ZÜRICH
ART OF GLASS ARCHITECTURE
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INTRODUCTION

In architecture, glass has for a thousand years been the medium through which light has entered buildings, revealing the spatial art of architecture, while completing the building's protective enclosure of walls and roof against wind, rain and noise while allowing visual contact to be maintained with the outside world.

My lecture focuses on glass as an extraordinary material whose uses and manipulation by man seems inexhaustible from telling stories to making electricity.

The history of architecture has been the story of light as architecture's essential material. Without light there is no architecture. Today we can look back and see how architectural interiors have been created, first by allowing light to penetrate through openings in solid walls, then through small openings in the roof. In the early 20th century, walls could become transparent, and today almost at will, we can make the roof transparent. In this context it is worth recalling the extraordinary achievements of Paxton and others in the mid-19th century, where the entire solidity-opacity associated with buildings was completely removed.

I will describe, using a number of our projects both realised and imagined, how we have used glass as the key architectural material to create not only the visual and spatial experience, but how we have sought to make glass perform in terms of the client's objective and the users of the building.

The lecture will refer to: -

transparency
La Villette Bioclimatic Facades, Paris (1981-86); Lintas Bridge, Paris (1984);
Reina Sofia Museum of Modern Art, Madrid (1990-91); Glass Hall, Leipzig (1994-96), Würzburg Station Canopy (1996-97)
the control of light and energy - passive & robotic
through roofs: La Villette Roof, Paris (1981-86); Eagle Rock House, Sussex (1981);
Bermondsey Underground Station, London, (1990-98), Louvre Pyramid, courts, Inv. pyr.
through walls : Fluy House, France (1976-77), B8 Offices, Stockley Park, London (1990)
Ecology Gallery, Natural History Museum, London (1991)
composing visible light 3-dimensionally,
Experimental research with EDF, Paris (1986)
light memory,
Experimental Interactive Exhibition, Ingolstadt &Frankfurt (1992)
landscape
National Museum of The Boat, London, (1984), Herne Academy, Germany, (1992)
Cultural Greenhouse, Terrasson, France (1992-93)
spherical geometry.
Pearl of the Gulf, Dubai (1987), The Meridian Cosmosphere, Greenwich, London (1989)
future directions
Seele Factory, Gersthofen, Germany (1994),
International Rowing Centre, London (1996)

New materials
During the last 30 years there has been a slow, but growing awareness amongst the general public, and the construction industry in particular, of the need for an "earth intelligence" and the important role of building design in physically demonstrating this new direction.

The overall environment of the earth has supplanted the raw energy concerns of two decades ago, and this has broadened industries' areas of research beyond those of renewable energy sources and the energy audit (extraction, processing, supply manufacturing, and cost in use) to now include sustainable materials, zero energy buildings and more environmentally intelligent and responsive facades, not only walls but also roofs. There can be no revolution in the industrialised regions of the world with regard to the way we extract, process & manufacture, distribute and consume materials - i.e. an energy revolution. Only a long campaign will eventually change our habits, of which this conference has a role. We are beginning to use and develop new materials which are less processed by industry (more tactile & saving energy).

History will almost certainly record the limitations of the narrow thinking of air conditioned buildings which developed with high rise building, as our health and the health of the environment become central to our architecture.
Healthy built environments for humans is one important aspect of a continuing biosphere.

Future Materials
By understanding solar geometry we can recapture the art of carving form and manipulate the surfaces of our buildings with nature's own light pen
Through the development of new facade technologies our own architecture will become more dynamic and less-material, in the sense that transparent structural materials such as glass and diamond films will become the support medium for holograms, transparent integrated circuits, miniaturised lasers and biogenetic coatings offering the possibilities to improve energy efficiency, to create interactive building surfaces to both user and the environment, and release new creative energies in the design and visual pleasure of our buildings. I am interested in nanotechnology - the molecular doping of glass to reduce its crack propagation characteristic while maintaining its glass quality.

In our architecture, understanding the symbiotic relationship of glass and light is crucial. Having explored glass technically over the past decade, our attention is now focussing on light, its energy and colour content.

Natural phenomena such as the firefly, *cold bioluminescent lucifer* - nature's own photonic communicator; mirage; virtual reality, holograms to control, focus and distribute light directly into spaces, or through light pipes (as we proposed in our competition entry for the new School of Architecture in Nancy). As we already pipe water, electrical energy, air, information, and waste through our buildings, it seems inevitable that we will find advantages in piping light efficiently. This should enable us to be more intelligent and creative with architectural spaces and envelopes.

Light is apparently both wave and particle, as demonstrated in the laboratories of Hamamatsu Photonics (‘92), where the analysis of photons revealed these behavioural characteristics *simultaneously,* undermining the accepted 'wholeness' of Quantum Theory. There is a long way to go to understand light as a material, and this research "mirrors" the atomic-bonding research of glass with the aim to understand its nature and hence open up new horizons for this ubiquitous material.

Conclusion

Humanity and intelligence have as much to do with the process of decision-making as with the tangible artefacts which result from our application of science, technology and economics.

The need to make evident metaphorical intelligence and humanity in what we design should be indisputable. It is this which drives our design approach.

Real progress for mankind and a real sustainable future for the earth are becoming essentially the same. Architectural and engineering design and construction must deal with its own progress by drawing upon the strong metaphorical stem of the human spirit and earthly values.