



GREENING

Suzanne Perrin – a specialist in Japanese history and culture – looks into the greening initiatives in Japan's industrialised cities.



Top: The Oasis 21 of Nagoya's Central Park area in Japan
Right: The roof of Oasis 21, which has an effect like an 'aquatic Zen garden'



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were tuning up in the bus depot preparing for the inaugural evening concert.

The clue lies in the name, for it is only when one ascends to the top of the structure – via the elevator of the stairs – that one discovers the 'oasis'. The whole huge dish is filled with water, like a large transparent swimming pool, reflecting light beams through the water to the plaza and the bus depot below. It has the effect of an aquatic Zen garden – nothing to look at but exuding calm and tranquility. 'Oasis 21' ('21' refers to the 21st century) is a cooling water feature among the densely packed buildings of Nagoya city. Open to all, it allows a refreshingly cool space to its citizens in the hot summers.

In rebuilding the Japanese economy in the post-war years, the boom in industry brought wealth and advancement for society, and business groups became the new patrons of art and architecture for a new age. Japanese architects responded to technological advances, creating a new identity that discarded the stereotypes of the previous age. Art became accessible in department store galleries, fashion boutiques and street culture; museums and shopping malls became the creative focus for a new generation of architectural style, innovative design and consumer culture.

With the urbanisation of Japanese cities and the increasing density of population, overcrowding and pollution were inevitable outcomes. Most Japanese cities did not have any green space – the Imperial Palace in Tokyo has its own huge park which acts like a lung for the city, but the public are not allowed access to it. Nagoya proudly has its Central Park as it was a 'planned' city being rebuilt after the war.

Back in 1995 the Fukuoka prefectural government in Kyushu demolished its old HQ and created an innovative building – called 'ACROS' – as its new government HQ and cultural centre. As well as government offices, the building housed a conference centre, concert hall, retail outlets,

'Oasis 21' is a curiously-shaped tubular steel structure located half-way down Nagoya's Central Park area in Japan. It has a large oval dish placed on top at a height of around 30m, and it straddles an open pit that connects to the Nagoya bus depot below. On the opening day on 2nd October 2003 when I visited, Nagoya City Orchestra



To combat the growing pollution problems in the city areas, the Tokyo Metropolitan Government issued the new 'Greening the City' ordinance in 2001, requiring that every new building project over 1000m² must provide 20% of their roof area as green space with vegetation, and to have greenery occupying at least 20% of its non-building area in the overall plan.

restaurants, an outdoor stage, terrace and plaza. The structure was glass-faced on the front three sides, but the rear was like a pyramidal step-building with terraces going from top to bottom. The terraces were accessible with steps and people could walk up and down and along them, and sit and relax in them. They were planted with over 60000 different shrubs and flowers and provided an unexpected green space for the general public, overlooking a large plaza area that was used for public events.

Nearly a decade later the innovations of the ACROS building began to catch on. To combat the growing pollution problems in the city areas, the Tokyo Metropolitan Government issued the new 'Greening the City' ordinance in 2001, requiring that every new building project over 1000m² must provide 20% of their roof area as green space with vegetation, and to have greenery occupying at least 20% of its non-building area in the overall plan,



Left: Architect Shigeru Ban uses recycled paper, card, wood, and plastics to create dwellings and shelters, particularly where they are needed quickly in disaster zones. **Top:** One of Shigeru's creations using cardboard tubing • **Bottom:** Architect Jounan Kensetsu's 'Quad Roof House' which can be large or small depending on the number of components used, and has a usable roof space in four sections.





Shigeru's Pompidou of the South's roof structure is composed of timber that intersect to form hexagonal wooden units resembling the cane-work pattern of a Chinese hat (see design detail opposite).



thus allowing for plants and gardens to be used as public access areas for recreation.

These measures not only create pleasant green spaces within the city, they also aim to address the enviro-problems of the so-called 'heat island phenomenon'. Densely built cities like Tokyo, Hong Kong and New York have suffered 'localised warming' caused by the high density of heat-retaining concrete used in their building structures, as well as the human activity concentrated therein. Planting vegetation on rooftops helps to insulate buildings from heating up in summer, which can save on energy used to cool them down with air conditioning.

This initiative has also spread to existing buildings, whereby newly-created green space areas are being added for public access, in neighbouring wards and counties around the Tokyo area. Local government buildings in Shibuya, Shinagawa and Shinjuku wards have turned the roof areas of their offices into gardens and plantations to set an example, and also provide information to private sector building owners on how to utilise their existing roof space. They advise on what kind of plants, vegetables and herbs can be grown, as well as the varieties of earth and containers that are suitable for rooftop use. The Bunkyo ward government office in Tokyo started an initiative by inviting owners of buildings around its ward offices to participate in a 'greening' project with firms

specialising in equipment for rooftop development. The project gained momentum and six months later the green results were clear to see on 13 rooftops observed from the 25th floor of the Bunkyo ward building. The Sky Front Forum was created as an NPO which promotes the use of urban rooftops for green space, and advises on appropriate construction and building materials for installation and safety.

So it was that rice was harvested in the autumn of 2005 in the middle of Tokyo's Roppongi district, a feat unimaginable since the days of pre-modern Japan. The Mori Building Company developed the Roppongi Hills entertainment and retail complex which opened in 2005, and were enthusiastic about creating a 'biotope' on top of the Keyakizaka complex that housed the Virgin Cinema group. Forty metres above the ground they created a green space of 1300m², which included a rice paddy, vegetables and herb plantings, a traditional garden with pool and bridge, walkways and trees of the four seasons planted around the perimeter to give added seasonal stimulus. The rice paddy was planted by local school children on 5th May, and harvested around 60kg of rice in the autumn. At ground level in the Roppongi Hills complex there are open spaces planted with trees and shrubs, another garden with flowers and a pond, and seating and play areas for mothers and children.

It's not only vegetation that can be grown on rooftops. In the Nagatacho area of central Tokyo, home to sprawling government administration buildings, some of the hardest workers are flying in the air rather than sitting at desks. Beekeeper

Seita Fujiwara has installed his wooden beehives on the roof of the Social Democratic Party (SDP) headquarters, and tends them every morning. While pen-pushers sit below, thousands of bees fly off to do their work over the road in the Imperial Palace grounds, enjoying free access to all the areas that are restricted to citizens. There is an abundance of yellow and orange flowers of the yurinoki tulip trees planted around the moat, and rape and cherry blossoms abound in other parts of the grounds. This produces a yield of more than 250kg of golden honey, some of the best quality ever produced by Fujiwara, who is a 3rd generation beekeeper from the northern prefecture of Iwate. 'They are doing a lot better than I expected,' he said. Atop the 7th floor SDP building, the bees do very well as the 'heat island' phenomenon actually keeps the rooftop temperature at an ideal level for the queens to lay their eggs and to feed and raise the young. Fujiwara was delighted to find that his bee colony had increased five-fold in the six weeks of his initial experiment. Now he brings over 200 000 bees each spring to the SDP rooftop to do their work in the heart of the city.

In other efforts to combat the effects of urban warming, solar panels and wind turbines are also being located on under-used rooftops in city areas. The Imperial Hotel in Chiyoda ward in Tokyo has a vast number of solar panels placed on one side of its huge rooftop, which powers the lighting for the roof garden on the other side. In Chuo ward the Eitaibashi Eco Piazza Building has 25 wind-powered generators which illuminate the building's sign and provide additional cooling for the building's interior. Admittedly they are not a pretty sight, but then they are only visible from other rooftops, so one bypasses them at ground level.

In other areas new designs for low-cost housing have been generated in urban and rural areas since the 1990s, and a growing awareness for ecological, bio-diverse and sustainable environments has become a main theme in contemporary building projects.

With the recent natural disasters affecting Japan, particularly the Hanshin jishin (Kobe earthquake) of 1995 and the Tohoku jishin/tsunami (Tohoku region earthquake and tsunami) of March 2011, the role of architecture has been put in the spotlight regarding the rapid re-housing needs for disaster victims. Recycled materials are being used to greater effect

The Sky Front Forum is an NPO which promotes the use of urban rooftops for green space in Japan.

and some younger architects have focused on these as their main building materials for relief aid in devastated areas.

For example, upcoming architect Jounan Kensetsu has designed a 'Quad Roof House' which uses standard unit style components to build a house, the first being erected in Sagamihara city in 2012. The house can be large or small depending on the number of components used, and has a usable roof space in four sections (hence the name) for gardening, recreation and play. It can be constructed in an urban or rural setting, and can be extended at any time with more components. With a minimum lot size of 55m² this dwelling can be constructed quickly and easily in almost any location where the ground is flat.

Another young architect has concerned himself with using only recycled materials for his building projects. Shigeru Ban uses recycled paper, card, wood, and plastics to create dwellings and shelters, particularly where they are needed quickly in disaster zones. His shelters made from recycled cardboard were used after the Kobe earthquake in 1995, and withstood normal weather conditions for several months afterwards, temporarily helping people in the region before they were re-housed at a later time. He created a traditional tea house with modern features, called the PTH-2 - Paper Tea House 2 - in 2006 using recycled paper and card. His designs have won awards and he has inspired other young designers to think more creatively about the materials they use, and the effect on the environment of over-utilisation of dwindling resources.

In contrast to the moribund aspects of Japan's recent economic stagnation and political weakness, the new building projects that are embracing enviro-awareness with green spaces and biodiversity in urban situations show that Japanese ingenuity is not all lost. Japan is using its creative skills to combat the negative effects of urban warming by creating green spaces and using new technology to show us the way to create a better, cleaner and more sustainable environment for humans and other creatures alike. **SG**