Hylozoic Ground – Twenty-first Century Responsive Architectural Art

BY NGIOM

INTERACTIVE ARCHITECTURE HAD BEEN IN THE RADAR OF ARCHITECTURAL RESEARCH SINCE THE EARLY 1980S, BEGINNING WITH MIKE DAVIES' POLYVALENT WALLS THAT WERE INTENDED TO REACT TO SEASONAL CONDITIONS AND USER REQUIREMENTS. RESEARCH HAS MOVED ON SOMEWHAT SINCE THEN TO THE POINT THAT RACHEL ARMSTRONG OF UCL NOW RESEARCHES ON DEVELOPING NON-DNA LIVING MATERIALS THAT WOULD ENABLE ARCHITECTURE TO CHANGE OVER TIME USING LOCAL SOURCES OF ENERGY AND RAW MATERIALS THAT RESPOND TO VARIANCES IN THE URBAN ENVIRONMENT. ONE OF ARMSTRONG'S AMBITIOUS PROJECT INTENDS TO EXTRACT CARBON DIOXIDE AND OTHER GREENHOUSE GASES FROM THE AIR AND RELEASE OXYGEN INTO THE ENVIRONMENT. ANOTHER PROJECT RESEARCHES INORGANIC CHEMICALS THAT COULD REACT TO LIGHT AND BECOME LIMESTONE.

Canadian Philip Beesley's work on kinetic architecture belongs to the same genre of research, but over the years, his work had taken a tour towards interactive environmental art. His 'Hylozoic Ground' installation at the Canadian Pavilion at the 2010 Venice Biennale was made up of tens of thousands of lightweight digitally-fabricated components fitted with meshed microprocessors and sensors, giving the exhibition an out-worldly experience. The least that could be said about the created environment was that it was mesmerising, captivating and sensual. The installation offered a vision for a new generation of responsive architecture. Beesley described the Hylozoic Ground environment as: "a suspended geotextile that gradually accumulates hybrid soil from ingredients drawn from its surroundings. Akin to the function of living system, embedded machine intelligence allows human interaction to trigger breathing, caressing and swallowing motions and hybrid metabolic exchanges. These empathic motions ripple out of the hives of kinetic valves and pores in peristaltic waves, creating a diffuse pumping that pulls air, moisture and stray organic matter through the filtering Hylozoic membranes".

Despite Beesley's description, the installation was made not from organic materials, but from tens of thousands of acrylic kit-like parts. And despite Beesley's architectural agenda, the installation provides neither shelter nor discernable function – it therefore is merely a mesmerising work of art with some pointers to future possibilities. Rob Gorbet of Waterloo University, the engineer who worked with Beesley describes the installation as 'good' technology art, and one that encourages interaction with the audience.

The interaction layer is achieved with low-level embedded electronics and distributed sensing and actuation systems powered by a computing platform. A microcontroller board is used to read sensors, make simple decisions and control devices. According to Gorbet, the palm-size computing platform is the product of an open-source community project that began with a small group of hardware developers giving workshops, and that now numbers many tens of thousands of international users that co-operate in developing sophisticated applications.

The interactive kinetic Hylozoic environment is a model system of synthetic ecology – it is like a synthetic forest, where the synthetic foliage-like tentacles react to human presence through sensors fed to a microcontroller board. It is almost as if artificial life has been created. The Hylozoic has a scientific interest although it now clearly displays itself as kinetic art. It is able to create a kind of environment not normally found in a controlled laboratory – where a typical scientific research environment normally subtracts environmental context, peculiarities and incidents in order to simplify and rarefy information so that governing principles can be deduced.

The interactive Hylozoic environment on the other hand provides an environmental matrix, where it is possible to observe generic conditions and behaviours that are too complex to deduce in the traditional way. Rachel Armstrong, a medical doctor who privileges architectural research offers that: "The Hylozoic environment undergoes a teleodynamic evolution – in other words, it exists in context and process, as opposed to being ordered through centralised systems embodied in the biological theories of the genetics…. elements can also be used to demonstrate transformation of the matrix as a whole within the context of a changing environment"[1].

This display of interdisciplinary enchainment that had enabled this interactive kinetic structure points to a future where a new form of art that could respond to environmental changes and interacts with humans. It could be an art that could retain information and regulate behaviours. It could also develop memories and change behaviour over time. The future of art could well be a dynamic one, with a degree of unpredictability.

Armstrong speculates that: "Since the matrix has the potential to reveal how living processes are organised, it is capable of producing surprising results. Living entities may appear with forms that have not previously been encountered. Hylozoic Ground can be described as a birthing matrix that operates at unpredictable scales of chemical complexity, with the potential to spit out 'life' – but not necessarily as we have already experienced it"[2].

This is also a pointer toward the possibility of self-corrective system for the environment sometime in the future where architecture isn't just passive, but living artefact that could correct adverse environmental condition. This could well be the new 'philosopher's stone' of architecture, over and beyond the convention of buildings being static and passive.

Reference

1. *Beesley, P. (2010), Hylozoic Ground – Liminal Responsive Architecture, China: Riverside Architectural Press p 139*
2. *Ibid. p 141*

VENICE BIENNALE