolution of time and space and the subversive undermining of social structures are those characteristics commonly labelled the democratic potential of the electronic network.

Architecture Begins where Space Ends.[11]

Dagmar Richter, in her 1988 project for Berlin, "Denkmal oder Denkmodell" ("Monument or Theoretical Model"), took up the question of the actual location of architecture in her design when she made the map of Berlin float over the representation of a huge computer chip as a three-dimensional sheet in reference to that which our actual environment expresses - the omnipresence of the computer chip. Surrounding it, depictions of "Berlin-Fühler" ("Berlin-Feelers"), which seem to float weightlessly in the air and "Berlin-Vernetzung" ("Berlin-Network") and "Implosion" discuss the actual location of architecture, which many already think can be found in an electronic world.

"Which is to say that since you are putting some filter to the given conditions, a process of screening through information, what you get is by no means the only information. There is always some noise. Always some other possibility."[12] The Japanese architect Keichi Irie is speaking of the mistakes and the noise inherent to his electronic tool, the computer. When he designs an architectural structure on the computer, he simultaneously proceeds from the creativity provided by these sources of errors: "Previous schemes of architectural planning and design lack this tolerance of noise and errors. Moreover, we can actually see this in the city around us."[13] His self-image as an architect therefore goes beyond that of being simply a "builder". As other architects integrate the concept of deconstruction into their designs, he goes further and deconstructs the entire genre of architecture, asking: "Ultimately, then, where is your real work? In the computer or the construction, the database input or the terminal output? You seem to continually switch modes back and forth like a cyberpunk …"[14]

The location of architecture disappears gradually, just as time and space dissolve in the world of telecommunications. Always at the same time and place, no matter where you are. In L.A., the city where deconstructivist architecture meets the edge of Silicon Valley, the Chiat/Day Inc. advertising agency had their new headquarters in Culver City built by Frank O. Gehry, at the same time commissioning the Art Technology Group in Boston (Jeet Singh and Joseph Chung) to work out an electronic communication and network model, which creates a completely new form of office. The so-called "student union", which fills an entire floor on which can one move freely and gather in comfortable cells. The employees work in large, open project rooms — or even at home — and are in constant contact with all other employees via networks and telecommunications. Every employee is provided with a portable

computer, meaning he or she is available and can be reached at all times. The Art Technology Group did not create the electronic communications structure for this purpose only; the user surfaces and therefore the surroundings actually occupied by the company's employees were more important. Cyberspace is produced through perfect cooperation between Gehry's "real" architecture and Singh and Chung's virtual "architecture".

The consciousness of city and the city's consciousness are changing radically. Mark C. Taylor created the term "electrotecture", which attempts to describe this link between material and non-material communication. Architecture as a body and the (human) body as a machine are therefore given new roles with which they are inscribed. In a deconstructivist sense, the new text (with the same old contents?) is in turn inscribed into a structure of the digital code. Breaking up this structure (which is also the foundation of the VR world) and forming it anew could be a further step in the development of (material and non-material) architectural design.

1 Vgl. Michael Sorkin: Variations on a Theme Park. The Noonday Press. NYC 1992

2 Williamsburg ist eine Stadt in den USA, die teilweise im Stil des Jahres 1770 restauriert wurde, und in der sich heute selbst Bewohner in der Mode jener Zeit kleiden. Vgl. u.a.: Ada Louise Huxtable: Die neue Stadt. In: Lettre International. Heft 22, 1993. S 82ff

3 Aaron Betsky: Violated Perfection. Architecture and the Fragmentation of the Modern. Rizzoli. NYC 1990. S 169

4 ARCH+. Zeitschrift für Architektur und Städtebau Nr. 111. S 62

5 Lebbeus Woods: Heterarchy of Urban Form and Architecture. In: Architectural Design. Free Space Architecture. London 1992. S 39

6 A. Betsky: Violated Perfection. S 188

7 Toyo Ito in: ARCH+. Zeitschrift für Architektur und Städtebau Nr. 111. Aachen 1992. S 42

8 Peter L. Wilson in: ARCH+. Zeitschrift für Architektur und Städtebau Nr. 111. Aachen 1992. S 54

9 Vgl. Jacques Derrida in Discussion with Christopher Norris. In: Deconstruction. Ed. by Andreas Papadakis, Catherine Cooke, Andrew Benjamin. London 1989. S 71 ff

10 Wolf D. Prix in einem Interview mit K. Gsöllpointner im August 1990.

11 Wolf D. Prix in: Construire le Ciel. Video von Marc Ries über Coop Himmelblau. 1993

12 Keiichi Irie in: Computer crash by design. In: Telescope Nr. 1, 1988

13 ebda.

14 ebda.