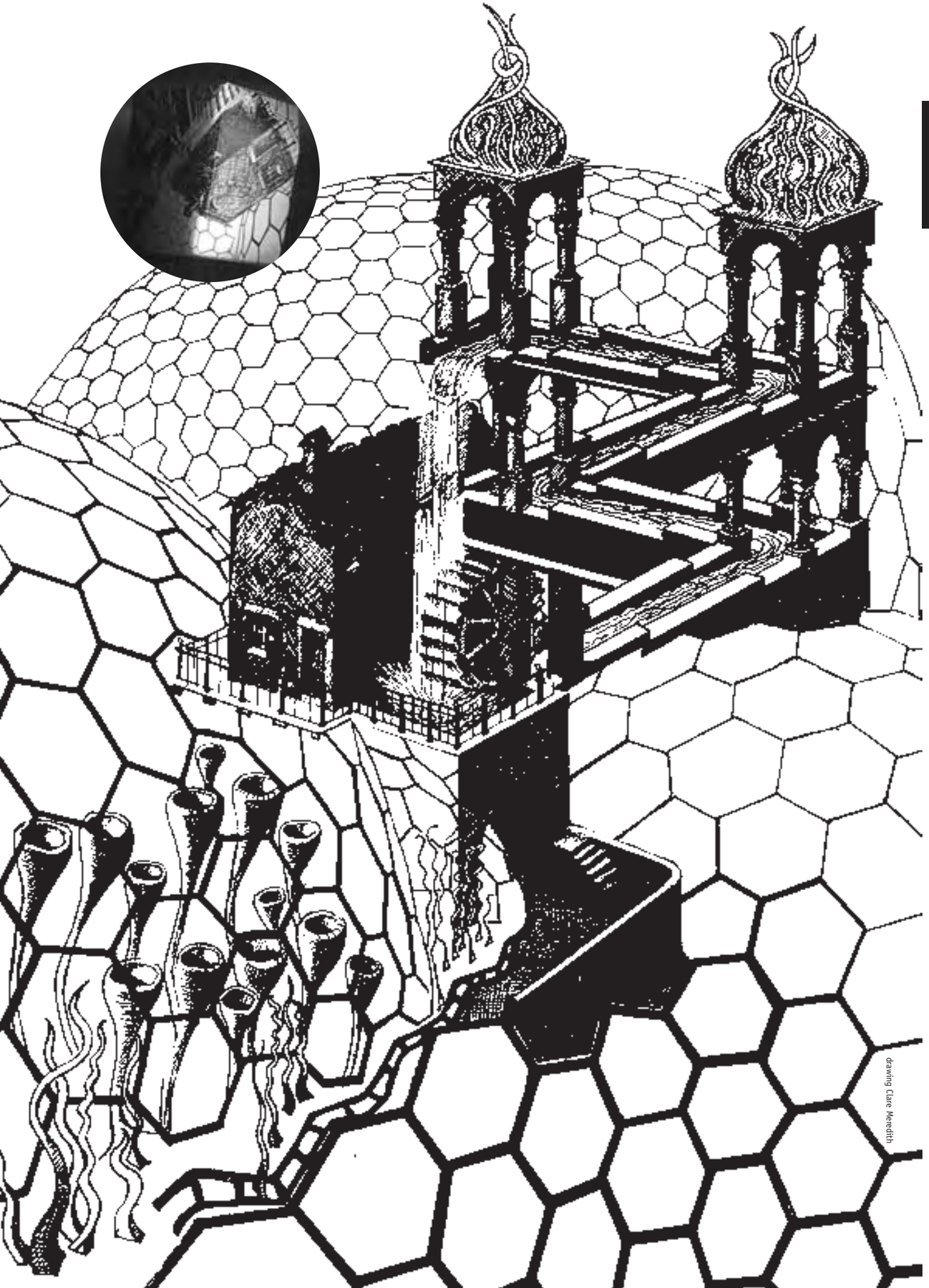

drawing Clare Meredith

Biome Beehive

All through the last century the beehive inspired leading architects. Today, as designing from nature becomes an increasingly attractive architectural principle, could beehive buildings be set to return?

Of the various social insects, bees are often seen as the most attractive to humans. Whilst ants can be viewed as war-mongers disciplined to an anonymous and militaristic degree with hierarchies of masters and slaves, bees seem different. They are pleasantly industrious. Their twin harvests, honey and wax, are seen as life-enhancing. Their strange radar, their dance of life for flowers, and their kooky colour vision adds something altogether spooky to their realm. Ants cast the mind towards the dictatorial group psychology of fascism and communism. This is not the case with bees, and although in recent times a certain ambiguity has crept in, bees and their beehives have down the ages, been eulogised as symbolising the 'perfect society' for the human sphere to base itself on. From Aristotle in classical Greece, from the Bible to the Koran, from the Ancien Régime to revolutionary France and its working class communes, the multi-faceted nature of apiculture, has appealed; and bee's colonies and their ways of organisation have been seen as a guiding metaphor for an ideal, utopian community.

It isn't surprising, therefore, that the 'natural architecture' and 'spirit of the beehive' has been an alluring startpoint for a range of architectural experiments in modern times, going back at least to the last decades of the nineteenth century. Simultaneously, during that period hand-constructed beehives underwent an industrially-influenced transformation. The essentially medieval circular basket and coned thatched hives, were replaced by the rationalised industrial hive; a container with a series of layered shelves in which the bees could make their honeycombs. This innovation was the mindchild, in the first instance, of Lorenzo Langstroth, although a series of further adaptions were required before it settled into the antecedents of contemporary design. This change towards the rational, announced by its box-shaped utility, has not escaped many who have observed it, as anticipating in miniature much of the skyscraper principle.

In the postwar years, with the spectre of fascism and the rise of society seen as a 'mass' phenomenon, the metaphor of bees and social insect became less attractive and the number and variety of structures emerging from this organicist imagery declined. Today however, the organic metaphor and 'design by nature' in architecture are experiencing a remarkable turnaround in fortunes. Not only this, but the man who throughout these postwar decades – new renaissance engineer Buckminster Fuller whose buildings resembled versions of beehives – sees his daily influence continuing to grow. Indeed Fuller is great-uncle to a major, newly completed British-based building which will surely be seen as part of the Beehive Metaphor tradition. This is the already widely celebrated multiple clustering of hexagonal domes which comprise the biodiversity centre at Boldeva quarry, Cornwall, known as The Eden Project.

Popular and media interest in the Eden Project's buildings seem likely to spark a renewed interest in buildings which appeal to designs in nature. It will also deepen the burgeoning curiosity about designing from nature, including, I suspect, interest in the recent and complicated history entwining apiculture to architecture. The only study I have come across on this is *The Beehive Metaphor*; an attractive run through earlier twentieth-century architectural interactions with bees, beehives, and apiary culture. Its author, the Spanish architecture writer, Juan Antonio Ramirez, doubts there are many who have been as exposed to bee-culture as himself, since Juan's father lost his fortune due to his father's obsession with bees. Accurate or not, its period of focus ends mid-century, beginning with Gaudí and ending with Le Corbusier. It is therefore incomplete as a history up to the present day. However, the period it does cover, from fin-de-siecle 19th century southern Europe, to the immediate post second world war period, makes for absorbing reading. The book demonstrates the sway bees and their building construction methods have had on many of the previous century's alpha architects, adding Mies van der Rohe, and Frank Lloyd Wright as well as a short cast of sublunary names, (eg, the Hungarian Odon Lechner, the German Peter Behrens and Austrian esotericist Rudolf Steiner), to Gaudí and Le Corbusier. The way in which Ramirez goes about illuminating the connections between these architects and apian culture, is by elaborate and inferential argument. After visiting Le Corbusier's library he notes how Le Corbusier would

inevitably have come into contact with many of the current apiculture thinkers and their books. And he feels sure that since apiculture was popular with the Franco-Swiss middle classes, Le Corbusier would have picked up on the influence in the air. For all the architects, excepting Gaudí, bees were a relatively temporary absorption. However, they may have become a partial influence on the thinking towards one or a handful of buildings, but beyond this, the creatures' influence is limited. With Le Corbusier, in a chapter entitled 'Mechanical Beehive, Social Beehive' the culture of the apian colony is evident, and Ramirez contemplates that Le Corbusier's machine cities were born out of beehive observations, with apartment block dwellings based on the honeycomb cells of the rational, rectangular shelving plan of the modern beehive.

If Le Corbusier provides a premature twentieth-century conclusion, Gaudí, as the architect who related most clearly to the natural world, gives the impression of coming from another time. In between the focus – van der Rohe, with his use of glass for crystalline, transparent buildings; Peter Behrens extraordinary machine hearth building, (the AEG turbine factory in Berlin, a veritable nest for workers, summoning images of ceaseless productivity); and an extended consideration of the interwar Parisian 'La Ruche' artistic colony, with its artist bees, producing the spiritual honey of art for further nourishment – are all interesting though give a sense of the diversionary.

The early chapter on Gaudí is the most absorbing, not least since Gaudi's interest in bees seems so much more developed than the other architects. With some intelligent detective work, Ramirez shows how Gaudí's beautiful parabolic arch form – his most famous architectural innovation – was developed out of careful observation of how bees hang on each other, and in so doing form an effortless parabolic curve in order to create a honeycomb. Ramirez shows how this 'hanging' architecture of the honeycomb was well enough known in Gaudí's time to be common knowledge. And Gaudí growing up in Catalan farming country would have had endless opportunity to witness bees creating these magical forms. Certainly, the parabolic arches at Palacio Guell give an eminently persuasive impression of having been influenced in their shape from the making of honeycombs.

Gaudí's work resonates with many aspects of the metaphor, for although he became a Catholic, it was infused with a deep naturalism, and also had its roots in building for workers' communities, including the bleaching room of the Cooperativa Obrera Mataronesa – the first Spanish Co-Operative. Here the beehive represented both solidarity and productive labour. Once again, Gaudí uses parabolic arches in the bleaching room, symbolic, Ramirez claims, of Gaudí's sensibility of the bee's mystical ability to work as a single social organism.

If Gaudí's metaphor embraces the mystical, working beehive, and van der Rohe the transparent, symbolic beehive, and Le Corbusier the mechanical, social beehive, how might one place the nexus of completely new buildings which has just been completed for the Eden Project, within this beehive metaphor frame? If anything, these buildings, a series of greenhouse biomes, with a central linking visitor area, might be seen as ecological beehives. Whilst all the examples in Ramirez's work are of buildings which house, or are intended to house, people, the inhabitants of these greenhouse structures are principally plantlife, with people as continuous if temporary visitors. The differing plantlife reflects the contrasting humid rainforest and mild temperate biomes, although common to each is the process of pollination – so crucial for generating oxygen and maintaining life on the planet as a whole. As bees play a crucial part in this life-forming pollination process, returning a flower's nectar to the honeycomb to make honey, its analogue is a greenhouse which draws attention to the respiratory function of the planet's forests in the biosphere. Thus it isn't completely surprising that the form the Eden Project's neo-geodesic domes presents most clearly, is the beehive's hexagon. There again this may be poetic licence. The hexagon proliferates as a natural form, rather than being exclusive to the bee. Think of radiolaria, and of bubbles. And as a form it is evolutionarily efficient, which is a partial reason for its applicability in designing by nature. Still, the Eden Project's domes make a good case for the return of the beehive as architectural metaphor, mixing space age with ecology. Given the mighty publicity the biome domes have generated, it seems likely other hexagonal beehive structures will emerge across the architectural world in the near future – variations on the Eden theme. And this, if indeed it happens, seems sure to propel the beehive metaphor even further from the nineteenth and twentieth centuries, into the twenty-first. *OL*

The Beehive Metaphor, by Juan Antonio Ramirez is published by Reaktion, 2000.