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A human architecture: space as membrane

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One of the less-familiar names associated with the Bauhaus, Siegfried Ebeling introduced a theory of space as membrane that is becoming increasingly relevant with the discourse of sustainability

The archives of the Bauhaus are kept in the former brewing room of the Alte Brauerei, an immense red-brick industrial estate in Dessau. Among the various artefacts is a folder containing the work of Siegfried Ebeling, which may provide the key to an alternative history of Modernist space.

A former student of the Bauhaus school in Weimar, Ebeling was an obscure figure among his peers. His archival record is mystifying, as watercolours, biographical poems and aircraft sketches co-exist with his architectural oeuvre. An abstract human figure – comprising a triangle and a circle shape – represents his personal logo, pointing to the central role the human dimension held throughout his work.

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Born in 1894 in Rätzlingen, Ebeling was shaped by a diverse academic background, in fields that ranged from art history via Christian archaeology to experimental physics. This diversity would manifest itself throughout his career. At the age of 28, he enrolled in Johannes Itten's preliminary course at the Weimar incarnation of the Bauhaus, shortly before László Moholy-Nagy's takeover.

Two years later, inspired by Itten's focus on the interiority of the self and holistic pedagogical methods, he published an influential article on the idea of cosmologic spatial cells, which he described as a means of 'criticism of constructive thinking'.

'The massive porous encased space of today,' Ebeling wrote in 1924, 'will become a membrane between our body as core and the plasmatic energies of the wider environment through the creation of new structural relationships.' Featuring in the school's magazine *Junge Menschen*, the article instantly reveals his interest in the relation between man and his broader spatial surroundings, the results of which distinguished him from his peers. During this period Ebeling was attending the carpentry workshop and collaborating closely with its master and director of the school, Walter Gropius. The interaction of the two men, as well as the previous engagement of Ebeling in the aircraft factory of Hugo Ungers, strengthened his radical vision for architecture.

Following a one-year break from the Bauhaus school, Ebeling's publication *Raum als Membran* ('Space as Membrane') appeared in Dessau in 1926, coinciding with the inauguration of the new school premises in the same city. Until that time, the metaphor of the membrane had been mainly associated with transparent structures in architectural historiography – as in the case of Arthur Korn who compared glass to 'the great mystery membrane, delicate and strong at the same time.' For Ebeling, the term had a different meaning. In exploring an architectural type that would 'relate to the human body more directly than ever,' Ebeling introduces an analogy between built space and the physiological membrane – the idea of the membrane as space.

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Mediating between interior and exterior, constructed and human, material and functional realms, the idea of the membrane enables Ebeling to discuss the performance of architecture, rather than just its external appearance. The introduction of new technologies demanded this discussion, Ebeling felt. It led to the appreciation of architecture as a machine, but one that would resonate with biological functions, while responding to human and environmental requirements. Ebeling's theory highlighted a responsive and efficient conception of space that would be echoed in visionary projects of the post-war period, such as Frederick Kiesler's Endless House (1950-60), Buckminster Fuller's geodesic domes, Archigram's Cushicle and Suitaloon (1966) and Coop Himmelb(l)au's Villa Rosa (1968).

Long before its impact on mid-20th century architecture, however, the appreciation of space as a biological membrane had already influenced the work of key Modernist architects, namely Mies van der Rohe, as the historian Fritz Neumeyer suggests. Indeed, Ebeling's theory interrogated the relation between architecture and the body as fervently as the members of the Bauhaus school at that time – yet from an altogether different viewpoint. 'Everything is still plastic, not plasmatic,' Ebeling argued in 1926. 'Everything is still formal or rather, once again, merely formal but not substantial.'

Beyond the boundaries of theory, he would pursue a similar approach to architecture through a small yet illuminating body of design projects. For instance, his 1931 patent for an all-metal circular house aimed at providing the maximum amount of natural light, while removing any feeling of enclosure. A clipping from the *Copper & Brass Research Association Bulletin*, published in New York that same year, features a model of the project, highlighting its potential to be naturally lit throughout its surface. Although the design is characterised as a radical innovation for the American audience, its material articulation hints at the Bauhaus steel house, designed and built by Georg Muche and Richard Paulick in 1927. It also evinces the quest for sustainability that is evident throughout Ebeling's writings. Ebeling approached the concept of the circular building again in 1934, with a design for a similar structure measuring 26m in diameter: its core is replete with a warm yellow colour, as sunrays are envisioned as permeating its outer shell. For him, appropriate lighting was as essential to modern habitation as efficient heating and ventilation systems.

Following questions that had arisen in his study *Raum als Membran*, Ebeling completed his second chief work *Das Autarke Haus* ('The Self-sufficient House') in January 1934. He responds to the contemporaneous insulated brick walls and high-voltage electric heaters that rendered interior heating inefficient with a visionary theory of energy autonomy. In view of contemporary architecture's ongoing concern with sustainability, Ebeling's exploration of housing as its own energy source remains relevant. 'The path to self-sufficient housing as the first cell of a new architecture is still distant, but no longer a utopia,' he wrote in 1934, and this idea shall 'extra-muros find its realisation'.

'Living as we do in highly regulated environments, Siegfried Ebeling's radical visions demand further research'

Such an affirmative belief prevails. As technology advances and we move further from the solid architectural envelope, the comparison of constructed space to an organic membrane remains pertinent. Insofar as it brings to the fore issues of architectural performance, adaptation and autonomy, Ebeling's biological approach to space prompts a rethinking of the relation between architecture and the human body – as was hinted at by his personal logo.

Living as we do in highly regulated environments, Siegfried Ebeling's radical visions demand further research – on the one hand, by reflecting on the potential of interdisciplinary synergies, which may link architectural practice with the biological sciences, and on the other, by contributing to the growing discussions on ecology from within the field of architectural criticism. Surrounded by the massive red-brick envelope of the Alte Brauerei in Dessau, the visitor cannot help but think that today, by contrast, the idea of space as membrane – as a self-sufficient, regulative and responsive organ – is indeed no longer a utopian concept.

Credits

Lead Image: Walking on Water (Pontube), Edinburgh