

Right: One of Patrick Blanc's *Murs Végétaux* (Verdant Walls) caused much excitement at the 1994 Chaumont garden festival in France. Unusually, this exhibit has been preserved there as a permanent feature and continues to flourish

Far right: Patrick has designed a number of living walls for public spaces. Here, in the Parc de Bercy in Paris, he has added an eye-catching red structure to add extra emphasis to the vertical, cliff-like planting



Stephan Léves



Nicolas Brouzet

Above: From early experiments with plants in aquariums, French botanist and scientist Patrick Blanc has been investigating the concept of the vertical garden, housing walls of plants without the need for soil

AS GARDEN SPACE, especially in the city, becomes increasingly limited, the idea of extending the available growing area is highly appealing. According to French botanist and scientist Patrick Blanc, a wall represents a wonderful means of taking the planting surface of the garden in an unusual and rarely-used direction. For many years he has been investigating the concept of the vertical garden, where plants grow from the wall to form a lush, verdant face of vegetation which requires minimum maintenance and, best of all, little weeding.

Walls and other upright garden structures around the garden tend to be used for defining or protecting areas, forming boundaries or acting as supports for climbing plants, but Patrick is innovatively translating his plant knowledge and experimentation to a myriad vertical places to change the way we view the garden.

A member of France's esteemed National Scientific Research Centre (*Centre National de la Recherche Scientifique*) and a professor at the University of Jussieu in Paris, Patrick regularly travels to tropical rainforests all over the world, to study unusual and

rare plants, and on research trips with his students. His fascination with plants stretches back to his childhood when he began experimenting with an aquarium at home to see which plants could survive without soil. He found that many tropical perennials, including philodendrons, scheffleras and bromeliads plus many orchids and ferns, all flourished with their roots in the nitrogen-enriched water.

#### Lessons from rainforests

With this research under his belt, and experimental plants all over his parents' house, Patrick focused his attention on the ability and adaptability of plants to grow on vertical surfaces, inspired by examples of plants growing from the sheer rock face of a waterfall or from the bark of a host bough. In rainforests, trees vie for sunlight and grow as tall as possible, their leaves forming a dense overhead canopy. Underneath it, other plants within the forest adapt and grow in every available nook and crevice and at all angles, their tenacious root systems searching out vital water and nutrients. If certain plants could grow happily in these precipitous states in the wild, Patrick thought, they might also thrive in a similar garden setting.

After careful study of such plants and their habitats, and experimentation with materials and nutrients, Patrick succeeded in creating a vertical garden at his home in Créteil, southeast of Paris. Measuring just 60sq m (650sq ft), this courtyard in front of the house is surrounded on two sides by 4.5-m (15-ft) high walls and an adjacent boundary wall. The space is typical of a small urban garden, shaded for much of the day by the building and walls. By expanding this small area skyward and covering the vertical surfaces with plants, however, the garden becomes in essence a green nest, cosseted by beautiful plants, yet sufficiently spacious at ground level for tables and seating.

Mirroring the natural formations of the tropical rainforest with which Patrick is so familiar (though with mostly hardy species in place of tender exotica), the plants near to the top of the wall are sun-seeking, larger-growing shrubs and flowers that form a canopy over the lower planting. Profuse clusters of *Buddleja* hang in long plumes all through summer, together with the tiny, starry flowers of *Spiraea*. Various *Salix* and *Ficus* species give height and depth with *Forsythia*, *Berberis* and *Erysimum* providing both depth and colour in different seasons.

Below this canopy a shaded, damper area is created and here grow a variety of ferns, *Corydalis*, rounded >

## Vertical thinking

Penelope Hill investigates an off-the-wall approach to gardening that is taking France by storm



Right: These hanging gardens at the Fondation Cartier, Paris, both complement and contrast with the modern glass and steel building

#### Epiphytes and lithophytes

Certain non-parasitic plants including mosses, some orchids and ferns, and many bromeliads are adapted to use trees and other large plants as a host or support without harming them. These epiphytes often have aerial roots to collect moisture from the air. Lichens and other plants (including certain orchids) that can grow on rocks or stones with little or no soil are called lithophytes



Nicola Brown

#### Further information

A similar wall has been established for some years at Barnards Farm, Essex, by Bernard Holmes (see *Constructing a cliff face*, Letters, Sept 2000, p710).

In 2001 the garden at Barnards Farm opens for the National Gardens Scheme every Wed in June (11am–4pm); Sun 8 July and Sun 2 Sept (2–5.30pm); admission £3; also by appointment. Tel: (01277) 811262 ([www.barnardsfarm.org](http://www.barnardsfarm.org))

•For more on gardening without soil, see *Brickbats for bouquets*, by Tony Kendle and Kate Lloyd-Bostock, *The Garden*, May 2000, pp377–81

clusters of the sweetly scented evergreen shrub *Azara serrata*, cushion rosettes of *Saxifraga* and groups of white-flowering *Iris japonica*. Mosses and lichens sprout in the moist, darker spaces close to the ground between the plants to form a uniform green background. Fortunately, weeds hardly ever appear.

#### Going public

Patrick created his garden in 1991, but it was not until 1994, at the third garden festival at Chaumont-sur-Loire, that Patrick Blanc's *Murs Végétaux* (Verdant Walls) were unveiled to the public – to instant acclaim. The Chaumont festival is France's annual showcase for innovative and exciting new ideas in garden and landscape design. Patrick's exhibit was created as a freestanding wall with its base in water, which was not only recycled to feed the plants but home to a number of goldfish. Visitors to the festival walked around the towering feature which was covered from ground level to well above head height with many well-known hardy garden plants, and were able to admire their beauty in a new and exciting way.

Its leafy luxuriance of familiar and exotic vegetation created an awe-inspiring three-dimensional space, providing an unaccustomed view of the plants and showing many possibilities for naturally beautifying walls. The design created new spatial awareness by drawing the eye to plants in mid-air and challenging the usual tendency to look down at flowers in a garden.

It was also a highly tactile, fragrant, sensuous space, appealing and easy to touch and care for. The dual

realisations – that the plants needed no soil in which to grow and that the constantly recycling nutrient-rich water was nonetheless clean enough for fish to live in – were also sources of amazement. Unlike most Chaumont display gardens, the wall was preserved for future festivals and continues to flourish.

#### Scientific background

The verdant wall concept is based on hydroponics, where plants grow without soil in an inert medium, fed on a dilute solution of all the elements necessary for plant growth. Nutrients and moisture are readily accessible in this system and since plants do not need to compete with each other for the nutrients, more can be grown in a smaller area. Commercial vegetable growers all round the world use a similar system, the nutrient film technique, in their glasshouses.

Proper nutrient formulation is essential, and 13 mineral elements are necessary for satisfactory plant growth, including nitrogen, phosphorus, potassium, calcium, magnesium and sulphur; plants suffer if one of the nutrients is missing or imbalanced.

The idea also has echoes of the Victorian fernery, where shady conservatory walls, faced with pieces of tufa, a porous limestone deposit, were kept constantly moist by ingenious watering systems, allowing fern enthusiasts to indulge their passion.

#### Wall gardening

To create a wall, Patrick places small, young plants he has grown from seed or cuttings into pockets cut in a blanket of stiff synthetic felt (such as propagation felt) that forms the wall's outer layer. The plants take root in the felt material in three to four months, their intertwining roots adding strength to the structure. Backed by a thin sheet of PVC to protect the wall, the entire planting mat is just 13mm (½in) thick.

A watering system, adjusted to the orientation and climate of each site, drips a classic hydroponic mix of diluted plant nutrients through the felt to feed the

#### SOME PRACTICAL CONSIDERATIONS

When making a 'green wall', ensure the underlying structure will support the considerable weight of wet capillary material and plants (which will increase over time). If it is to be sited against a house wall or outbuilding, treat the wall with clear waterproofing compound and install a damp-proof membrane to protect the building, even if it seems impervious; also take care to prevent seepage from the sides of the feature. Do not use a neighbour's wall without permission, and avoid covering any airbricks. Freestanding walls can be made from breeze block, or hung from scaffolding poles, as at Barnards Farm (see margin note, left). The electric pump to circulate the nutrient solution should be installed by a qualified electrician.



Nicola Browne



Nicola Browne

Left: Patrick's tiny courtyard garden is home to two planted walls established 10 years ago. Moisture-loving *Adiantum pedatum* (maidenhair fern) and *Tolmiea menziesii* (piggy-back plant) (far left) thrive in the shady areas at the base of the walls

plants. Originally the drip system was the weakest link of the gardens, as the irrigation holes tended to become blocked, depending on the level of calcium in the water. Patrick, however, has overcome this after trying many different filtration systems.

Patrick believes that a verdant wall can be created anywhere so long as the nature and needs of the plants are respected. Inside his house he has established a tropical plant wall with flourishing exotic specimens found on his many travels.

#### Art of glass

Patrick has designed a number of walls in public spaces including the Parc de Bercy, in Paris, where a graphic red bar emphasises the verticality of the structure, and notably, a façade at the Fondation Cartier, Paris, a dramatic modern glass-and-steel building which houses a collection of contemporary artworks. Here, audaciously, the backing wall is a sheet of glass. Created in 1998 for an exhibition about nature and art, the permanent exterior verdant wall was mirrored by a temporary interior garden of tropical plants on the reverse side of the glass.

The result was a work of art in its own right, a juxtaposition of the building's ultra-modern materials, which play with transparency and light, and the dense, jungle appeal of Patrick's hanging gardens.

Sheltered and protected from extreme weather conditions by its location, the outdoor garden hovers above the entrance to the building. Part wild garden, part art canvas, the façade is like a three-dimensional

painting by Henri ('le Douanier') Rousseau. Its large, almost graphic plants and luxuriant verdant imagery manifest a surreal atmosphere. All that is missing is Rousseau's benevolent tiger to push back a lush leaf.

Through the visible web of steel that holds the sheets of glass in place, the vertical garden hangs supreme, linking the surrounding greenery from the trees that line the boulevard in front of the building to the garden by artist Lothar Baumgarten behind the foundation.

#### Reaching new heights

The novel concept has found a growing niche market in France, where Patrick Blanc is commissioned for public and private works nationwide. Testing the system to its greatest height yet, Patrick completed a 30-m (100-ft) high wall in a Parisian hotel courtyard near the Champs Elysées which will be unveiled later this year. Patrick hopes the vertical gardens will last for at least 30 years; his own is the oldest, established a decade ago. It is maturing beautifully, with just one pruning a year and little other maintenance except for the automatic watering and feeding. Ideally suited to commercial and corporate surroundings, this versatile technique seems to be equally adaptable to a domestic setting, and it will be interesting to see how its exciting possibilities are explored by adventurous amateur gardeners in the future. ☛

**Penelope Hill** writes about landscape architecture; her book *Contemporary European Garden Design* will be published in spring 2002

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0033 (1) 42 18 56 51.  
(www.fondation.cartier.fr).  
Admission: adults  
FF30, ages 17 and  
under FF20.  
Open: Tues, Wed and  
Fri-Sun, noon-8pm.  
Closest Metro station  
is Raspail.

•Patrick Blanc's garden is not open to the public

#### 10th Annual Chaumont Garden Festival

This year's theme is 'Mosaiculture et Compagnie' - novel interpretations of bedding plants.  
Open: 2 June-21 Oct 2001, daily, 9am-dusk.  
Admission:  
adults FFR50  
(concessions FFR40),  
children (8-12) FFR20.  
Contact: Conservatoire International des Parcs et Jardins et du Paysage, Ferme du Château, 41150 Chaumont-sur-Loire, France.  
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