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「建築と自然」

シュツットガルト大学軽量建築研究所教授　フライ・オットー

Professor Frei Otto

In the field of architecture, Professor Otto has introduced and developped a new creative method of the membrane structure based upon his profound interdisciplinary study into ecological structure, organization and models imbued with a harmony and natural balance. Further, he has presented many outstanding works of architecture, which have been built utilizing such new methods and which reflect his concept of a beautiful and rich human environment.

Personal History

1925	Born in Siegmar, Sachsen, Germany
1950-1951	Studied sociology and city planning at the University of Virginia
1952	Obtained the title "independent architect" from Berlin
1962	Became a visiting professor at the University of California, Berkeley and at Harvard University
1964-	Served as professor and director at the Lightweight Plane Support Institute of Stuttgart University
1969	Founded Atelier Warmbronn
1973	Doctor of Art and Architecture from the University of Washington, U.S.A
1980	Honorary Doctor of Science from Barth University, U.K.

In addition, Professor Otto has Worked with numerous architectural styles including gardens, kindergartens, churches and hotels as well as the German Pavilion in the Montreal Expo of 1967 and the Roof of the Munich Olympic Games in 1971, receiving various awards from many countries.

オットー氏の受賞は、氏が自然の調和と均衡を備えた、生態的構造・組織・造形について学際的見地より深く研究して、建築学の分野に新しい独創的な膜構造の手法を導入・開発するとともに、この新しい手法を用いて、美しく豊かな人間環境の観念に即した数々の優れた建築作品を残したことによるものです。

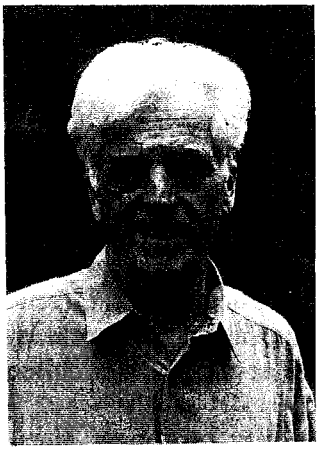
●略　歴

1925	ドイツ、ザクセン州ジークマール生まれ
1950～1951	ヴァージニア大学で社会学、都市計画を研究
1952	ベルリン「独立建築士」の称号取得
1962	カリフォルニア大学バークレー校及びハーバード大学客員教授
1964～	シュツッツガルト大学軽量建築研究所教授兼所長
1969	アトリエ・ヴァルムブロン開設
1973	米国、ワシントン大学　芸術・建築学博士
1980	英国、バース大学　名誉科学博士

この他、モントリオール万博ドイツ館（1967）、ミュンヘンオリンピックの屋根（1971）を代表とし、庭園、幼稚園、教会、ホテル等、数多くの建築物を手掛け、各国より、数々の賞を受賞する。

Architecture and Nature

Professor Frei Otto
Lightweight Plane Support Institute of Stuttgart University



Text of a lecture presented on the occasion of the award of the 1990 Honda Prize on 16 November, 1990

There is discord between ourselves and the world we live in. Architects have been building against nature for 5000 years. It has been their duty to protect mankind against enemies, and especially against its greatest enemy: nature. Houses have been their weapons and their symbols of victory.

The architects of today, still build against nature. They have destroyed nature and they continue to destroy nature instead of conserving it.

They can build everything they want to build. The technical and the financial possibilities have never been so great before. Feasibility is not the problem today, but rather the enormous range of options available to us.

As all buildings, —since they should not collapse—, are subject to the natural laws of physics, certain constructions and building designs are more appropriate for certain purposes than others. However, this fact does not reduce the number of possibilities open to the architect. Even the search for the minimal house, —that is a house which has nothing unnecessary—, has led to more than one solution.

Against this background the question arises: Why are so many buildings overdesigned obstacles against nature?

Is the will to be artificial unnatural? Man himself has invented the artificiality by restriction based on social conventions, doctrines, design regulations and aesthetics. Art and the aitificial are still regarded as the opposite of nature and the natural. But these opposites are outdated. However, architects still lack the philosophical basis which could help us develop a new understanding of nature and to see man as a part of it.

The ability to build naturally has yet to be developped. There is still no natural architecture. But I hope that there will be the peace between man and the ever changing nature. It is our duty today to prepare the many new roads to natural and humane architecture. We will only make use of the irretrievable chance of our age if we set to work now; if we do what has to be done, simply, naturally and friendly, with a will to peace and an awareness of what is good and right.

The second half of our twentieth century is a time of big changing. In architecture there was taking place a radical transformation in its relation to humanity.

In the architecture of the Fifties humanity meant creating vast amounts of living space. In the architecture of the Sixties it meant emphasizing simple forms. In the Seventies it meant reviving past

aesthetics. The term of humanity was alienated, because it was increasingly equated with beauty and finally replaced by it.

At the beginning of the Sixties the term "humanity", which had increasingly been overused, and thus was losing much of its meaning-, was also being related to the many varieties of the term "nature" or "naturalness".

Some architects finally started to realize that their aims, working methods and the resulting products were, in principle, unnatural, because man is increasingly becoming aware of ecological problems and the detrimental effects of buildings. Already, a minority of architects is promoting a new ecological approach to architecture.

This minority no longer aims to serve the clients or users of a specific project alone, nor to build for man or for humanity alone, but to attain a new, all-embracing naturalness. The buildings and the people who live in them are seen as an integral part of a greater whole. It is imperative to help people, but it is no longer man who is the center of nature.

This new view of nature leads to a new understanding of nature, not only by architects. The most recent findings of natural science and an awakened society force us to reconsider. The awareness that vast ecological systems are ailing has a mobilizing effect on us.

The youngest ecological system within evolution is the human city which has probably never been genuinely healthy since it came into existence. Not blind conservation of nature, but integration of the natural individual into his environment, into the world in which he lives, is our new task. And this means achieving greater knowledge of the natural processes which lead to the forms of objects. These forms, in turn, form the overall picture of nature.

Just as architects of the Twenties never found the entirely simple and inexpensive "house per se", so the form of the "natural house" and furthermore the "natural city" has still to be found today, —not surprisingly, since only a few architects are searching for it anyhow. Most are content to celebrate those forms which they think are ecological or biological.

Some architects think that they will find a greater nearness to nature by limitating living natural forms and structures. For the most part this is bound to fail.

Technical objects such as a house do not become natural by imitating forms found in living nature or by using so called biological building materials.

Gradually, adaptable building has developed since about the end of World War II. Building are no longer conceived and built as unchangeable entities, but can be adapted to changing tasks. The potential for rejuvenation is built into them.

The idea of adaptable building has led many people to again build their individual homes for themselves. A new, unconventional do-it-yourself building culture, borne out by amateurs, has developed and should be taken very seriously.

In the field of architecture (including engineering, cityplanning and environmental design) we are nowadays aware of a fact which we call plurality.

This means: All of the old traditional methods of design are still valid. They are not out of date. On the other hand new methods of thinking and new technical inventions have been introduced. There are infinite possiblities. Man is technically prepared to solve the immense problems.

This new time of plurality makes it possible to focus on aspects of increasing importance, which are for example:

—a new understanding of the terms humanity and nature as an inseparable whole;
—conservation of nature, in particular of the biological macro systems and their components;
—avoiding of unnecessary buildings and building masses and conserving the energy for human and ecological concerns;
—a new sensitization of the faculty of perception for quality in architecture by reviving lost components of the senses;
—the integration of contemporary arts as painting, sculpture and music;
—striving for natural security for every human being in a society which through tolerance encourages individuality;
—consideration of natural self-forming processes when designing buildings and developing cities;
—development of adaptable building adequate to changing environment and functions through the use of adjustable structures;

Now I will give you some remarks on my own research work, which follows one way of all the unnumbered possible ways in the plurality of our time.

In the field of building structures my research work relates to the evolution of light weight structures such as space frames, shells, tents, air-supported membrane halls and adaptable dwelling houses.

One of the very clear results of our research was that most of the technical functions of buildings can be performed by a very small consumption of material and/or energy, which often means that less than 5% are necessary from that what is usually used on normal buildings.

In the field of natural sciences we study together with biologists living structures and we do research work on so called self-making or self-organizing processes in non-living nature, using the methods of synergetics. We concentrate our work especially on those processes which are equivalent responsable for the building of forms in living nature and which equally influence many kinds of technics of man, such as cityplanning, engineering and architecture.

For this reason we cooperate with physicists, mathematicians, engineers, biologists, historians and philosophers.

In our research teams we know: Scientific results become only valid by having been proved in experiments.

Real experiments in the field of architecture are executed buildings which should be carefully observed in their behaviour as parts of the human society and their environment.

But even buildings which are scientifically correct and perfectly done don't guarantee to be at the same time objects of architectural art.

Nowadays the architect is still demanded to gain the special quality of architecture. It is his duty to develop and to guide projects as fare as possible until buildings get their own individual beauty.