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Construction and the web of life – *building connectedness*

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Global ecosystems are in crisis, and by many measures biodiversity is collapsing. For those seeking to build a more sustainable building sector, two obvious questions spring to mind: what role has the construction industry played in the crisis, and what can it do to help fix it?

Biodiversity is in crisis. Just weeks ago, a landmark UN report concluded that up to one million species currently face extinction, and that biodiversity is declining faster than at any other time in human history. *"The biosphere, upon which humanity as a whole depends, is being altered to an unparalleled degree,"* it concluded. Last year, the WWF's Living Planet Index found that between 1970 and 2014 global vertebrate populations decreased, on average, by 60%. In February, a paper published in the journal Biological Conservation said that the total mass of insects on the planet is falling by 2.5% per year, with more than 40% of insect species in decline, and one-third in danger of extinction. Biologists have warned that the planet is facing a *"biological annihilation"* of wildlife that represents a *"frightening assault on the foundations of human civilization."*

Alongside climate breakdown, biodiversity loss is the other great environmental crisis of our time. And while it sometimes feel like climate change is too sprawling a challenge to inspire individual action – too distant, too far-away, too *planetary* – ecological collapse is perhaps even more difficult for us to grasp. We at least understand some of the implications of climate change – extreme storms, flooding, drought. And that we must urgently reduce carbon emissions by largely abandoning fossil fuels and rapidly transitioning to a society run on decarbonised heat and power, with less carbon-intensive lifestyles and diets.

But 'loss of biodiversity' feels like an even more nebulous concept. How should the extinction of an individual species, or the decline of an insect population, make us feel? It is hard to perceive any direct visible or emotional connection between our daily lives and reported signs of ecological collapse. Occasionally it may hit us, in very high profile cases, such as when an orangutan is filmed trying to fight off a bulldozer in a forest being cleared for palm oil plantations, or in the revolting aerial footage of festering colours across the endless acres of a once-forested Canadian tar-sands pit.

For those of us not visibly dependent on, or working intimately with, the natural world, we struggle to feel anything when it comes to the extinction of insects and other 'unnoticed' invertebrates. And maybe we think: the world is a big place, there is still plenty of room for nature. We also justify the local destruction of biodiversity to make our own lives easier, averting our eyes from the bigger picture – from using slug pellets to building a house larger than we need, from choosing peat-based composts to importing exotic pets, from buying unsustainable timber to demanding a new road through ancient woodland.

Two ongoing sagas in my own hometown of Galway, in the west of Ireland, illustrate this neatly. One is the construction of a city bypass that was held up for a decade by the presence of protected limestone pavement and bog along the planned route. The other was a the construction of a hospice that was refused planning permission because it was partly to be built on a wildflower-rich hay meadow. How could bog cotton, flowers and butterflies stop the construction of such necessary works, local politicians fumed? But the collapse of biodiversity happens not in grand sweeping acts of destruction but in countless small decisions made at the expense of nature. It is a death not by stabbing but by a million pinpricks.

The sustainable building sector must now treat biodiversity loss as another urgent challenge. The science shows that to slow the damage and start the long process of ecological repair and renewal, we need a revolution in both thinking and practice. Biodiversity still lags far behind the climate agenda, though both are – albeit too slowly – seeping from the green end of the industry into the mainstream. But while the mainstream building industry is at least now aware of the concept and practice of robust low energy building (Passivhaus, EnerPHit and AECB Building Standards) where is biodiversity on its agenda? Even within the green building sector, the answers are not reassuring: 40% of UK Green Building Council gold leaf members, for example, have no public commitment to nature and biodiversity, and only 8% have a public commitment to no net biodiversity loss. Though 44% do have a biodiversity strategy in place, at least.

The construction sector does not get off lightly here

So what impact has the construction sector had on biodiversity loss to date? In 2016, the journal *Nature* published an analysis of the threats facing 8,000 IUCN Red List species. Its authors found that over-exploitation of natural resources (ie the direct harvesting of species from the wild) and agriculture were by far the biggest threats. This was followed by urbanisation, invasive species and disease, pollution, ecosystem modification, and climate change.

The construction sector does not get off lightly here. The researchers categorised unsustainable logging of forests as the biggest single form of over-exploitation, threatening over 4,000 species on the list. 'Sustainable sourcing', recycling, and efficient use of timber has never been so important. Conceptual rigour is also needed – particularly as using more timber in construction is increasingly being mooted as a way of both reducing up-front carbon emissions (with sawn timber having less embodied energy than say bricks, steel and concrete for example) and of 'locking up' or sequestering carbon for the lifetime of a building. It is important to remember that it is the trees themselves that do the sequestering, not the buildings, and there is a danger of double-counting this sequestered carbon both in the forest and in the buildings. This is misleading and if there are 'accounting' mistakes at scale, the consequences for the climate and natural world are dangerous. It is also important to remember that the ecological richness of a forest may be partly defined by how much timber we extract from it, and how often. More efficient use of timber, and therefore less frequent extraction, may allow for the development of older trees and more natural forest conditions. The method of extraction is also vital: see for example the advantages of continuous cover forestry over clear felling.

Meanwhile, housing is the single biggest form of urban development that threatens IUCN Red List species, affecting over 2,500 in total, according to the *Nature* study. Of course, access to the space and resources to create housing (aka shelter) has historically been seen as a fundamental human right – as it should be – despite capitalism's ongoing agenda to commodify it and control the supply. We should not stop building housing for which there is increasing human need.

Better use of existing builds and brownfield sites, along with new models of co-housing and communal living, may be part of the solution. But a shift to more rational, efficient and communitarian forms of living goes against the interests of those who currently make large profits via the ownership and control of building land, and is unlikely to happen at scale without much more radical political change.

This leaves more limited, but still important choices for designers and builders seeking to reduce the ecological footprint of housing: more responsible materials sourcing; more value-engineered and *efficient* use of natural materials; more modest buildings – smaller, more compact, less ostentatious (yet more beautiful); and making more efficient use of space – and more sharing of existing habitable space through, for example, groups of young people buying to share.

Design for biodiversity

Members of the AECB network – architects, builders and other construction professionals who are already 'environmentally conscious' – will probably already have worked on projects that took great care to protect biodiversity, perhaps driven by sustainability ratings like BREEAM, LEED or the Code for Sustainable Homes (see also the Irish Green Building Council's excellent new Home Performance Index, which includes site selection and ecology as part of a holistic appraisal of sustainability and occupant wellbeing).

Design strategies like tree planting and retention, green roofs, and wetland and meadow creation, can all enhance biodiversity locally of course. Best of all, perhaps, is careful site selection to avoid damaging existing habitats, and the engagement of a good ecologist early in any project.

On a practical level, we can also be aware of the threat posed to roof-dwelling species like bats and swifts by using modern materials to make our roofs more air-tight and insulated from the elements, and design alternative habitats – like bat boxes and swift bricks – into our projects. There is also a nascent movement to avoid the use of modern breathable roofing membranes in roofs used by bats, as bats can become entangled and trapped in these. A calculation based on the AECB's building stock modelling tool suggests that there may be around 1,300 km^2 of roof space and 2000 km^2 of wall space across the 22 million homes in England that need retrofitting, a large area that can potentially help or hinder wildlife depending on how it is treated.

Of course our material specification choices affect biodiversity too, in the habitats from which they are extracted. Wood is the obvious example, with many specifiers now demanding FSC or PEFC sustainability certification for timber. Many sustainability rating schemes also award points for the specification of wood with such certifications.

But they are no panacea, and they illustrate why ticking a certification box is no substitute for a genuine sense of care and informed engagement about where your timber is coming from. For example, both of these certification systems have been heavily criticised for greenwashing and certifying unsustainable timber (see here, here and here for more), though Greenpeace says FSC is the better of two. And we have heard cases of timber certification being either forged or unavailable when requested. There are also commendable efforts underway by the likes of Green Halo in Hampshire, and Wood Knowledge Wales, to develop a sustainable supply of local construction timber in the UK.

The nature deficit

Perhaps, however, architecture and design has played a more subtle role in the ecological crisis. Barring notable exceptions, it seems to me that one of the underlying principles in the design of homes, offices, towns and cities since the industrial revolution has been to remove us from nature, and nature from us. This has manifested itself in ways that have been good for human well-being – keeping us warmer, safer and protected from the elements – but also in ways that have arguably not: concreting over green space, creating manicured green deserts for our gardens, turning our parks into concrete plazas, and generally removing nature from our towns and cities, and from our hearts and minds.

Ultimately, this loss of connection with the natural world seems to be at the heart of biodiversity loss. When we do not experience nature on a daily basis we lose – over the generations – our sense of wonder, love and care for the natural world, our opportunities to share that with our friends and children, and our sense of duty to protect it.

According to a report by the National Trust, in the space of one generation the number of children regularly playing in the wild has fallen from less than half, to one in ten. *"Most of those I know who fight for nature are people who spent their childhoods immersed in it,"* writes the British environmentalist George Monbiot. *"Without a feel for the texture and function of the natural world… people will not devote their lives to its protection."*

This loss of connection led the American writer Richard Louv to coin the term 'nature deficit disorder' in his 2005 book *Last Child in the Woods*. Louv was keen to stress that this is not a medical diagnosis, but a metaphor meant *"to serve as a description of the human costs of alienation from the natural world."*

Of course it is not just urbanisation that is responsible for this loss of connection, but also the safety worries of anxious parents, and the proliferation of technology that makes it far easier for children to entertain themselves indoors. Nonetheless, it's fair to say most architects and city planners have not designed opportunities for engagement with nature into their homes, office and neighbourhoods over the last century.

"Connection to nature should be an everyday occurrence, and if we design our cities – including our homes, apartments, workplaces, and schools – to work in harmony with nature and biodiversity, this could become a commonplace pattern," says Louv.

This raises the question: how might the construction sector design and build differently if its relationship to the natural world came from a place of genuine connection and feeling - and if it sought to build that connection into the very heart of its projects?

Right now, the approach to biodiversity in planning and construction is often a 'tick box' exercise of complying with regulations on paper, rather than one that seeks to genuinely engage with and enhance the natural world. This is of course far better than nothing (though it can also lead to incidents like the netting of trees on construction sites to prevent birds from nesting).

But a whole generation of graduates in the ecological sciences, most of whom probably entered this field out of idealism and a love of the natural world, have now found work opportunities largely restricted to consultancies whose primary function appears to be showing developers how to do the minimum needed for compliance with biodiversity legislation, which in the UK is largely based on the EU's Habitats Directive. This Directive was transposed into national law in 1994, and while flawed, has still probably prevented significant destruction of habitats across the UK in recent decades. However, green groups are worried that its provisions could be at risk from deregulation post-Brexit.

On the positive side, environmentalists hope the appointment of long-time environmental campaigner Tony Juniper to head Natural England will now give the organisation real teeth. The government also recently held a consultation on whether delivering 'biodiversity net gain' should be a made a prerequisite of planning permission.

Another concept rapidly gaining traction in Westminster is *natural capital*: the idea of putting a monetary value on the 'ecosystem services' provide by nature – flood attenuation, pollination, soil quality, recreation and so on – to ensure their value is properly factored into political decision-making. There is even a natural capital

advisory committee to government now. But critics of the idea, including George Monbiot, say putting a price on the natural world will ultimately just perpetuate its destruction. *"Still more deluded is the expectation that we can defend the living world through the mindset that's destroying it,"* he says.

Ultimately, if a loss of connection with the natural world is at the heart of our exploitation and disregard for it, it is not just the job the building industry alone, of all things, to fix it. But loss of care for nature is not something that has just sprang forth in recent generations either. It has arguably been deeply embedded in our cultural values for centuries.

The culture of nature

In a thought-provoking paper published in 2013, the American academic Elizabeth Dickinson sought to critique and deepen Richard Louv's theory of nature deficit disorder. She argued that Louv's analysis actually perpetuates the idea of our disconnection from nature –essentially, that nature is something external that we must 'visit' in order to overcome our 'deficit'.

Dickinson argued that it is not technology, urbanisation or overprotective parents that are responsible for our disconnect, but rather that these are a symptom of much deeper values towards nature that pervade western culture. She said that without deeply examining these values, spending more time in nature by itself would not be enough. The problem, she wrote, is not a *"modern fall from nature"* but a *"long, gradual history of psychological estrangement with nature and place"*.

The author Jeremy Lent greatly deepened and expanded these ideas in his ground-breaking recent book, *The Patterning Instinct*. In the book, Lent proposes that the very history of western scientific and religious thought has left us with deeply ingrained cultural metaphors and stories – of nature as something external to us, separate to the soul and mind, fundamentally a machine to be exploited – that now threaten ecological collapse.

These ideas were the basis of the scientific and industrial revolutions, which transformed human lives for the better, but also left us with entrenched metaphors of human domination over the natural world. Now, we urgently need new metaphors and stories that can reshape our relationship with both nature and the rest of humanity.

We have the capacity to build an alternative worldview around a sense of connectedness within the web of life

It might seem like these ideas, however profound, are too philosophical to be of relevance to someone on a building site trying to protect biodiversity. But the job for those of us in the building sector is the same as for everyone: to examine and reflect on our own values towards nature, to explore whether we have lost and can re-establish a connection with it, and then from this place of deepened connection spring forth with fresh ideas, creativity and a renewed sense of how we can design and build in a way that supports and enhances the living world.

Lent writes that the *"very precariousness of our current system… increases the potential for deep structural change"* and that *"when the linkages within the system begin to unravel, it's far more likely to undergo the kind of deep restructuring that our world requires."* He also says that: *"the same human patterning instinct that has brought us to this precipice is also capable of turning us around and onto a path of sustainable flourishing. We have the capacity to build an alternative worldview around a sense of connectedness within the web of life."*

A new story emerges

Indeed, there are tentative signs that this might already be happening, from the fresh sense of purpose and hope that Extinction Rebellion and student climate protests have brought to environmental activism, to the renewed momentum behind the campaign to have ecocide, the destruction of ecosystems, recognised as an international crime against peace (its leading proponent, the barrister Polly Higgins, sadly passed away recently). The latter is a good example of how, on a practical level, law and policy might radically change in response to a deeper evolution in our relationship towards nature.

"We are inherently social and have formed our immensely complex civilisation on the basis of agreeing what is 'socially acceptable' and enshrining that with laws and rules," read one particularly eloquent recent letter to the Guardian, by a Harold Forbes of Devon. *"With climate change, where we have gone astray is failing to update those laws and rules to cope with our burgeoning population, especially in our relationship with nature and the functioning of our economy… In Extinction Rebellion and the UK Student Climate Network, we are seeing the emergence of social acceptance that it is wrong to not just allow but to actively reward the destruction of our future."* Perhaps our inner stories are now slowly starting to shift.

Appetite for large scale restoration and rewilding of ecosystems is now gaining critical mass, too. The recently launched, and hugely exciting, Natural Climate Solutions campaign points out to research showing that ecosystem conservation, restoration and better land management can contribute 37% of the *"cost effective CO_2 mitigation"* needed to give the world a 66% chance of staying under 2C of warming. It says that these strategies also deliver *"water filtration, flood buffering, soil health, biodiversity habitat, and enhanced climate resilience"*.

A question for those now driving the sustainable building sector forward might be: how can our industry play a deep and meaningful role within a new movement to protect and restore biodiversity at scale? How might we now examine and renew our own relationship with nature? And how might our work look if it emerged from a place of real and heartfelt connection with the living world?

"There are so many buildings that exclude nature," the legendary Australian architect Glenn Murcutt says, *"But I want to smell the rain, hear the rain falling… To do that, one must design a building so nature is the musical score, the occupants are the audience, and the building is the instrument through which it is allowed all these things to take place."*

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