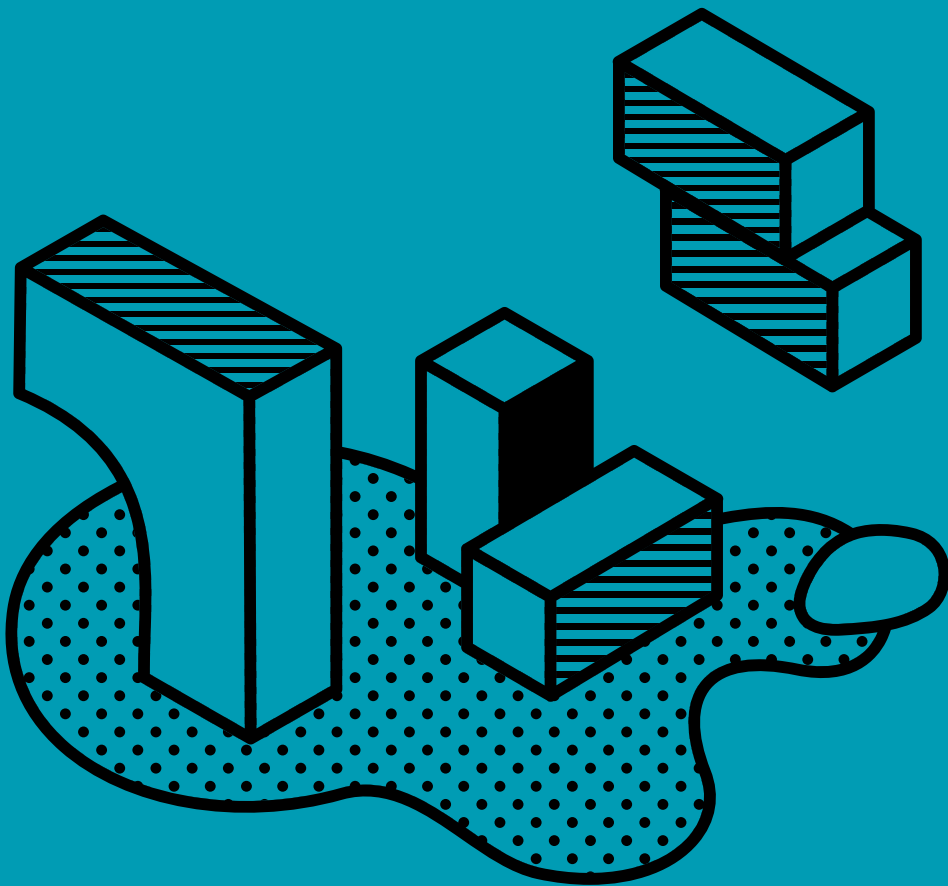# Designing Brussels Ecosystems

Metrolab Brussels MasterClass II

Bernard Declève
Geoffrey Grulois
Roselyne de Lestrange
Andrea Bortolotti
Corentin Sanchez Trenado

(eds)

Designing Brussels Ecosystems

Metrolab Brussels MasterClass II

Bernard Declève

Geoffrey Grulois

Roselyne de Lestrange

Andrea Bortolotti

Corentin Sanchez Trenado

(eds)

Towards an Integrated Architecture and Ecology of the City

Brian McGrath

Beyond the urban ecosystem double bind

I came to this workshop from New York City, part of the US' north-east megalopolis, stretching from Boston to Washington and primarily made up of timber houses and lawns within inhabited forests structured by watersheds. Historically, rivers became the productive sites of mill towns and industrial neighbourhoods, while business centres of glass and steel — such as Manhattan — attest to accumulation of wealth of the megalopolis; currently, however, sprawling office campuses, distribution 'fulfilment' centres and retail strips are the backbone of this sprawling conurbation. During this MasterClass, I came to understand Brussels' territorial history as a stone city built by agricultural and craft merchants along the Senne River, a tributary of the North Sea, protected by a duke with his magnificent hunting forest to the south-east. In the xixth century, the Brussels-Charleroi Canal connected the coal fields of Wallonia to the North Sea, creating an industrial city along the length of its transect at the nodal city of Brussels, leaving the forested south-west of the city-region as an elite enclave. The aftermath of World War II saw the development of a service economy as Brussels became the seat of NATO, then the European Union. Territory and history are the architectural and ecological destiny of cities. Brussels exists as a bilingual artefact between sea and forest, with its own history of manufacturing complexes and clusters of glass towers as well as its own sprawling conurbations.

Architecture is the art and practice of designing, constructing and living in buildings, cities, landscapes and territories. Ecology is the scientific study of the patterns and processes involved in the distribution and abundance of organisms, the interactions between them and between organisms and the environment and flows of energy and matter. Designing urban ecosystems through the lenses of ecology and inclusion demands a multi-scalar and multitemporal material project located at the intersection of the architecture and ecology of the city. Both mineral and forested, green and grey, dense and dispersed, the design of urban ecosystems is caught in a double bind in which two irreconcilable demands or choices between diffusion and density must be made. The current design debate, between a dispersed city structured by green infrastructures and a high-density urban future, results in difficult choices between the architecture and ecology of the city.

We are in a time when the ancient cultural heritage of the city's architecture is being usurped by the novel concept of urban ecology. While architect Aldo Rossi (1982) distinguished the collective artefact *of* the city from building *in* the city, ecologist Steward Pickett (1997) made the same distinction between the ecology *of* the entire city — mineral and vegetal — from the 'green stuff' that is the object of most ecological research. Likewise, the architecture of the city must expand its concerns to ecological structures, spatial patterns, processes and functions as well as flows of organisms, materials and informational. Based within the historical distribution, interactions, flux and feedback between humans and the city's territory, the future city needs to move beyond the double bind of architecture and ecology as conflicting demands. An inclusive architecture and ecology of the city must also begin with a process of coproduction with urban residents, not be dictated from on high by urban specialists.

Intersections between the architecture and ecology of the city
Five potential intersections between the architecture and ecology of the city move beyond the urban ecosystem's double bind and provide a framework for designing urban ecosystems: 1) the architecture of the city is a collective artefact that can also be understood as a social-ecological patch structure; 2) the city can now be both an object of long-term ecological research and the subject of history and civic memory; 3) an integrated architecture and ecology of the city become operative through historical typo-morphogenetic analysis enhanced with land cover classification of both built and vegetated urban ecological patches; 4) the architecture and ecology of the city both focus on the cyclical relations between the structural and functional patch dynamics of urban artefacts at nested scales, from the furniture in a room to the territory and from the leaves on a tree to the entire forest; 5) patterns of habits, behaviour, disturbance, feedback and learning are understood both in the physicality of the city and the study of human and non-human life within nested time scales, from daily cycles to geological time frames (McGrath, 2018).

For example, the Hubbard Brook Experimental Forest in New Hampshire (Likens and Bormann, 1995), continues to collect data on forest dynamics drawn from small instrumented watersheds. This research model has been translated in the Baltimore Ecosystem Study (Grove, Cadenasso, Pickett, Machlis and Burch, 2015) in order to understand individual and community changes in the built environment in a wide range of neighbourhoods across the Baltimore region. It is a pattern that extends across the entire north-east megalopolis of the US. Exurban subdivisions and central city row houses share the same watershed and a nutrient cycle depositing into coastal estuaries such as the Chesapeake Bay. With industrialisation, a string of coastal colonial ports transformed to specialise metropolitan centres. Car-based suburbanisation and exurbanisation fragmented these manufacturing centres into hubs of knowledge (Boston), finance (New York) and governance (Washington), with uneven development leaving cities like Baltimore in severe economic decline.

The European city, in spite of the post-war investment in historical centres and high-speed train links, has similarly fragmented into unevenly developed post-industrial megalopolitan regions. In Brussels, the duke and his forest, together with the traders and their canal to the North Sea, formed an urban ecosystem that still socially and ecologically stratifies the urban region. Brussels' industrialisation occurred when the city's merchants connected the North Sea to the coal fields of Charleroi. In the second half of the xixth century, the king of Belgium built a colonial empire and the city became a modern metropolis, with bourgeois extensions reaching deep into the forest. Today, as a remnant of the coal-based metropolis, think tank Architecture Workroom Brussels suggests that the post-industrial city is divided into those trained to be makers or thinkers (Architecture Workroom, 2016) and an economy that is creating extensive zones of gentrification along the industrial canal as well as in the historical centre.

As a way of linking the architecture to the ecology in the progressive social coproduction of the city, the concept of the metacity (McGrath and Pickett, 2011) was developed. The metacity recognises new forms of planetary urbanism that are both highly segregated to local coherence, yet globally linked through leisure and tourism, supply chains and communication networks. Lefebvre's (2011) prophecy of a global urban revolution has arrived, yet the city needs to be socially appropriated from the concentrated wealth of a global elite. Metacity theory is based on the distribution logics of metacommunity and metapopulation research in ecology. It recognises the healthy diversity of low-density urban dispersion and high-density agglomeration, and the role of new global communication and distribution logics in combating the segregation of patches of poverty and wealth. In addition to being a social and biophysical necessity, the intersection of the architecture and ecology of the city must challenge the political architecture and ecology of the present.

Hotspotting the metacity
The four projects produced during the Metrolab MasterClass on urban ecology can be seen as operative of a multi-scalar and temporally based architectural and ecosystem approach to address the social and environmental impacts of Brussels' inherently fragmented urban form. The projects are situated as both an architecture and ecology of patches and boundaries, rooms and doors, walls and gates, courts and gardens, forests and fields, making and growing, recycling and circulating. Each project focuses on new architectural and ecological cycles that are being coproduced with governmental and non-profit organisations as well as community groups throughout the Brussels-Capital Region. Demographic data shows that the region is both densifying and diversifying, so the double bind between green and grey is acute. Local agriculture is regaining a foothold and a circular economy of construction techniques, temporary occupations and small-scale reconfigurations of live and work is emerging in the cracks of a fragmented metropolis. These innovations in managing material flows and new types of living and work form an ecosystem of situations and stakeholders, patterns and patches, geographic and temporal scales, flows and fluxes that forms multiple 'hotspots' within the

Brussels ecosystem as a metacity. The conclusion will address how each of the MasterClass's four groups are 'hot spots' in the matrix of possible interrelations between the architecture and ecology of the city mentioned above.

The land along the Brussels-Charleroi Canal is the site of gentrification and rapid real estate speculation. Government development agencies promote the conversion of land to higher density residential uses, displacing workplaces as well as poorer residences and new arrivals to the city. The 'Density' group explored the transitory occupation of two former industrial areas slated for redevelopment along the canal: the Biestebroeck Bassin and Heyvaert. Sanctioned programmes for the temporary occupation of land in transition offer an alternative model of incubating new ways to integrate the architecture and ecology of the city rhythmically in time. While there is temporary support for these kinds of experiments in normal development cycles, the Brussels ecosystem project of the 'Density' group seeks to sustain these types of cyclical occupations by providing a much more heterogeneous and ecological city than the one currently being planned. The project points to a more integrated approach by aligning patterns of habits, behaviour, disturbance, feedback, and learning in the physical fabric of the city with the study of human and non-human life within nested time scales, from daily cycles to geological time frames.

The distributive logics of the global neoliberal economy has resulted in vast distances between the production and consumption of even basic needs. The zoning approach of modern city planning has resulted in the nature/culture divide and the current double bind between the architecture and ecology of the city. Food is a crucial area for creating new local productive economies and mixing grey and green land uses. The 'Agriculture' group focused on new agricultural patterns emerging in fragments of open space along infrastructural corridors at the periphery of Brussels. An integrated approach would diversify the monocultural fields just outside the city and promote new, local food logistics. An integrated architecture and ecology of the city becomes operative through historical typo-morphogenetic analysis of leftover spaces in the gaps, vacancies and planned open spaces of post-industrial Brussels. Enhanced land cover classification combines both built and vegetated urban ecological patches of mixed urban and agricultural patches. New patterns of the flow and movement of perishable food counters the centre/periphery zone pattern of regional agricultural markets and the peripheral logistics of global agribusiness and supermarkets. This social-ecological patch structure provides opportunities where urban agricultural coops are creating a shared landscape for new social and mobility patterns within gaps in the dense mineral city.

The disruption of regional food markets is matched by efforts to reverse the enormous waste that results from a construction industry as part of a global supply chain by 'hot spotting' the circular economy. The 'Circularity' group looked to territorialise the circular economy by closing the material flows within hot spots under redevelopment. The Northern Quarter in Brussels was developed after World War II as a single-use central bustiness district, and it has already become

obsolete. The transformation of the district within the framework of a circular economy would require the development of new demolition and construction skills at the scale of a city district, but also initiate a new kind of high-density mixed use and socially integrated neighbourhood. The Northern Quarter can now be both an object of long-term ecological research in circularity and the subject of history and civic memory.

Balancing work and life through a project of doors was inspired by the Zinneke association. The proposal developed by the 'Work' group is a remarkable example of urban ecosystem design through the fundamental restructuring of the basic materials of the architecture of the city. Zinneke inherited several adjacent properties in a fragment of the xixth century metropolis, near the old industrial canal and behind the work zone of the Northern Quarter. Employing a feminist concept of space as matrix that questions both the forced enclosures of Victorian room arrangements and the openness of the modernist free plan, their carefully designed renovation uses flexible openings and closures at different time frames to modulate between the needs of privacy and publicity. Work and play, privacy and publicity are not binaries. The project of rooms extends Zinneke's project first to the institutions and public space of the surrounding neighbourhood. The architecture and ecology of the neighbourhood around Zinneke promotes a dual focus on the cyclical relations between the structural and functional patch dynamics of urban artefacts at nested scales, from the furniture and doors in a room to the territory, through the renewed green infrastructure of Parc de la Senne, reconnecting the forest to the sea.

The canal is a collective artefact defining the industrial era of the city, and it structures the projects as social-ecological patches along it. Density, agriculture, circularity and work are lenses used to demonstrate how the buildings, districts, gardens and farms of the Brussels-Capital Region are probes or hot spots that can be both objects of citizen-led long-term ecological research and ongoing subjects of history and collective memory. These hot spots have both typo-morphogenic legacies and form different land cover structures. The cyclical relations between the structural and functional patch dynamics of urban artefacts at nested scales, from a few sheep in the regional food system, reconfiguring doors in a former factory, or replacing windows within a cycling construction system to temporary occupations of buildings and the reconfiguration of room and property relations. Patterns of habits, behaviour, disturbance, feedback and learning, such as temporary uses, are understood both in the physicality of the city and the study of human and non-human life within nested time scales from daily cycles to geological time frames.

Together, the four projects point to the multiple ways of overcoming the architecture/ecology double bind of irresolvable contradictions. When culture and nature are seen as inseparable, and buildings and organisms are seen as part of the same ecosystem, the line separating architecture and ecology is blurred. In fact, the word ecology was derived by Ernst Haeckel from the Greek 'oikos', meaning the study of house, dwelling place or environment. The future

city must be inclusively coproduced as an integrated architecture and ecology of a collective civic consciousness. As architects gain knowledge in social and biophysical sciences, ecologists will take on the role of cultural figures speculating on future urban ecosystems. Patchy social and ecological disturbance and dynamics are current norms in our complex contemporary conurbations, not an idealised predictable balance and harmony between culture and nature. While the future city is an open system, social groups as well as ecosystem science and typo-morphogenetic research demand nested boundaries for scaled analyses from the room and garden, to the neighbourhood fabric and regional territory. An architecture and ecology of a collective mind reminds us that we make that world and the world makes us within daily, seasonal, historical and geological cycles.

References

Architecture Workroom (2016). *A Good City Has Industry, Atelier Brussels Productive Brussels*. Brussels: Bozar.

Grove, J. M., Cadenasso, M. L., Pickett, S. T. A., Machlis, G. E., & Burch, W. R. Jr. (2015). *The Baltimore School of Urban Ecology: Space, Scale, and Time for the Study of Cities*. New Haven, CT: Yale University Press.

Lefebvre, H. (2011). *The Urban Revolution*. Minneapolis, MN: University of Minnesota Press.

Likens, E., & Bormann, F. H. (1995). *Biogeochemistry of a Forested Ecosystem* (2nd ed.). New York, NY: Springer-Verlag.

McGrath, B., & Pickett, S. T. A. . (2011). The metacity: a conceptual framework for integrating ecology and urban design, *Challenges* 2(4), 55–72.

McGrath, B. (2018). Parallels in the Evolution of Conceptual Frameworks: The Architecture and Ecology of the City. *Ecosystem Health and Sustainability*, 4(6), 148-159.

Pickett, S. T. A., Burch, W. R., Dalton, S. E., Foresman, T. W., & Rowntree, R. (1997). Integrated urban ecosystem research, *Urban Ecosystems*, 1, 183-184.

Rossi, A. (1982). *The Architecture of the city*. Cambridge, MA: MIT Press.