Frei Otto (1925-2015)

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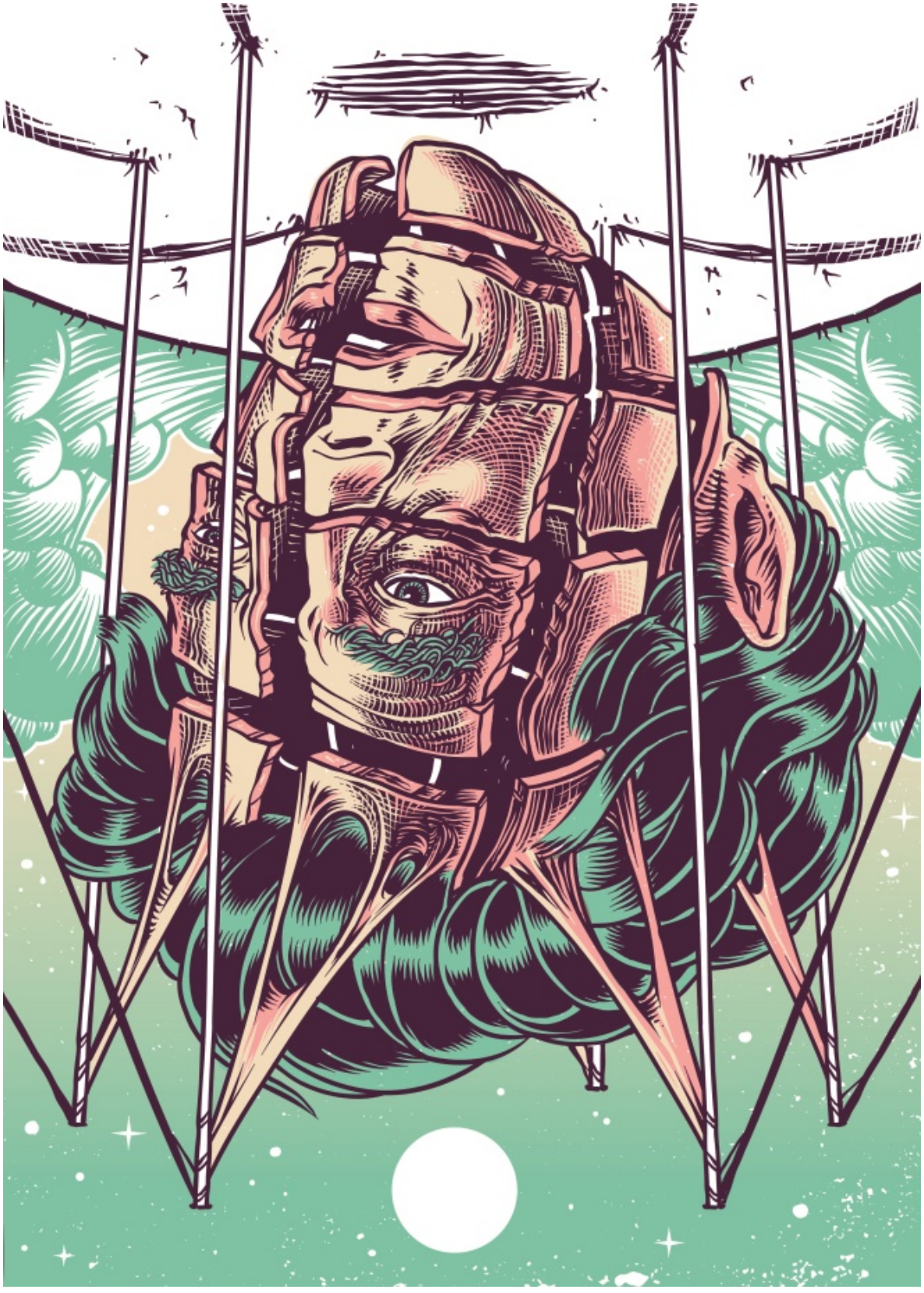

2015 Pritzker Prize winner Frei Otto freed architecture from simple geometry to design interactions between humans, technology and nature

Frei Otto left the world in a way that few of us can ever hope to better. At 89 years old he was awarded the Pritzker Prize, and after telling the jury ‘you have here a happy man’, he died a few days later, on 9 March. He’d added: ‘I will use what time is left to me to keep doing what I have been doing, which is to help humanity’. This is both endearingly silly, and a sign that Otto was of an era when anything - even designers saving the world - seemed possible.

Born in 1925 into a family of sculptors, as a child Otto trained in stonemasonry. A youthful hobby of flying gliders led him into the Luftwaffe, and he spent the latter part of the war as a POW in France. He was put to work repairing bridges, and he later explained that the shortage of materials for this task was what set him on the course that would define his life’s work.

Upon returning to postwar West Germany, Otto completed his architectural training, and took postgraduate studies in lightweight structures. This was a neglected field, mainly because the complexity of the forces at work in membranes meant that engineering calculations were near impossible. His innovative methodology involved form-finding from nature, studying soap bubbles, catenary structures and other minimal surfaces. For his own designs he created huge models that could be tested with loads, similar to Gaudí’s intuitive experiments, but by carefully photographing changes in deflection the performance of Otto’s structures could be accurately analysed.

Otto began to attract notice in the late ’50s with structures for garden festivals in Cologne and Kassel, and in particular Berlin Interbau of

1957, which included space frames and a variety of membrane structures with a real frisson of high technology and structural daring. These early projects, mainly temporary and mostly just for roofs, set Otto off on the building spree that was to make his reputation.

Over in Canada, Otto built the seminal West German Pavilion for Expo 67 in Montreal, a series of steel masts with a cable-net slouched between them, whose swooping translucent roof bathed the interior in milky light, a serene technocratic vision from the *Wirtschaftswunder*. This temporary construction was designed at his Institute for Lightweight Structures in Stuttgart, a smaller version of the Expo structure whose roof was finished in timber, with its open plan and potted plants creating a most attractive variation on the *Bürolandschaft*.

‘Patrik Schumacher claimed Otto as the only true precursor of parametricism’

The Montreal pavilion also led to Otto’s most significant work, the stadiums for the 1972 Munich Olympics. Again, massive steel columns hold up cable nets, in this case clad in transparent acrylic, seemingly floating above the stands and landscape. The architecture provided an optimistic vision of ancient techniques married with cutting-edge technology, of architecture as a barely visible infrastructure, and of a reconciliation between technological society and the natural environment.

In his heyday, Otto was seen as a sophisticated European answer to Buckminster Fuller. He may have lacked a trademark form like the geodesic dome, and he may not have proselytised quite so eccentrically, but he was a vanguardist of the ‘doing more with less’ ethos, and a leading light of the anti-architecture that accompanied

cybernetics and the post-industrial society.

By the end of the ’60s Otto, like Fuller, was making predictions for the future of cities, supplementing his research into lightweight structures by working on ‘giant envelopes’ that could cover entire settlements in the Arctic Circle, or greenhouses many kilometres across, or shaded cities in the desert where agriculture could take place. In the pre-oil crisis years, Otto worked on feasibility studies for giant envelopes for major industrial clients.

Otto talked - slightly mystically - of ‘span’, by which he meant not only the performance of his structures but also the larger questions of what humanity was capable of achieving, and he referred to his own time as ‘the dawn of a new age […] of consciousness of the individual existence within the greatest spans’. There was an evangelical tinge to this rhetoric. The conventional massive ways of building were soon to be swept away by a more enlightened, lightweight world - the only serious option for alleviating the population and ecological crises that were rapidly becoming apparent.

Biography

Frei Otto
1925-2015
Key works
Institute for Lightweight Structures, Stuttgart, 1964
West German Pavilion, Montreal Expo, 1967
Stadiums for the Munich Olympics, 1972
Quote
‘I have built little. But, I have built many castles in the air’
The giant envelope era never came to pass, and by the end of the ’70s Otto’s early promise had petered out into a steady career lacking his initial visionary drive. In the days of PoMo, heavy architecture was back, and questions of meaning and history replaced efficiency, futurism and social change as driving forces in architecture. Despite his inventiveness Otto was never a particularly skilled conventional

architect, and most of his projects were collaborations, so it was unlikely he could have turned his hand to fake keystones even if his living depended on it. Instead, much of his work in the ’80s took place in Saudi Arabia, where his technical approach made climatic sense, and where the taste for kitsch was not as extreme as it would become.

But Otto experienced a renaissance once PoMo faded. His cardboard tube gridshell structure with Shigeru Ban was a highlight of the 2000 Hanover Expo, linking Otto’s innovations to Ban’s concern for recycled materials. Later still, the rise of digital design and particularly scripted form-finding meant that Otto was in demand with organicists like Lars Spuybroek.

Like many from the anti-architecture era, Otto’s ideas appear in diluted form in British High-Tech, which claimed to inherit the visionary engineering tradition, albeit without any of its yearning futurity. But while this may appear superficially correct, Otto’s rare ‘conventional’ buildings place him closer to the eco-architecture of, say, Steve Baer or Lloyd Kahn, than the world of office blocks and airports.

It is difficult to tell what Otto’s legacy really amounts to. After his death, Patrik Schumacher claimed Otto as the ‘only true precursor of parametricism’ whose innovation was to free architecture from simple geometry. But the wasteful spatial doodling that Schumacher peddles has nothing in common with Otto’s obsession with reduction and ‘span’, apart from a tendency to curvature.

Closer in spirit may be the campus for Google being designed by BIG and Heatherwick, which dusts off Otto’s ‘giant envelope’ ideas for the sake of adaptable, indeterminate office space. This is apt, given the lineage from ’60s counterculture to the tech industry, but it’s a far cry from Otto’s humanist experiments.

Towards the end, Otto himself seemed wary of his earlier ambitions. When he received the RIBA Gold Medal in 2005, he said: ‘We can build houses which are two or three kilometres high and we can design halls spanning several kilometres and covering a whole city, but we have to ask what does it really make? What does society really need?’ This was perhaps the wisdom of an old man talking, or it may have been the result of decades of disdain for the architecture of the late 1960s. But it’s hard to see now, with ecological, resource and population crises back on the agenda like never before, how coming generations aren’t going to see Otto’s concern for questions of material efficiency, and the fraught interactions between humans, technology and nature, becoming any less important.