A spectacular global survey of some of the world's most inventive buildings, whose conception and realization bring architecture and horticulture into a sustainable whole.

Garden City

Supergreen Buildings, Vertical Skyscapes and the New Planted Space

Anna Yudina

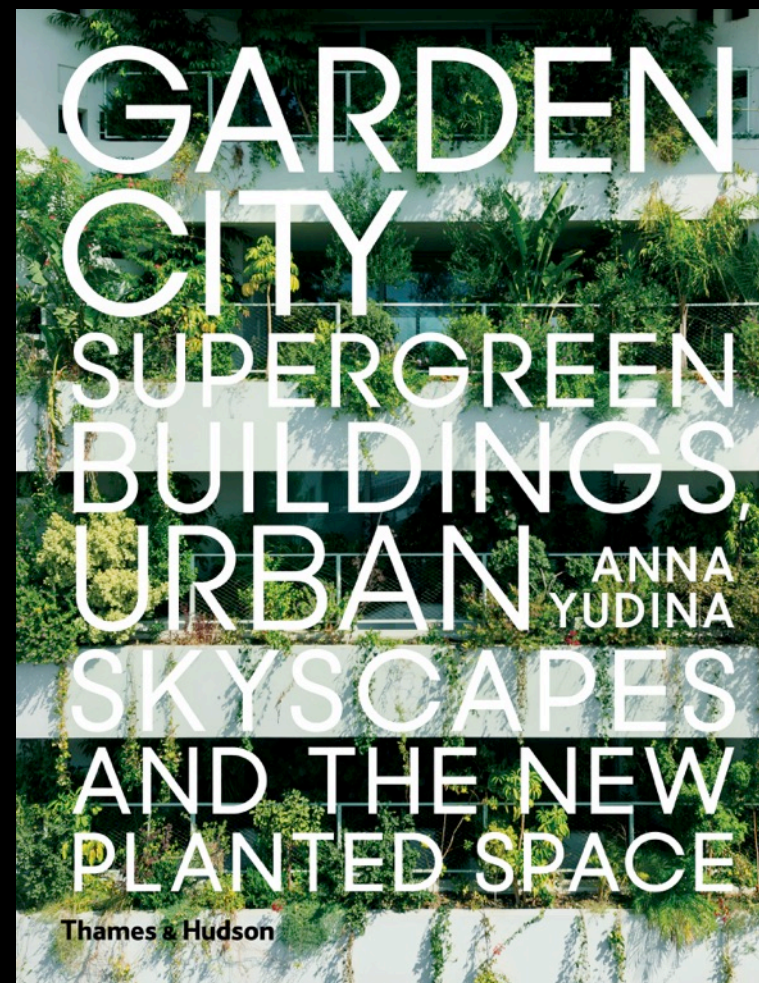300 illustrations
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GARDEN CITY SUPERGREEN BUILDINGS, URBAN SKYSCAPES AND THE NEW PLANTED SPACE

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Thames & Hudson

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Key Sales Points

- Charts one of the most dynamic and often arresting new areas of contemporary urban architecture

- Packed with ideas about urban, green design, from small-scale balcony gardens to major public spaces

- Includes projects from established practices and emerging studios from the past decade

- Celebrates the growing importance of using all available spaces for planting – from 'vertical gardens' on the sides of office buildings to blocks incorporating trees on every level

25 Green

Luciano Pia / Turin, Italy

Turin-based architect Luciano Pia describes 25 Green – a five-storey apartment building located in a former industrial zone – as a child's dream of a tree house coming true. The project's nondescript surroundings prompted Pia to consider an introverted scheme that would be like an oasis for its residents, while its proximity to the River Po and the Valentino park gave him an idea of 'importing' a fragment of both the river and the park into the new urban block.

The apartments were designed as irregularly stacked, empty modules of various shapes and sizes, allowing their owners the maximum freedom to organise the interior space according to their needs and preferences. These residential modules are immersed in a 'habitable forest': each apartment has a large terrace planted with trees and shrubs, which makes a total of 140 trees for 63 units. Forty more trees populate the courtyard garden. This vertical forest is inseparable from the building: in the architect's words, cutting down one of these trees would be equal to demolishing a part of the structure.

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Widely known green wall schemes wouldn't have worked in this case, because they require a vertical surface for the plants to be properly watered and fed. Instead, the project uses a bespoke facade system, in which standard rectangular planters are mounted on a superstructure made of metal tubes and rails, with specially developed joints that allow creating the desired irregular shape.

'As city and nature increasingly mix with each other, it becomes exciting and even necessary to artificialise nature and naturalise the city,' says architect Thomas Corbasson. Responding to a competition brief for the renovation and extension of the Picardy Regional Chamber of Commerce and Industry in Amiens, France, his firm chose to take the park – and not the 18th-century mansion that had previously housed the Chamber – as their point of reference. The new building's courtyard-facing facade merges with the existing landscape and its artificial rocks; large bay windows seem to be cut into the green mass.

As the park already had its own irrigation and water management systems, the green facade could simply be 'plugged' into the circuit. The technical aspects of covering the irregular, three-dimensional facade surface with a continuous layer of vegetation proved much trickier. Together with engineering consultants from Betom, the architects developed a modular, low-tech solution. Custom-designed for this project, their system can be adapted to other complex facade geometries.

Milan's Vertical Forest consists of two towers 80 and 112 m (262.5 and 367.5 ft) high, which together host 480 large and medium trees, 300 small trees, 11,000 perennial and covering plants, and 5,000 shrubs. In other words, Stefano Boeri's scheme fits an equivalent of 2 hectares (4.9 acres) of forest and undergrowth into some 1,500 sqm (16,150 sqft) of urban surace.

It took three years to develop the garden system for the Vertical Forest. The design team – which included Emanuela Borio and Laura Gatti, in charge of the vertical landscape design, – collaborated with a group of botanists to select the plant species that would fit in the designated slots on the balconies, but also to devise their optimum distribution in relation to the facade orientation and height. The trees, some of which should grow up to 9 m (29.5 ft) tall, had been tested in a wind turbine to make sure they would pose no danger if planted on the upper floors. The plants were pre-cultivated in a nursery, where they got accustomed to their future living conditions.

On the average, Boeri's design provides two trees, eight shrubs and forty other plants per resident, and – quoting the architect – 'promotes the formation of an urban ecosystem able to be inhabited by birds and insects.' With an initial estimate suggesting an impressive 1,600 specimens of birds and butterflies, hopes are that the Vertical Forest will become a magnet for the spontaneous recolonisation of the city's flora and fauna.

House With Plants

Junya Ishigami / Tokyo, Japan

In this house for a young couple, Junya Ishigami puts into practice some of the ideas he had developed for the Venice Architecture Biennale in 2008 (pp. 152-3). Back then, Ishigami proposed a series of conceptual projects, in which he revised the relationship between architecture and landscape through mixing these two environments to create 'ambiguous spaces' that brought the inside and the outside 'infinitely close' to each other, but 'never allowed the two to assimilate.' Among the examples were a vacation house in the city and a bachelor pad, both of which engaged in a lively dialogue with their surroundings. The ground floor – a single, extremely transparent, semi-outdoor room – hosted an 'inner garden' that spilled out into a thick mini-forest occupying the entire plot. A small bedroom was tucked upstairs, while the bathroom was placed in a separate structure. The Tokyo-based House for Plants follows a very similar pattern. Its thin-walled, double height, cuboid envelope with large glazed openings seems to be built around a fragment of a garden that shares space with a human dwelling. Stepping stones embedded into the open ground lead to a closet in the corner; a kitchen block complete with a dining table, a cupboard and a fridge sits on a freeform patch of flooring, while the living room is housed in a smaller box-in-a-box structure whose roof doubles as a bedroom.

Market Garden Tower

Ilimelgo, Atelier Secousses / Romainville, France

Life in Romainville will be getting more dynamic as this suburban town is now part of the Greater Paris region and is being integrated in new transport networks. Since the area has always had strong agricultural roots, urban farming sits at the top of the list in the long-term plans for the local economy. Among the pilot projects is the Market Garden Tower, designed by Ilimelgo and Secousses architects on a site that belongs to the public housing agency and is challenged to enable economically viable local production of fresh food, create jobs, and liven up the neighbourhood. Over 1,000 sqm (10,764 sqft) of plant beds with organic substrate instead of soil will be stacked inside a transparent facility complete with an educational greenhouse and a direct sales shop. The design team opted for archetypal shapes and matched the project's height with the surrounding buildings. The project relies on prefabricated structural and facade elements. The double-volume design with an all-glass exterior maximises natural lighting. Sustainable features include composting, rainwater management, and a facade with mobile and thermal screens for efficient insulation and natural ventilation.

4

Performance

Paris Smart City 2050

Vincent Callebaut / Paris, France

When he speaks of 'archibiotics', Vincent Callebaut means combining architecture, biology and information technologies to create hyper-connected cities that will function as natural ecosystems – that is, knowing no such thing as pollution and waste. In a way, he seeks architectural expression for social thinker Jeremy Rifkin's concept of the Third Industrial Revolution – notably, his ideas about transforming each building into a power plant and connecting them with a smart, peer-to-peer energy-sharing-grid.

Challenged by the Paris City Council to propose solutions for densifying the urban fabric while fulfilling the city's plan to reduce greenhouse gas emissions by 75% within 2050, Callebaut joined forces with experts in bioclimatic engineering from Setec to develop eight case studies for transforming Paris into a Smart City.

How do you design a Smart City if you can't build it from scratch, like South Korea's Songdo or Abu Dhabi's Masdar?

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The Photosynthesis Towers (opposite, top) use the existing structure of the Montparnasse tower and two adjacent tall buildings to wrap them in a verdant, spiraling, piezoelectric ramp – a 58-floor high public parc that will generate electricity from its visitors's footsteps. The new facades will integrate photobioreactors for the production of microalgae as a source of biofuel.

The Bamboo Nest Towers (opposite, bottom) will envelop thirteen 1960s residential high-rises with a three-dimensional 'eco-skeleton' in plaited bamboo that will support the load of vegetable garden balconies and incorporate funnels to accelerate the winds and boost the output of wind turbines.

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