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PERCEPTION OF SPACE AND ITS SYMBOLIC MEANING

Although we all inhabit the same world, we do not all perceive it in the same way. This is because the world is comprised of the totality of things and phenomena, we are not conscience of all these, and those we are aware of we often interpret differently. The environment we perceive and our way of relating to it depend on our concept of the world which derives from elements such as language, our logical structure of thought, culture and even physical conditions of climate, vegetation, orography etc. Applying this to the world of architecture we can therefore say that we all see the same structures but we perceive them differently, the image we have of architecture therefore depends on our concept of space.

The subject-object relationship is thus not only fundamental for our acknowledgement of space but also for its actual existence.

Perception thus mediates between us and architecture or between us and space. The aim of this work is therefore to inspire designers to create new spatial models that challenge the existing relationship between knowledge and perception in the mind of the observer, so that new aspects of architectonic space can emerge from this conflict.

We know that space is comprised of a set of figures and a transformation system that governs their behaviour. If these transformations are translations, rotations or symmetries then we are in a metric space. However, if the behaviour of these figures is ruled by properties of continuity and discontinuity, of domain and boundaries, of exterior and interior, then we know we are dealing with a topological space.

We are now going to show how these two spatial concepts have become an integral part of architecture by analyzing how individuals from different cultures relate to the objects of their environments. We also show the very different role of perception in the acknowledgement and interpretation of space in different groups that can in some cases even be incompatible.

Until the end of the 19th century and the beginning of the 20th century, most western architectonic design was addressed from the viewpoint of measurements and proportions. The architectonic vision of the Renaissance designer L. B. Alberti who considered that an architectonic work was an entity which could be subdivided into smaller spatial units, or the proportional study of the Milan cathedral carried out by Cesare Cesarino in the first half of the 16th century, based on small equilateral triangles, are examples of the reasoning that has governed the history of architecture to the present day. Always trying to show the Universe through architecture as if it were governed by ruler and compass.

Psychologists have found that a large number of indigenous populations live in a world without perspective, as proven by their not being affected by the illusory shapes of Necker, Hering, Ponzo or Muller-Lyer. Their houses are round with rounded doors so their surrounding space is circular and without perspective. The absence of angles and parallel lines from their environment makes it difficult for them to estimate distance. They see the world from the concepts of near and continuous and have a strongly topological vision of space.

An extreme example of this is given by jungle populations.

Studies on the tribes from the Amazon Basin show that when the indigenous people are taken out of their environment to a place they call "the edge of the world", or in other words the open spaces, they have no concept of distance and instead of seeing distant objects as far away, they see them as small.

Taking the risk of simplifying the matter, at this point I would like to propose a working hypothesis concerned with the habitat, architecture and space. In general, cultures with a more developed perspective, see the world as if they are "looking through it" and have a greater tendency to penetrate the medium. In contrast, indigenous cultures with a highly topological view of space, tend to remain in their own environment, provided this is not hostile to them. Thus, western culture, steeped in a world with perspective, has developed an exploratory activity, whereas, on the whole, cultures with less developed structures are settlers.

In the present day, our conception of space is not just a metric one, but a combination of the metric and the related projective and topological properties. Studies carried out by J. Piaget in the university of Geneva, revealed the genetic supremacy of topological over projective and Euclidian relationships. This means that the conception of space is primarily topological, then projective and last of all Euclidean with the former being related to the sense of touch, projective properties to the sight and the latter, Euclidean, to the combination of sight and touch. In the field of psychology the principal topological properties are those of proximity and contact followed by those of continuity and measurement. Metric spaces are governed by measurements and distances. In summary, topological properties are concerned with proximity and Euclidean aspects are related with what is measurable.

When applied to architecture, these spatial conceptions not only produce different architectonic models, but completely opposing views of the world. Japanese and related architecture fit into the topological model since they strive to find continuity between man and nature. Architecture evolved with a concept of perspective, however, takes one or two points of reference from which the whole space is controlled. This therefore produces a vision of the world which encourages a division between man and nature.

Insofar as architecture is involved with the senses and adds harmony to man's life, it brings us closer to nature and to ourselves. It can arouse our complex system of perception. When faced with an architectonic object, our five senses can be stimulated by the material, shape, colour, scale and space of the objects introduced in it and its meaning stems from the result of these ideas and forms and the nature and quality of our perceptions.

One setting which seems able to arouse our five senses is the Japanese Tea House, here a simple space and tea making ritual aim to transform the architecture in Kakuko Okakura's (the author of the Book of Tea) House of Fantasy. A Tea master describes the process as follows: the spirit of Cha-no-yu is to clean the six senses free from contamination. By placing the kakemono in the tokonoma and the flowers in the urn, one's sight and sense of smell are cleaned; listening to the water boiling in the iron pot and the water dripping from the bamboo pipe purifies the sense of hearing, the mouth is cleaned by tasting the tea, the sense

of touch is purified by touching the tea utensils. When all the sense organs are cleaned in this way, the mind itself will be free from stains." Here, we are not aiming to emphasize the ethical viewpoint but instead the aesthetic or perceptual aspect: this ceremony submerges us in an environment that is rich in sensations and that can change our view of the world.

With respect to the design of the Tea House, it follows metric geometry with very simple forms that, together with its perceptual geometry, produces architecture that reaches beyond purely metrical and topological procedures. The Tea House transforms into a process that blends with nature.

In western culture it is not easy to find architecture that awakens our senses and is accessible to all levels of society, such as the Japanese Tea House. Although in Gaudí's architecture we are faced with a perceptual world that can transport us into the past, as into a fantasy world, with geometrical shapes that evoke the natural world.

The field of topology, by Marcoli's accurate definition in his book "The Theory of Field" is a "field of communication" and this also describes Gaudí's work, communicative. It is not just architecture to be seen, but also to be touched and heard, since its sinusoidal roofs and facades share both visual and emotional traits. The topological world described by Gaudí is similar to the topological universe of a child. Contemplating the works of Gaudí, the observer not only communicates with the natural world but also with the deeper layers of his inner self, he can evoke to his conscience the worlds of soft, malleable and curved shapes that he experienced in the first few years of his life in close contact with his mother and the mysterious and magical world of his childhood.

The Casa Batlló and the Casa Milá are two of the most representative buildings of Gaudí's later period.

The facade of the former building is made up of organic forces that appear to have been moulded by waves from the sea and its balconies perch on it like gulls nests on the cliffs that face the ocean. Dips and grooves remind us of the strength of nature that formed the Earth in another Age. Straight lines and angles are absent from the surface which instead is finished with a zigzag line and covered with slates shaped like fish scales and resembles the back of a dragon.

"Originality is returning to the origin", this line of thought of Gaudí comes to life in the Casa Milá, called the Pedrera (or Quarry), so named because of its resemblance to a jumble of stones. The origin is topological space and to create this he designed a structure comprised of helicoidal shapes that produces gestural spaces. The surrealistic design of the roof terrace of the Pedrera evokes fantastical and enigmatic worlds. Gaudí creates an image of the unknown and uncontrollable forces of the natural world that awake in the visitor the old fears of his infancy. This effect is produced by the use of spectrally shaped chimneys and ventilators and with a path that goes around the edge of the deep courtyards, this vulnerable sensation is accentuated by the lack of railings and the whistling of the wind as it passes through the chimney shafts.

In spite of the topology, these perceptions of space, that are linked to our subconscious, produce a violent and hostile image of nature. In these spaces, the individual feels like the traveller lost in the wood or trapped by the dark where his

perception betrays him and converts the trees into monsters and cocooned enigmas like the chimneys and ventilators of the Pedrera. This is far removed from the harmony with nature created in the Tea House; instead, this work of Gaudí reflects man's conflict with nature.

With the same passion as Gaudí, Shin Takamatsu is developing his architecture, but following the inverse process. In some of his projects, Takamatsu aims to architecturalize nature. His building Origin III, resembles a ruby or a beautifully set quartz crystal; his building Earthtecture has a light tower in the shape of a butterfly's wings. However, in the Kunibi Messe museum, in a rectangular courtyard between two glass walls is where he fully achieves this objective. This space is called Takamatsu, "a garden of abstract forms". The organic elements of this garden are made up of metal and glass spheres, cones and crystals which change throughout the day, thanks to the two large windows. The light and the exterior landscape continually change the perception of this space; during the night artificial light fulfils the same role. A "building in constant flow" is thus created which transfers us to the world of floating forms that the Japanese artists of the last century called "ukiyo-e", that is, a world in which not only phenomena but also objects are transient. It is an environment of geometric shapes and high technology that, thanks to the nature of the visitor's perceptions, one feels as if emersed in nature.

This setting seems to combine both the oriental and occidental cultures. The courtyard seems to represent a sacred place, which in the West would be a new cathedral in which the visitor participates in cosmic rather than celestial experiences. The Japanese, on the other hand, would consider it as a kind of sand garden, or a new setting for the tea ceremony.

Perhaps because of technological development or the rift between man and nature in western societies, designers and artists are exploring new spatial concepts, some of which are inspired by the philosophy of eastern cultures and others by design techniques that change the normal mode of perception. Many of these, however, aim to convey the dynamic and changing structure of nature.

A Madrid sculptor, following the teachings of Taoism, creates his works in large open spaces that, since the space the sculpture occupies is penetrable and can be used, permits it to function as an architectonic object. I would also like to show you the "Winter Mountain" by Jesús Gironella, constituted of 6,000 kg of weight on a 400 metres square surface. This sculpture is a sonorous space that enables us to become acquainted with and participate in the rhythms of nature or, as its creator says, "it entails knowing and contributing to the fates of the Universe".

The Winter Mountain is a mandala, but a three dimensional one, in the form of a lotus flower on a cement pond. This structure, like all mandalas, reflects an image of the Universe and can serve as an instrument in the integration of man with nature and space. Another possible and simpler purpose, and probably Gironella's objective, is the creation of an abstract garden, with disposable elements, in the urban environment. For this purpose it incorporates a metal sphere with a number of attachments suspended in the air. The visitor can bang the sphere and produce a large variety of different sounds, which Gironella

It seems that at least part of western society is no longer satisfied with the exploration and domination of nature, and prefers to contemplate it and understand it. On these lines, I designed a small inert garden, based on the dry Japanese gardens. for a Madrid businessman.

It was called the "Garden of Silence" and was to comply with certain conditions. The proprietor wanted a pleasant environment in which he could relax and be free from worries but which was dynamic. I therefore designed a microhabitat as alive and dynamic as the real thing but completely silent. The garden consisted of the following elements: a river, some mountains, a lake, a plane and some clouds. Playing with the oriental philosophy of the harmony of opposites I tried to convey dynamism to the model by balancing vertical elements, such as mountains and clouds against horizontal elements such as the lake and the plane; or static elements such as the lake or the plane against dynamic elements such as the river or the clouds. The texture of the materials and the colours of the rocks imitate a part of nature and both change with sunlight and rain which makes the colours of the rocks brighter. The dragon shaped river appears to flow beneath one's feet and gives energy and movement to the creation.

This Garden of Silence is thus composed of a series of inert objects which, in spite of being unalterable forms, are continually changing.

This view of nature has not always existed in the western world. In previous eras, when architecture and nature both played a decisive role in the development of art, the situation was very different.

Nature was most highly esteemed in the Romantic era. During this movement, the garden lost its formal, geometric appearance and acquired a more natural aspect. As Constable in 1822 said, in reference to the formal garden, "it is not beautiful because it is not natural". At this time, the first national parks appeared in the United States in an attempt to conserve nature in its wild untouched state. The traditional image of the gentleman in the formal garden, in which he was looked on as the central focus in a frame of natural beauty, was abandoned, and the romantic gentleman more in harmony with nature emerged.
Around the middle of the last century, construction of the gardens in Sintra, which were to become the most beautiful romantic gardens in the world, began. In the same era, the gardens of the Meiji restoration such as the Murin-an and Heian Shrine, which have a naturalist external aspect, were built. There is a clear difference between these two worlds, however: although the Sintra landscape beautifully combines nature and architecture, it is designed to be seen from an external independent viewpoint. In contrast, in the Murin-an these three elements are united. In other words, the romantic traveller sees his surroundings across himself and in Murin-an he sees the garden as an indivisible unit of individual, landscape and architecture.

In Sintra, the traveller does not seek harmony and fusion with the landscape, but the emotion of the sublime, the affirmation of himself with nature. In Beaudelaire's words "romanticism is neither the selection of a theme or complete sincerity but is a way of feeling". This emotion is an exaltation of the imagination, mystery and exoticism with which the inner self of the traveller meets the no-yo of nature.

Murin-an makes use of a double shakkei. The first is bringing the mountains from the landscape into the garden and the second is the incorporation of rocks into the house. Although one can walk around the garden, the view from the house invites contemplation. Unlike in Sintra, the traveller is not tempted to explore the immense, powerful landscape unfolding before him. His perception of the garden incites reflection, this is a real landscape and not a fantasy.

Japanese designers are changing under influence from the West. In the garden of the Crystal Light building designed by M. Takasaki, instead of following traditional ideas, he glories in the dualism of man and nature.

At present, the East and the West seem to be unretrievably on the brink of a drastic change. They will either follow the path of destruction or that of synthesis. If the latter way is chosen, architecture will become a flux, like space and nature. Behaviours such as that observed in Mediterranean villages, where the people open the windows during the day and close them in the evening in order to enjoy the fragrance of the orange blossom or designs such as Atsushi Kitagawara, Fog-forest park and Prospecta 92 by Shoei Yoh are all examples of design on the route to synthesis.

To conclude, I would like to quote the words of Ludwig Wittgenstein "The mystical is not how the world is but what the world is" applying this to our field we can thus say "architecture is not how space is but what it is".