

Science in culture

London's gherkin

The architect Norman Foster has taken 'green' building to new heights.

Michael Hopkin

The latest addition to London's skyline is distinctive for more than aesthetic reasons. The 40-storey, 180-metre-high cigar-shaped office building has also been hailed as a milestone in ecologically friendly architecture. Designed by Norman Foster for the reinsurance firm Swiss Re, the tower has now reached its full height and is due to be completed later this year.

The building is arranged in a series of spirals, each twisting five degrees per storey as they snake upwards. The curved atria or 'lightwells' thus created allow air to circulate throughout the structure — the building's smoothly curving glass skin features opening windows — and the oxygenating indoor gardens that punctuate these atria also prevent the atmosphere from becoming stale. The design cuts air-conditioning costs to a fraction of those in conventional skyscrapers. The lightwells also allow maximum penetration of natural light, reducing the need for electric lighting.

The design is socially friendly to those working in and around the building. Although its shape might seem gratuitous — it has been variously dubbed the 'Erotic Gherkin' and the 'Towering Innuendo' — the aim is to reduce the structure's physical impact on its surroundings. The building's curves will reduce reflected light and prevent winds from being deflected to ground level, as it is by rectangular buildings. And the tower's tapered form allows for more public open space at ground level.

The design has its origins in Foster's collaboration in the early 1970s with Richard Buckminster Fuller, the architect and humanist who lent his name to the football-shaped carbon molecules whose structure resembles his famed domes.

In 1971 the pair came up with a theoretical concept called the 'Climatrotroffice', to feature storey-spanning spaces containing indoor gardens for the circulation and oxygenation of air. Traditional walls and roof are replaced with a 'curvilinear' glass

covering, to minimize building materials. Both of these features are faithfully brought to fruition in the Swiss Re building, which is effectively a high-rise incarnation of the Climatrotroffice.

The idea of glass-skinned buildings was not new even in the 1970s — in 1960 Fuller built a 21-metre-high geodesic dome known as the 'Climatron' to provide hot and humid conditions for the Missouri Botanical Garden's collection of tropical plants.

Although the Swiss Re tower's environmental credentials are unmatched in London, it is not Foster's first 'green' skyscraper. Europe's tallest building, the 259-metre Commerzbank tower in Frankfurt, which was completed in 1997, also borrows from the Climatrotroffice concept by incorporating a series of nine indoor 'sky gardens'. The gardens — four-storey open spaces — surround a central atrium that pierces the building's entire height. This huge column allows air to circulate throughout the building, providing natural ventilation in place of air conditioning.

Other British architects are also keen to see their country mirror the devotion to ecological considerations shown by continental Europe.



David Marks and Julia Barfield, the architects responsible for the London Eye observation wheel — another of the less conventional shapes on London's skyline — recently unveiled their Skyhouse design as a response to urban planners' demands for affordable housing solutions. The proposed 40-storey towers, which would be composed of petal-shaped wings to make maximum use of natural light, could pair high-density housing with economical energy costs. The contemporary design could also go some way towards subverting the traditional British notion that high-rise living is undesirable.

Ironically, it seems that the world's most skyscraping nation, the United States, is lagging behind in the endeavour to build greener towers. Of the final two proposals competing for New York's Ground Zero site, neither has an ecological focus. Instead, the Lower Manhattan Development Corporation seems determined to make the simple, symbolic statement of erecting the tallest tower in the world. But committing to an environmentally progressive building is a noble response to a terrorist attack — as those in London's financial district are well aware, the Swiss Re building stands on a site whose previous incumbent, the Baltic Exchange, was destroyed by an IRA bomb in 1992.

Michael Hopkin is a subeditor at Nature.



The computer-generated image above shows how the Swiss Re building, with its eye-catching spirals (left), will alter London's skyline.

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on to topics that are more easily absorbed.

The concluding chapters are about the solar cycle, space weather forecasting and thoughts about the future. Appendices with further reading, selected websites, and acronyms and abbreviations will be useful for many readers. The eight pages of colour plates are beautiful and revealing, but are not numbered, and only two plates are referred to in the text.

The book is not without errors, but most of these are minor and are unlikely to be noticed except by experts. For example, at least twice the authors discuss how the solar wind material "tends to fly off in spirals", whereas its motion is actually known to be

primarily radial, and the spiral appearance that results from changing to a rotating coordinate system could have been explained. Elsewhere the authors have managed to provide simple descriptions of complicated processes.

The authors are even-handed when discussing controversial issues, such as solar influences on climate change; how the United States will capitalize on its investment in research to the benefit of space weather operations; determining how many satellite failures are really due to space weather events or perhaps to other causes; and the apparent reluctance of private companies to talk about space weather problems because of

competitive forces. But most importantly, they bring these issues to the attention of a broader community.

Storms from the Sun covers a remarkable breadth of material that is presented in an appealing format. When asked what they do, professional space scientists now have a book to recommend that explains many aspects of what they study. Policy-makers now have a useful reference book on space weather issues. And non-scientists have an informative and interesting book that explains space science and space weather. ■

Howard J. Singer is in the Research and Development Division, NOAA Space Environment Center, Boulder, Colorado 80305, USA.