WORLD ARCHITECTURE

The business magazine for the global architect

Issue number 77 | US $18.00 | UK £12.00 | June 1999

British revolution

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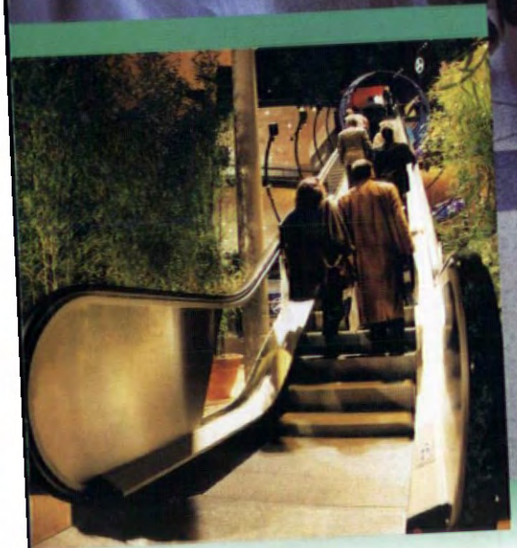
Bilbao's other cultural centre | Moneyspinning supersheds | Going underground with the UK's top architects



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Two of the 12 cylindrical pods designed by Buro Happold to service Richard Rogers Partnership's Millennium Dome, London. Photo: Mandy Reynolds A.B.I.P.P. Fotoforum

WORLD**ARCHITECTURE**

Contents **Issue number 77 | June 1999**

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Ruling class

It might come as a surprise to learn that more and more architects and associated professionals are talking down architecture as an isolated "art", recognising instead the flourishing collaboration between architects, engineers, planners and politicians in the planning and regeneration of cities. In Glasgow, even Deyan Sudjic, director of "Glasgow 1999 – UK City of Architecture and Design", spoke recently of the challenge of reinventing a city as "too important to be left to the architects". Glasgow was one of the first cities to benefit from the booming growth of the industrial revolution. At the end of the century it looks likely to become one of the most successful at realising the potential for a post-industrial future (see page 60).

Indeed, throughout the UK, cities are benefiting from an injection of cash and design initiatives which is redefining the shape of British architecture – even the Americans are getting twitchy about competition around the world from their fellow Anglo-Saxons. The success of recent projects, from London's Jubilee Line Extension (see pages 56-59) to the redevelopment of Manchester after the 1996 bomb, is not founded on the brilliance of individual buildings, but rather on the benefits of the collaboration highlighted above.

It is this understanding of cooperation, as well as the technical expertise spawned by the High-Tech school of Sir Norman Foster, Lord Richard Rogers, Nicholas Grimshaw *et al* that has made British design, and architecture in particular, such an exportable commodity. Not only are more Brits building abroad, and astonishingly (given their xenophobic reputation) inviting foreign designers in, but American educational establishments are opening their doors to UK architects and engineers, and packing lecture halls with young hopefuls and established architects eager to catch a little of the stardust. No wonder then, that at the Illinois Institute of Technology in April, more than half of the guest speakers for the Architecture with Technology conference (see pages 28-29), were Brits. The danger is that British architects will become complacent. At the moment they are too busy to even think about it.

Nicola Turner, editor

The WA78 double issue will be dedicated to celebrating ten years of World Architecture *(see* Next issue *page 25). It will be distributed in the first week of July.*

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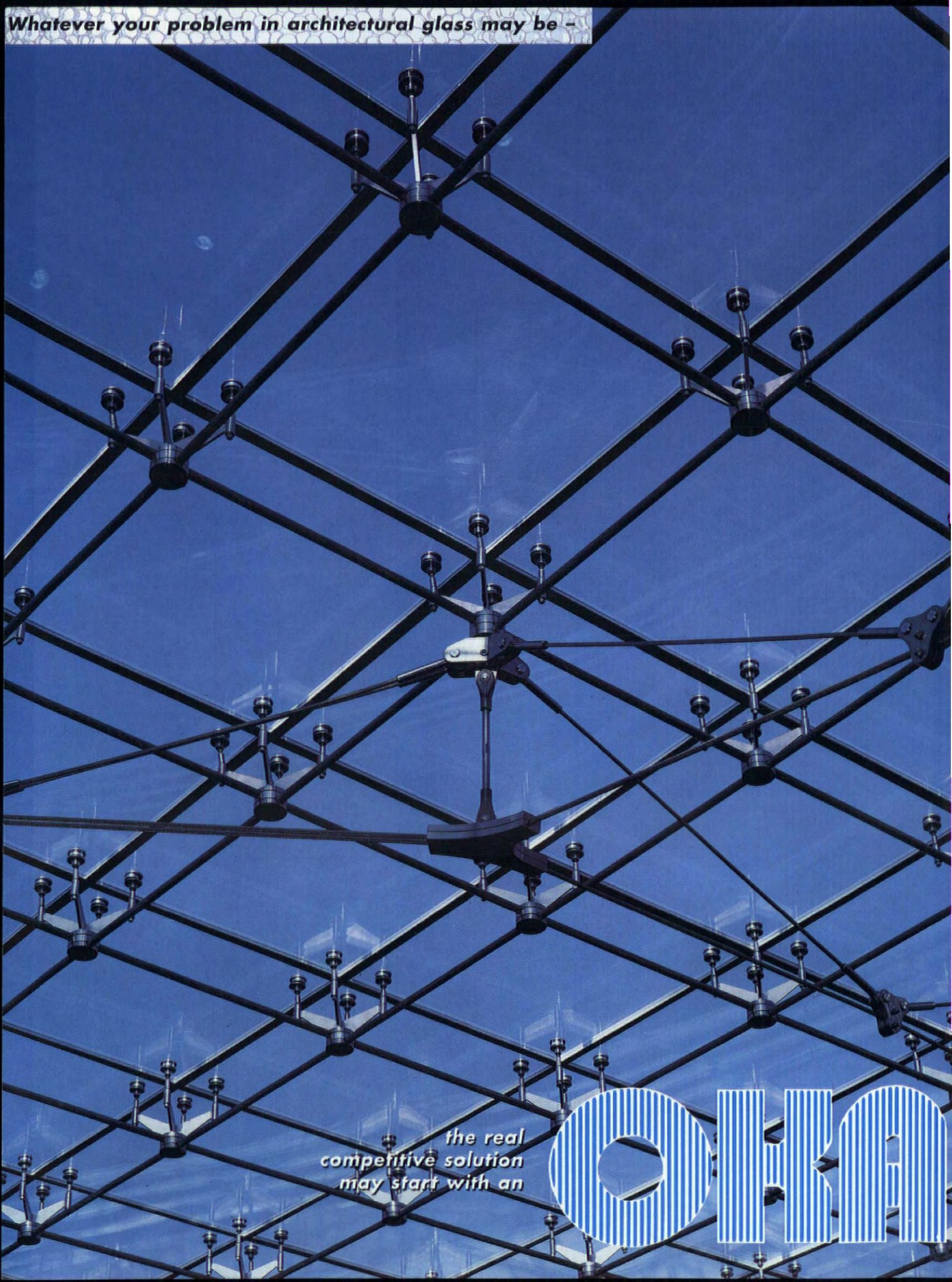
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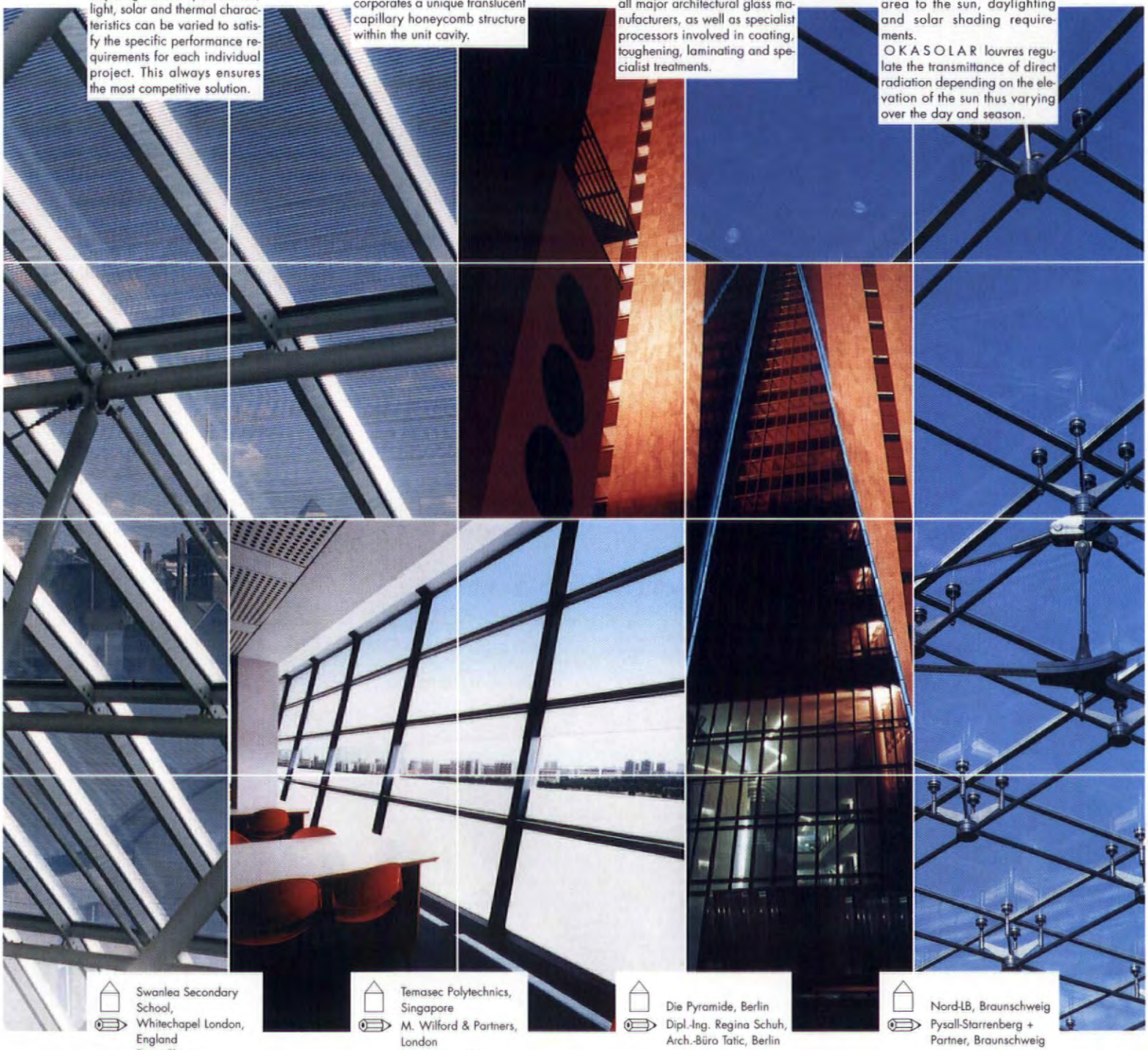

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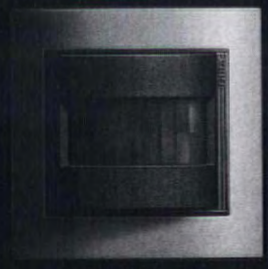

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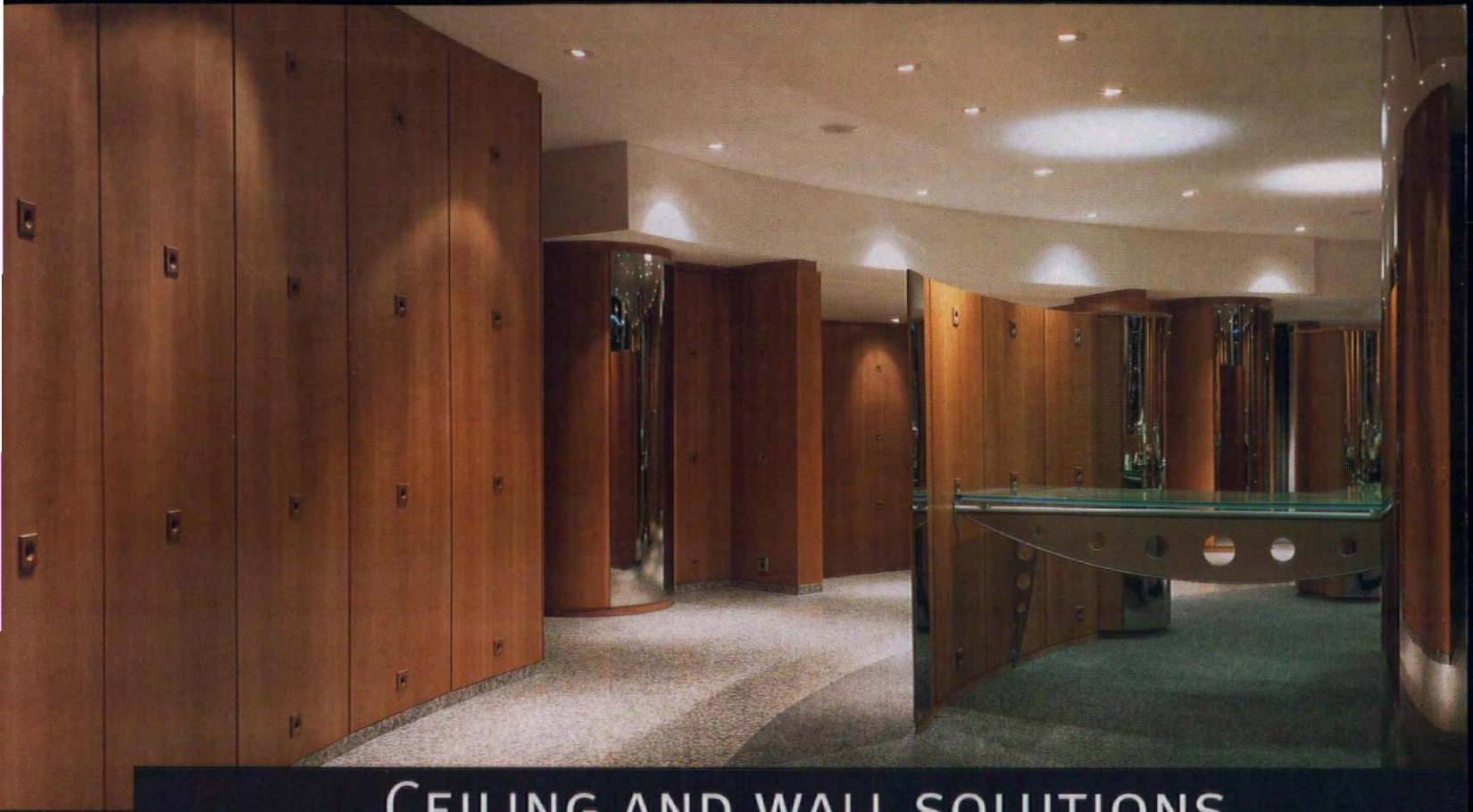

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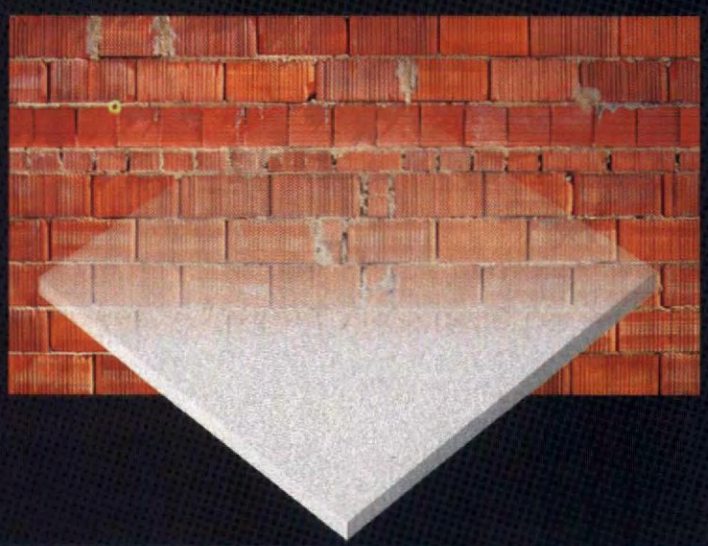
AN ACOUSTIC AND DESIGN SYNTHESIS



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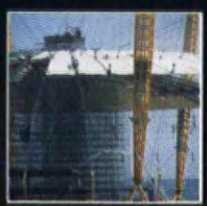

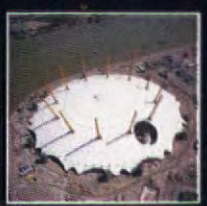

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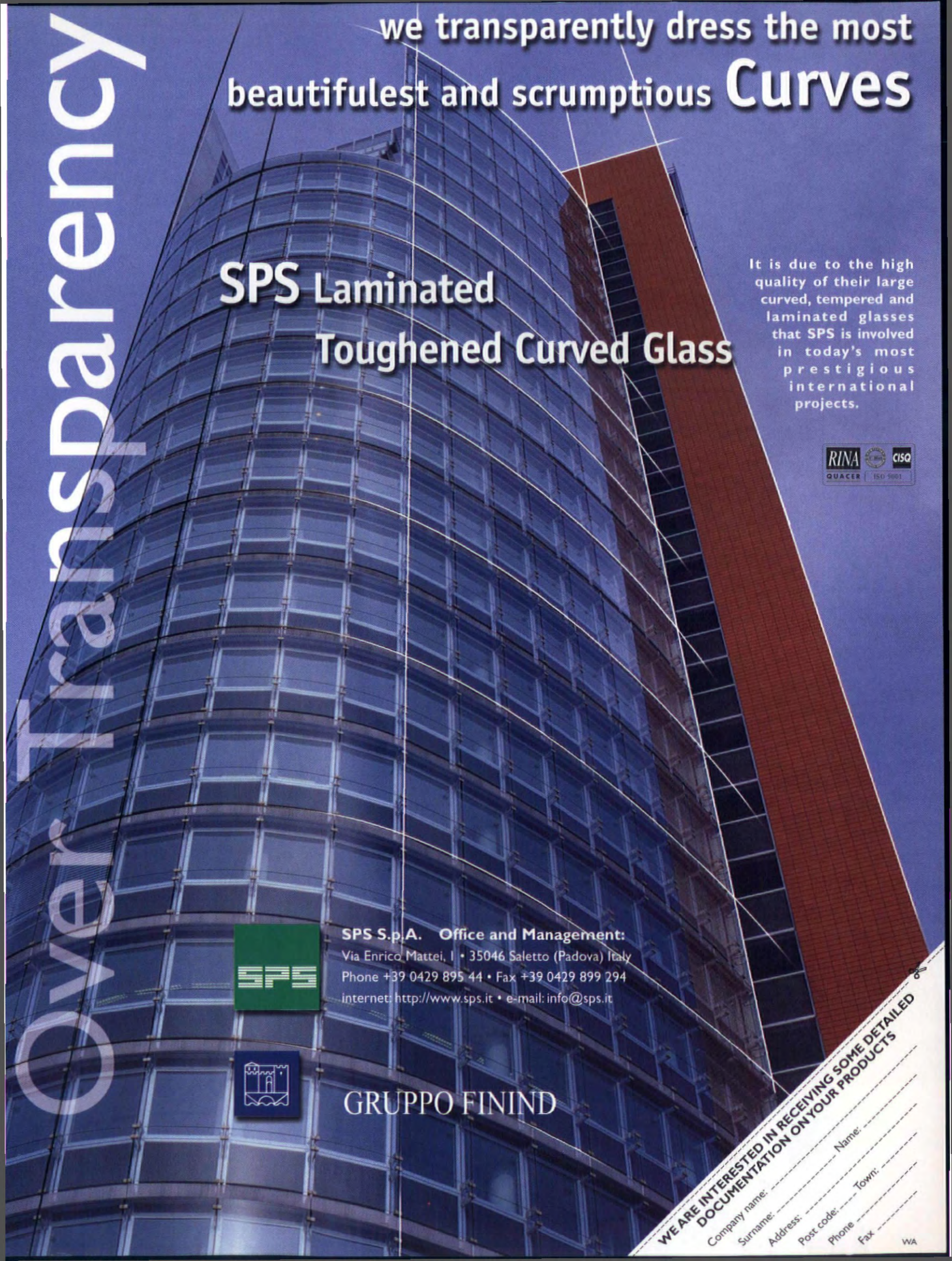
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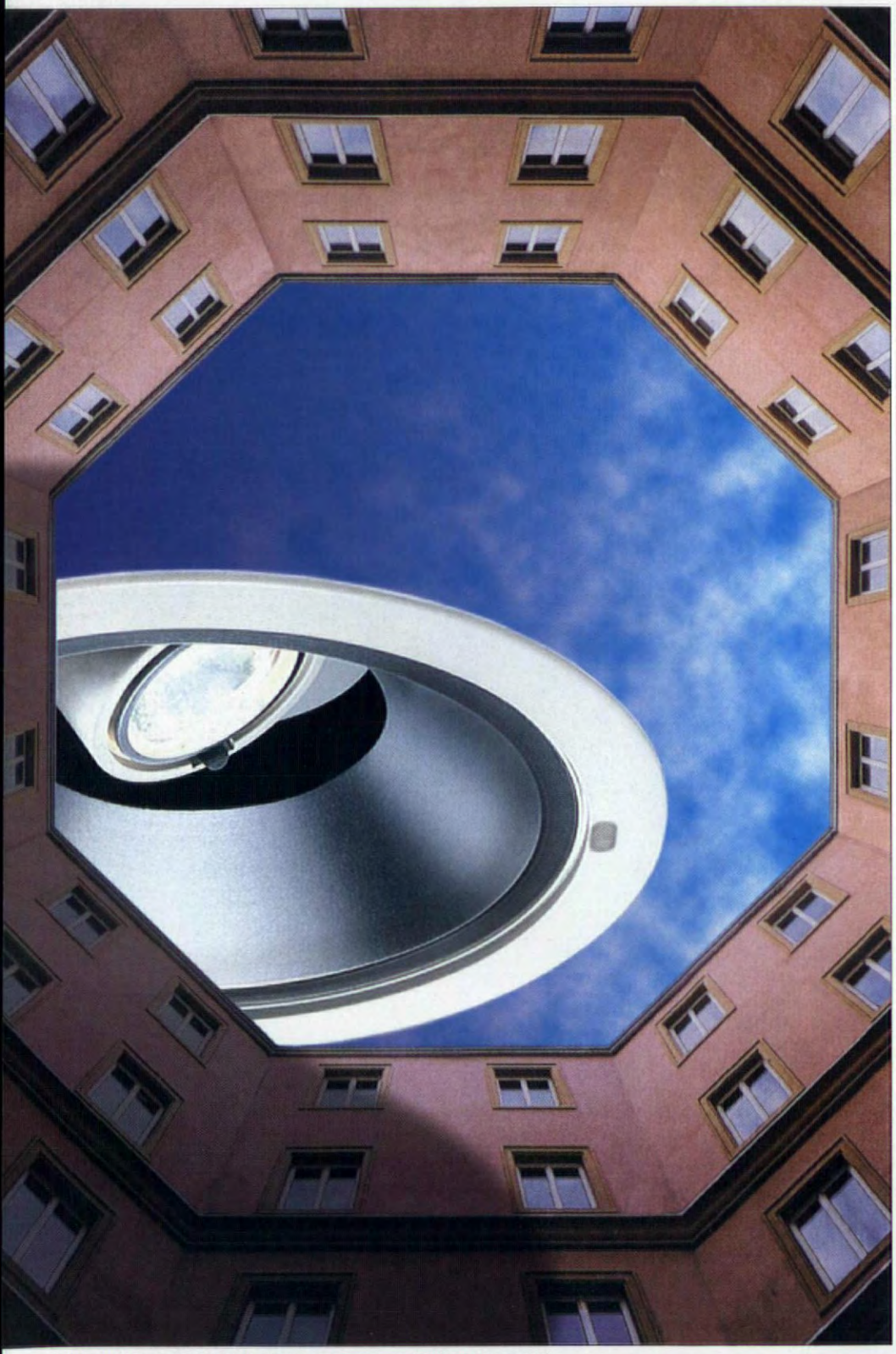

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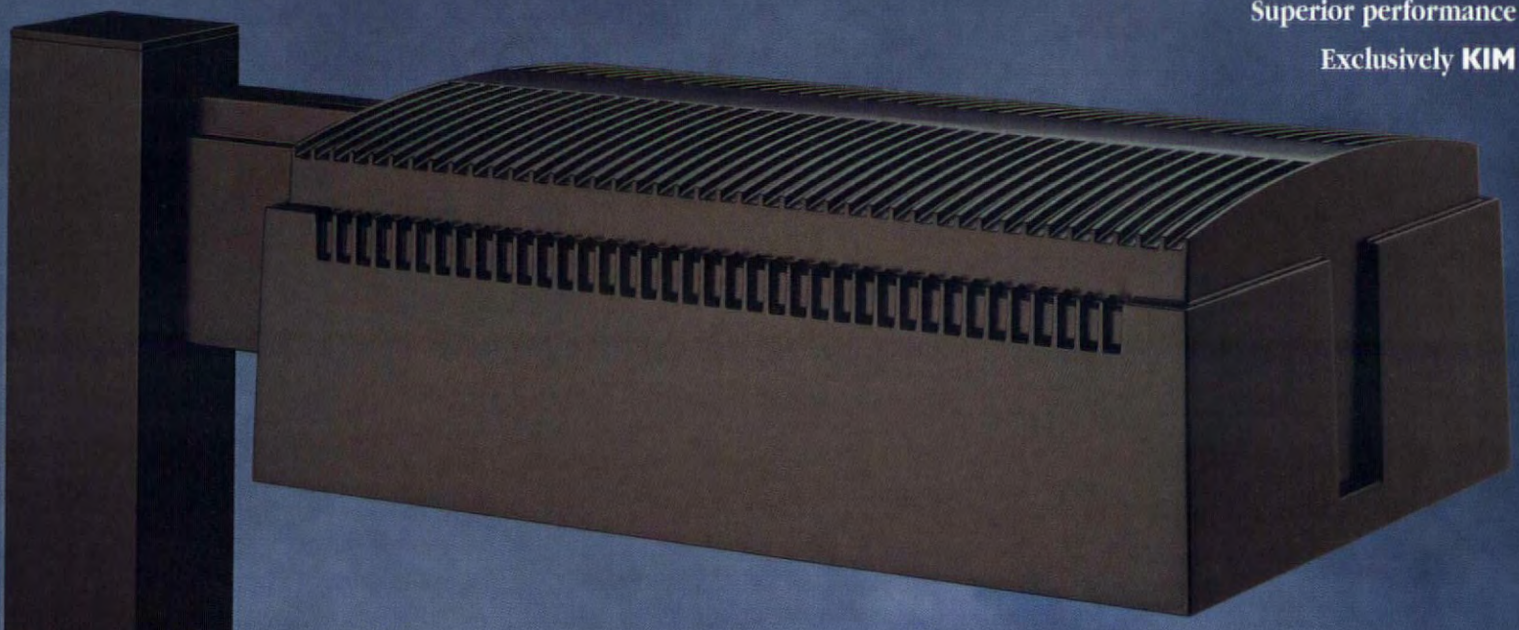

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News

Cardinal sin

Canadian architect sunk by legislation

USA

An aboriginal Canadian architect has received the backing of one of North America's highest arts institutions in his year-old fight for justice against the Smithsonian Institution.

The Smithsonian, parent organisation of the US$110m National Museum of the American Indian, dismissed design architect Douglas Cardinal last May. It alleged Cardinal had failed to meet contractual requirements on the project in Washington DC.

In late 1997, Cardinal, who is best known for the Museum of Civilisation in Ottawa, went US$200,000 over budget – an amount which the Smithsonian had agreed to reimburse – in order to take in design adjustments requested by the Smithsonian.

Upon delivery of the updated plans, Cardinal was dismissed. A spokesperson at the Smithsonian cited delays and over-spending as the grounds for termination of contract.

Speaking to *WA* at the time, Cardinal alleged that the Smithsonian used his Canadian citizenship to its own ends. As a non-native architect working in the US, Cardinal has no statutory rights to legal representation. Cardinal also claimed that his Indian heritage was used to secure funding in the early stages of the project (see *WA*67 page 21).

The Smithsonian replaced Cardinal with New York practice James Stewart Polshek and Partners (JSP&P) to complete the Museum. JSP&P declined an invitation to have details of its work published with this story.

On the advice of native American elders and legal representatives, Cardinal has withheld design documents until he receives compensation. Twelve months after the event he is still waiting for "more than US$200,000".

GBQC Architects of Philadelphia, prime contractor on the project, was dismissed at the same time as Cardinal. The firm has also yet to receive its full fee from the Smithsonian.

Boost

Cardinal's case has received a huge fillip in the shape of the US Commission of Fine Arts' endorsement of his original designs. Speaking to *WA*, Charles Atherton, an architect and member of the commission, says: "[The new design] doesn't meet the same spirit and quality of Cardinal's original ... the life has been drained out of it."

It is Cardinal's understanding that the Smithsonian cannot proceed with construction until it has the Commission's approval.

The Commission is a Washington-based, seven-person body appointed by the US president to, "guide the architectural development of Washington so that the US capital reflects the emergence of the US as a world power".

That the Commission is in direct dispute over the design of

Know your rights

The Cardinal/Smithsonian case reveals a legislative loophole affecting architects working outside their home nation. It has already caused the Royal Architectural Institute of Canada to review the process by which it awards firms design contracts.

Phil Simon, a spokesperson for the Architectural Institute of America, says there is no statute anywhere that can prevent a breach of contract suit where one architect is dismissed from a project in favour of another. There are only two pages in the AIA's Architect's Handbook of Professional Practice that refer to such incidents.

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Architectural showcase

New additions to Hong Kong's waterfront

PRC

Pictured is a vision of Hong Kong's skyline as it will look in 2003. Already furnished by the work of such contemporary luminaries as Sir Norman Foster and IM Pei, the waterfront will also be graced by new towers by US architects Cesar Pelli and Leo A Daly.

The Cheung Kong Center, by Leo A Daly, is in a direct line with the Hong Kong and Shanghai Bank, and the Bank of China. "We were overwhelmed by the challenge, but very pleased with the result," says Leo A Daly III, of the solid square block with reflective double-glazed stainless steel-clad curtain wall.

Local reaction hasn't been so complimentary. One anonymous local architect described it as "boring", while tenants have reportedly been referring to it as "the box the Bank of China came in".

The Cheung Kong Center was designed by Leo A Daly in association with Cesar Pelli & Associates.

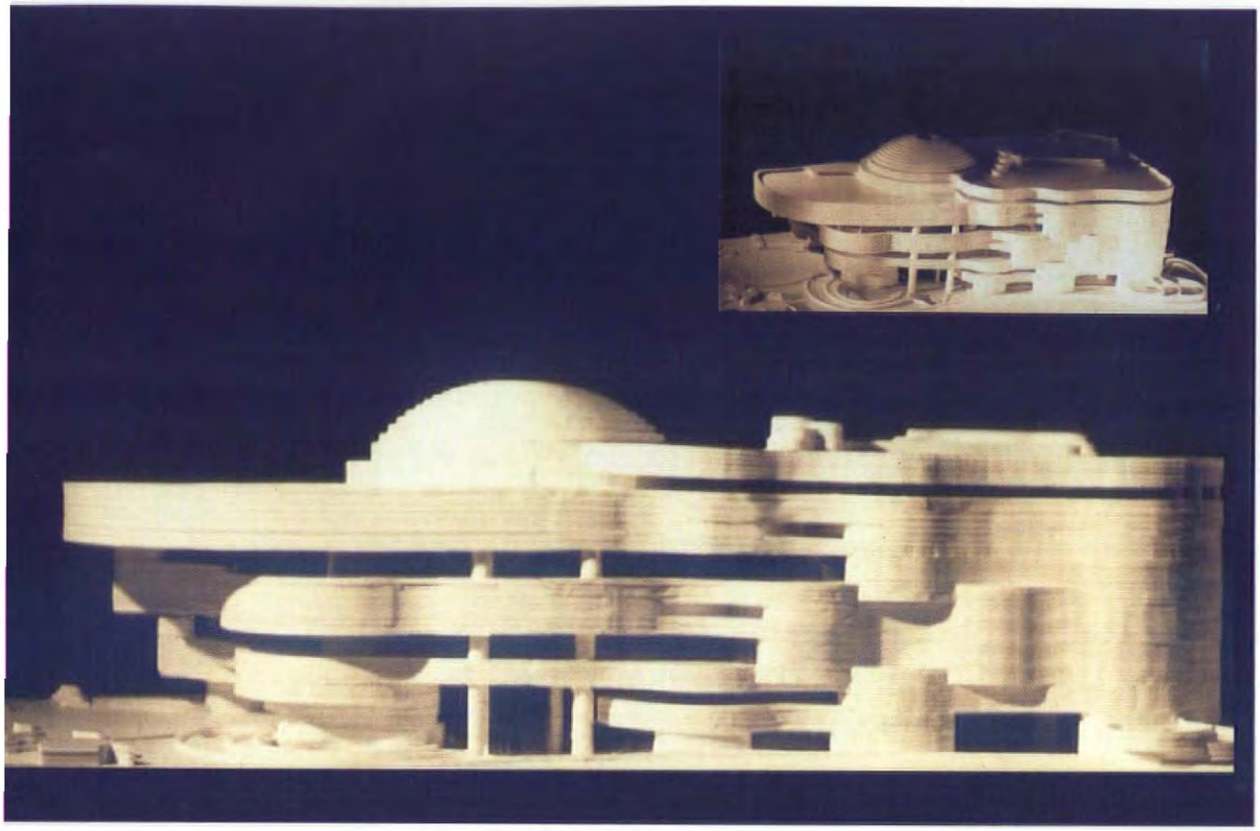
The 283 metre-high, 63-storey tower incorporates a stainless steel curtain wall – the first of its type in Hong Kong – and a fibre optic lighting system intended to make the building "glow".

1 Bank of China, IM Pei
2 Cheung Kong Center, Leo A Daly
3 Hong Kong and Shanghai Bank, Foster and Partners
4 Two International Finance Center, Cesar Pelli

Cesar Pelli & Associates is also the design architect of the 400-metre Two International Finance Centre. When complete, in 2003, it will be Hong Kong's tallest building.

The most striking feature of the building is that it is being constructed without foundation pilings. Instead ,the developers have dug a 40-metre deep basin – the deepest excavation at Central – to sit the foundations on the bedrock.

The office tower is part of the 435,000-square-metre property development at the Central terminus. The first phase, comprising One International Finance Centre, was completed late last year.



the new National Museum with the Smithsonian – another government body, whose remit is to uphold America's cultural heritage – the matter could develop into an undignified public squabble. But Cardinal's cause is unlikely to be forgotten in the crossfire.

Atherton adds: "[The Smithsonian] doesn't want to see his [Cardinal's] shadow across their door. The degree of hostility there is quite extraordinary. A lot of people are shocked it has come to this."

A further boost for the beleaguered architect came in the form of the Royal Architectural Institute of Canada awarding Cardinal its Gold Medal for 1999 at the beginning of last month.

But any support for Cardinal could be a case of too little, too late. He describes himself as "non-litigious", preferring to trust that "logic and reason will prevail". If the Smithsonian prevails, construction of James Stewart Polshek's design will begin in September. AM

Douglas Cardinal's design for the National Museum of the American Indian – as it stood at the end of May last year. James Stewart Polshek and Partners was unwilling to release its updated designs

Moth balls-up

AUSTRALIA

Mitchell Giurgola & Thorp, architect of Canberra's Parliament House, which was completed a decade ago, is to blame for two moth invasions in the complex, a Supreme Court judge has ruled.

In a belated judgment , Justice Higgins determined that the damage – "the moths ate and ruined 40 to 50 wall panels" – occurred because the architects had failed to specify moth-proofing when the contract was let.

The firm was the sole cause of its own misfortune, and could not blame its technical consultants, the judge said. The invasions necessitated the replacement of the fabric that lines the wall of the House of Representatives chamber, at a cost of between US$500,000 and US$800,000. AS

Canberra's Parliament House, by Mitchell Giurgola & Thorp

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THIS MONTH

page 20
Architects in Australia may soon have to prove their "design excellence" credentials to an undisclosed jury to be in the running for work.

page 22
Stalin had nothing on this – find out about plans for a ring of 60 skyscrapers, and the mayor of Moscow's bid for immortality.

page 23
The competition for Swiss Expo 2001 attracted only 47 entries – and hardly any of them are Swiss. We explain how this happened, and why.

ASIA PACIFIC

New contracts of the month

VERY COMPLEX
AUSTRALIA

Philip Cox Richardson Taylor, in association with **Crone Associates**, is behind the redevelopment of wharves nine and ten at Darling Harbour, Sydney. The New South Wales government has approved plans for a US$473 million residential and tourist complex on one of the sites. The developer, Walker Corp and Multiplex, is responsible for another, much-reviled, wharf scheme at nearby Woolloomooloo Bay.

VERY UNLIKELY
INDIA

Architect **Hafeez Contractor** has proposed a scheme to create a 357-hectare green belt along Mumbai's coastline. "Our plan is to increase green space and public areas to enhance the city," says Hafeez Contractor. The proposal includes a plan to reclaim more than 200 hectares from the sea. The government has approved the proposal in principal. The cost and source of funds have not been announced.

VERY ANDO
JAPAN

The city of Toyosaka in Niigata Prefecture, is preparing to let for bid a library designed by **Tadao Ando**. The two-storey, 2,000-square-metre building is estimated at US$3.9 million. The exposed concrete building is composed of square and circular shapes. The city hopes for completion by the end of 2000.

VERY AMERICAN
JAPAN

RTKL's Dallas office has been called in to overhaul Lalaport Shopping Centre in Tokyo, Japan's first "US-style" retail mall. The US architect – in association with **Fujita Corporation**, Tokyo – will add 32,500 square metres to the mall in the Minami Funabashi suburb.

Grade expectations

Benchmark of "design excellence" proposed

AUSTRALIA

Architects hoping to practice in Australia may soon be at the mercy of government-appointed juries to get work.

If Sydney City Council approves new planning rules, developers of all projects over 55 metres high, or on sites of 1,500 square metres or more, will be obliged to employ a registered architect.

However, these architects will have to pass a series of undisclosed "design excellence" tests, overseen by an undisclosed jury, before they earn the right to be considered for employment .

Mixed reaction

The controversial "design excellence" criteria would be a fundamental requirement for planning approval for large projects.

Such excellence could be determined in one of three ways: open architectural competitions, invited competitions or by using an architect of a "recently completed building that demonstrates 'design excellence'". Reaction has been mixed.

While some believe such a system would raise the standards of design, others say it would lead to discrimination.

Established architects, who are doing pretty well out of the system as it is, are fuming. Philip Cox, of The Cox Group Pty Ltd – the 12th most active practice in Australasia (*WA*72 page 117) – says: "[The idea of holding competitions is] against all democratic viewpoints. You can't tell people that they must employ certain architects. It will lead to cronyism. Everyone applauds the ambition of increasing the quality of architecture, but I don't believe competitions and selecting lists of architects is the way to go. How do you legislate for taste, and whose taste? It's a step backwards rather than forwards."

"You can't tell people that they must employ certain architects, or insist on limited competitions. It will lead to cronyism and discrimination." Philip Cox, The Cox Group Ltd

Some architects are concerned that the proposal could enshrine a clique of "name" architects.Architect Stephen Buzacott, of the Royal Australian Institute of Architects, says the RAIA welcomes the idea. Buzacott, himself a small practitioner, says the proposals could potentially open up the system to smaller firms.

Graham Jahn, also an architect and one of the prime movers behind the initiative, says Council staff are listening to all the viewpoints, but emphasises that the proposed system is not about favouring large practices or small, old architects or young, or about homogenising architecture.

Sydney's mayor, Frank Sartor, says the move will be better for building owners and investors, and discourage speculators. A decision is expected by the end of the year.

The proposal is one of several in recent months aimed at upgrading Australian architecture. In April, architects won the right to a minimum wage, and a competition system has been introduced to encourage the development of the nations' young architects. AS

One-stop shop

UNITED ARAB EMIRATES

The first enclosed retail centre in the Middle East is being turned into the region's first urban retail district. RTKL is expanding Dubai's Al Ghurair Centre to more than 55,000 square metres, adding apartments and offices. NORR Group is local architect. The first phase is due for completion in June 2000. AM

Isozaki puts up resistance

Star architect sensitive to seismic activity

JAPAN

One of Japan's foremost architects, Arata Isozaki, has developed an innovative system for seismic resistance.

Collaborating with Mamoru Kawaguchi, a professor of engineering at Hosei University in Tokyo, Isozaki has found a means of isolating individual floors from earthquake vibrations.

The solution was required to protect a collection of rare pottery to be displayed within a new pottery theme park in Tajimi, Gifu Prefecture.

Isozaki is designing a four-storey, 12,800-square-metre building in which to house the collection. But only 900 square metres is devoted to the pottery. So rather than take the widely accepted option of putting the entire building on base isolators – thick rubber pads inserted between the structure and the foundation – it was decided to isolate just one floor.

Isozaki plans to suspend the 1,000-tonne floor section from the structure above, like a pendulum. The hanging arrangement prevents earthquake shocks from being transmitted to the suspended floor. Dampers attached to the floor prevent the swinging from accelerating, and will gently restore the floor to its proper position within the building.

The building will cost US$75 million and is due to open by the end of 2001. DN

ASIA PACIFIC

Record-breaking bridges

US$27bn Honshu-Shikoku project winds up

JAPAN

One of the world's most ambitious construction projects was officially concluded on 1 May. The Honshu-Shikoku Bridge Authority (HSBA) opened to traffic the last three of its bridges in a programme which has taken almost three decades to complete.

The US$27 billion project is made up of three routes, which comprise 18 major bridges and 150 kilometres of expressways, allowing road users to skip from islet to island across Japan's Inland Sea.

The bridges and tunnels link Honshu, Japan's main island, with Shikoku, the smallest and least-developed of the four.

The most spectacular of the three bridges opened last month, Tatara Bridge (pictured above), is a cable-stayed structure with a centre span of 890 metres, making it just a few car-lengths longer than the 856-metre Normandy Bridge over the Seine in France – the previous cable-stayed record-holder.

The HSBA's collection of bridges now includes two of the world's ten longest cable-stayed bridges and two of the ten longest suspension bridges. The latter distinction includes the world's longest, the Akashi Kaikyo Bridge (opened last year), with a centre span of 1,991 metres.

The project has been in the works since the early 1970s. Originally, all three routes were to be built simultaneously but the national government abruptly shelved the project just five days before the scheduled ground-breaking in 1973 because of the first world oil crisis. Construction started in 1976, but on a piece-meal basis, with the first of the three routes completed in 1988.

HSBA engineers have noticeably improved the appearance of their bridges. The first completed were thought to be overly muscular, and probably over-designed. The later bridges – Tatara in particular – are drawing praise for their elegance. DN

Tower blocked

KPF beats DCM to world's tallest

AUSTRALIA/SOUTH KOREA

Plans to build Denton Corker Marshall's pioneering Grollo Tower – which, at 560 metres, would qualify as the world's tallest building – have crashed to the ground.

The US$980-million tower was to have been a new beacon for Melbourne's emerging Docklands district. It would also have eclipsed Malaysia's Petronas Towers – the world's tallest building since 1996 – by 108 metres.

John Tabart, chief executive officer of the Melbourne Docklands Authority, announced last month that plans for the 113-storey tower had been scrapped because the developer, led by Bruno Grollo, had failed to make a US$24 million upfront payment to the Victoria government for land and infrastructure costs. The payment was a fundamental condition of the development agreement, which was signed last year (*WA*74 page 29).

It is possible that the Grollo Tower could be resuscitated, but the Docklands Authority has already announced that it is seeking government approval for a revised development plan to offer the 11-hectare precinct back to the market.

DCM's tower was to have been a "shimmering" silver-blue structure, and was designed to house a hotel, 60,000 square metres of office space, a 10-level retail centre and 450 apartments.

It appears that the accolade of the "world's tallest" is set to fall to Kohn Pedersen Fox Architects. The firm is already in detailed design with its 462-metre Suyoung Bay Landmark Tower in Pusan, South Korea.

When the New York-based firm completes the tower in 2002, it will be 10 metres taller than Petronas Towers.

KPF is also the architect of the delayed 460-metre Shanghai World Financial Tower in the People's Republic of China. If all had gone to plan, the tower would have been the tallest building in the world upon completion – which could have been soon as the end of next year. It was announced last month that, due to financial difficulties, the tower's completion will be delayed until at least 2004 (*WA*76 page 30). AS

Stadium divides opinion

AUSTRALIA

The biggest Olympic stadium in history, Bligh Lobb Sports Architecture's Sydney Olympic stadium, has opened for business.

One of the largest and most expensive projects ever built in Australia, Sydney's new US$400 million, 110,000-seat stadium, which opened last month, has divided opinion. It has been described as looking like: a shucked oyster with all its meat sucked out (by a journalist); a cathedral of sport and icon for the 21st century (by one of its designers, Rod Sheard); and a Pringle potato chip (by architect Philip Cox, designer of several other Olympic venues).

The stadium is probably Australia's biggest architectural project since the US$630 million Parliament House in Canberra (see page 19). To give an idea of its magnitude, developers cite statistics such as: the two main triangular roof trusses span 296 metres; there are 18,000 truckloads of concrete in the superstructure and the complex contains 180 kilometres of electrical cabling. AS

EUROPE

In brief

AUSTRIA

Zumthor's Mies-adventure

Peter Zumthor has been awarded the fourth Mies van der Rohe Prize for the Museum of Art in Bregenz, Austria. The US$46,000 award honours European works of architecture. The two other finalists were the Liner Appenzeil Museum, Germany by Swiss architects Annette Gigon and Mike Goyer, and a private house in Bordeaux, France, by Rem Koolhaas. Zumthor also won the 1998 Carlsberg Prize.

THE NETHERLANDS

US$16.5bn airport decision

The Dutch government will decide by the end of the year whether to build a giant airport on an artificial island in the North Sea. The US$16.5 billion scheme would make the Netherlands the centre of the European Union's international air traffic, rivalling the supremacy of the two London airports, Heathrow and Gatwick. Details on what the airport might look like, and who might design it, are sketchy, although it is known that an island 6.4 kilometres in length and 4.8 kilometres in width has been proposed.

UK

Plans for a tall London

The debate about London's potential as a venue for tall buildings was reignited last month with a proposed 365-metre tower in the district of Southwark. The 100-storey tower is nearly 50 per cent higher than Cesar Pelli's Canary Wharf tower in the Docklands. London practice Alsop and Störmer has put forward its 93,000-square-metre proposal to developer Mallory Clifford. Planners anticipate that the new Jubilee Line extension could be the catalyst for swathes of development in the east and south-east of London.

Towering ambition

First of 60 skyscrapers goes on site

RUSSIA

Construction will begin on the first of a ring of 60 skyscrapers around the centre of Moscow next month.

Proposed by Moscow's mayor, Yuri Luzhkov, the 39-story luxury residential tower was designed by his favoured architect, Zurab Tsereteli. The eclectic style of Tsereteli 's tower has been coined "Luzhkovian".

A spokesperson from Luzhkov's office says: "These towers will create a new image of Moscow in the 21st century."

The masterplan was drawn up by the Research and Design Institute of Moscow.

Set to open in 2001, Tsereteli's tower will be built beside Victoria Park by a municipal firm for an estimated cost of US$100 mill ion.

The tower is one of seven in current planning, with the others to be completed in 2003. Plans call for 50 more to be built between 2003 and 2015 in a ring between the old city and the outer peripheral highway, each with 35 to 40 floors. Sites for 23 of the towers have already been reserved. International design competitions are planned for many of the buildings.

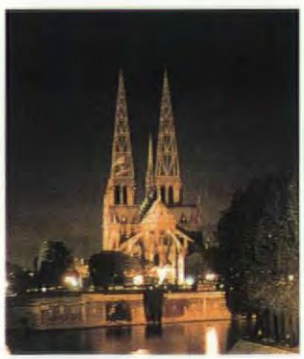
The residential towers are to replace much of the housing and industrial stock built in the 1950s and 1960s, although estimated prices will place the new apartments out of reach of the average buyer. The real estate market has been hit hard by the nation's economic crisis.

Over the next five-to-six years a total of 400,000 square metres of useable floor area will come on the market

The city is offering tax breaks and other incentives to attract investors. It hopes to draw international banks and companies, and is considering an international bond issue, to meet capital needs of at least US $2.7 billion. There are also plans to issue "New Ring of Moscow" bonds. The public/private funding mechanism is new to Russia.

If realised, the plan will dwarf the skyscraper programme undertaken during the regime of Joseph Stalin, in which seven towers of between 26 and 32 storeys were built in the centre of the city, including the State University, the Foreign Ministry, and the hotels Ukraine and Leningrad. AM

Above, the first of six towers planned for Moscow has been designed by the mayor of Moscow's favoured architect, Zurab Tsereteli



Gothic goes high-tech

FRANCE

A privately-financed proposal by architects Marcelo Joulia and Alain Renk of Studio Naço, Paris, to complete the towers of the Notre Dame cathedral is being considered by the French culture ministry.

The plan proposes the addition of high-tech steeples to the 13th-century towers. The lightweight, transparent, 69 metre-high structures would double the cathedral's height.

They will comprise eight inverted pyramids composed of fibre-carbon elements. If approved, the structures will be lifted into place by helicopters in October.

The project is estimated to cost US$5 million.

The last proposal to finish the towers was made in 1842 by Violet le Duc. DC

New kid on the block

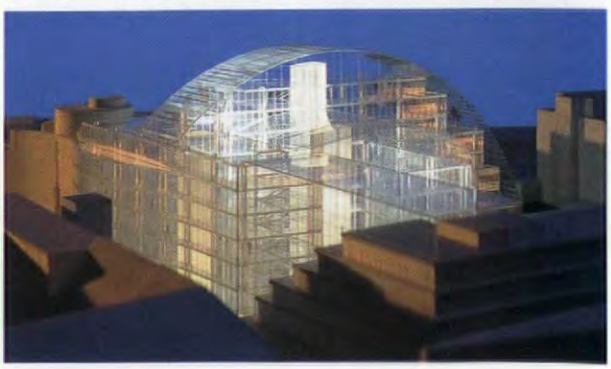
Glass arch rewrites the rules

GERMANY

Hamburg hasn't seen anything like this before. When complete, ABC Arch, a US$73 million transparent office building, will stick out like a sore thumb in the monochrome mediocrity of the city's business district.

The 14,000-square-metre, 11-storey building is the work of local architect Bothe Richter and Teherani. Completion is expected in 2001.

Almost entirely naturally ventilated, its concrete floors will be cooled at night to act as heat sinks during the day. The building will be enclosed in high-insulation glass, and adjustable louvres added for shading. Only the crest of the roof will be opaque, to lessen heat from the sun. AM



EUROPE

Cuckoo

Native architects ignore Swiss Expo

SWITZERLAND

So few architects entered the architecture competition for Swiss Expo 2001 – the nations' cultural showpiece – that the organisers were forced to chose designs that weren't even in compliance with the competition guidelines.

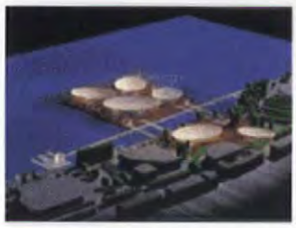
The Swiss press has attacked the project's organising committee, claiming that its media campaign is to blame for the humiliating lack of interest – only 47 architects entered the competition.

The competition was only advertised in Swiss trade magazine Schweizer Handelsblatt and on the Internet.

Native architects, in particular, were noted for their absence. None of the internationally-recognised names of Swiss architecture (Herzog & de Meuron, Mario Botta, Peter Zumthor ...) submitted proposals for Expo 2001 – discounting Hanover 2000, the first major Expo of the new millennium.

Of four winning designs, two did not comply with the competition guidelines. The organisers called for "arteplage" designs, floating pavilions located on four sites on the lakes of Sizzera – in Biel-Bienne, Murten-Morat, Neuchâtel and Yverdon-des-Bains. However, only Austrian architect Coop Himmelb(l)au and GMS Architects of Neuenburg, adhered to the organiser's wishes.

Jean Nouvel, of Paris, and Vehovar & Jauslin, of Zurich, used the lakes as dramatic backdrops in their proposals. AM



Clockwise from top left: Coop Himmelb(l)au (Biel-Bienne); Jean Nouvel (Mureten-Morat); GMS Architects (Neuchâtel); Vehovar & Jauslin (Yverdon-des-Bains). The four architects won the international competition to design *arteplages* for Swiss Expo 2001

Spanish banished by UIA

Andalucian team sidesteps UIA, fearing delays

SPAIN/FRANCE

A rift has developed between the organisers of an architectural competition in Spain and the International Union of Architects (UIA), based in Paris.

The Andalucian Department of Culture organised an international competition for a visitor and research centre at the Madinat Al-Zahra archaeological site, an Islamic-period palace complex outside Cordoba. It claimed that its competition bases conformed with rules established by the UIA for such events.

The department sent out notice of the competition to UIA national associations and professional organisations worldwide – but not to the UIA itself, which regulates international competitions.

Soon after, the UIA issued a statement disclaiming any relation to the competition. Eileen Quinn, of the UIA, told *WA*: "There is an international regulation established by the UNESCO for international competitions, and the UIA is mandated to see to its application. We simply wanted it known that it hasn't come through us."

The Madinat Al-Zahra competition was not in compliance with UNESCO rules in at least two areas: its timetable was too short, and its jury did not include any international figures (UNESCO rules require more than half of the jury to be from outside the sponsoring country).

Juan Carlos Ortega Alegre, co-ordinator of the competition, said he did not submit the competition to the UIA, "at the recommendation of the UIA's own national organisation here in Spain".

"They told us that competitions – for the most part – get held up at the UIA, that it can take months, even years, for them to be approved. In the face of this prospect, we decided to send our announcement directly to the national associations instead of going through Paris."

Juan Carlos Ortega Alegre said that all references to the UIA have now been removed from competition material. Also, the time period for registration has been lengthened by 15 days. The submission deadline is 23 September 1999.

• On a happier note, Mexican architect Ricardo Legorreta has been awarded the UIA's Gold Medal. Awarded every three years, to coincide with the World Congress of the UIA, Legorreta is the sixth recipient of the medal.

Other awards went to Karl Ganser (Germany), Ken Yeang (Malaysia), Juhani Pallasmaa (Finland) and Martin Treberspurg (Austria). DC

For competition information, contact: Juan Carlos Ortega Alegre
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New contracts of the month

VERY ARTE
FRANCE

London-based **Ian Ritchie Architects** is designing a new headquarters for privately-run European television channel, Arte, in Strasbourg. The architect will design two studios with a combined useable floor area of 3,700 square metres. The project will be on a riverside site, within sight of the European Parliament and the Courts of Human Rights.

VERY NEAT
GERMANY

UK practice **Michael Wilford & Partners** has started work on the detailed design for the House of History in Stuttgart, which will complete the urban composition begun with the Staatsgalerie in 1977. Construction will begin in October; completion is planned for the end of 2002. In 1997, Michael Wilford & Partners won the Stirling Prize – a UK award named in honour of Wilford's former partner, James Stirling – for the Stuttgart Music School.

VERY REPETITIVE
SPAIN

Swiss practice **Herzog & de Meuron** has been selected to design the Oscar Dominguez Institute of Contemporary Art and Culture in Santa Cruz de Tenerife, in the Canary Islands. The museum will be located in the historic centre of the city. The firm won a limited competition last year to redevelop the Santa Cruz de Tenerife's port area.

VERY BIG
UK

MBM Arquitectes of Barcelona, Spain, has won the competition to masterplan a 400-hectare area of east London. The site, to be developed over 20 years, will provide 18,000 new homes, and four commercial centres, served by the new Stratford International rail terminal.

THE AMERICAS

New contracts of the month

VERY CONVENIENT

CANADA

Adamson Associates has been awarded the contract to design a new US$145 million twin-tower headquarters for the Royal Bank of Canada. Located in Toronto, the two nine-storey office towers will comprise a total of 75,000 square metres. Adamson Associates previously developed working drawings for **Cesar Pelli's** Canary Wharf in London's Docklands and the Petronas Towers in Kuala Lumpur.

VERY FAMOUS

USA

Upstate New York art school Bard College has approved plans to build a US$40 million performing arts centre at a new site, after the first drew opposition from preservationists and environmentalists. **Frank Gehry** is the architect of the US$40 million development. The decision to chose a new site added US$10 million to the cost of the 9,500-square-metre project. Dr Leon Botstein, the president of the Bard, says: "It's more expensive than we bargained for, but in the very, very long run, this is probably the best solution. Gehry's architecture will be undisturbed by other buildings".

VERY DIFFICULT TO SPELL

USA

Bernard Tschumi has been awarded the commission for a new US$15 million School of Architecture building for the Florida International University campus in Miami. Tschumi was selected in partnership with **Bruno-Elias & Associates**, of Miami, from a final round of four firms. Tschumi won out against **Mateu Carreno Rizo & Partners**, **Spillis Candela & Partners** and **Arata Isozaki/ Zyscovich**. Scheduled to open in 2001, the building will be the first dedicated solely to architecture at the school.

Architects lose ground

Design/build contracts alter the rules

USA

The US government has made one of its first forays into the world of design/build contracts, threatening the territory traditionally controlled by architects.

The US General Services Administration (GSA), awarded the contract for the new Federal Building and Courthouse in Las Vegas on a design/build basis.

Architecture and planning firm Langdon Wilson, in association with JA Jones Construction, both of Los Angeles, will provide full design services for the US$90 million complex.

Asad Khan, senior managing partner of Langdon Wilson, says: "The GSA is utilising this new project delivery approach with the intent of retaining the control of the basic building design, while at the same time enjoying the cost-control benefits of a traditional design/build approach."

Asked whether there was a downside, Khan said: "[There is a loss of flexibility] the owner must define the programme and must not change the programme and building after the approval of the design and project costs."

The eight-story tower will comprise 38,000 square metres of space – enough to satisfy the courts' space requirements for between 10 and 30 years. Occupancy is expected by the end of next year. AM

Ott's full Monte

URUGUAY

Unveiled for the first time, the model pictured left is what the new Carlos Ott-designed tower on Montevideo's waterfront will look like when complete, early next year.

The sleek, curvilinear 34-storey head office tower for La Administracion Nacional de Telecommunicaciones de Uruguay (Antel), is in stark contrast to the city's Baroque, European-style architecture – though it would not look out of place in Buenos Aires, across the Rio de la Plata.

The US$65 million, 41,000-square-metre tower is on a site overlooking the Uruguayan capital's port and downtown area.

Ott who, along with Rafael Viñoly represents the leading-edge of contemporary Uruguayan architecture, emigrated from Montevideo 25 years ago. He is based in Toronto, Canada.

He has achieved international acclaim, thanks chiefly to the Opera de la Bastille in Paris and other buildings in Weimar, Germany, and Dubai, in the United Arab Emirates – where he has an affiliated office.

Ott was also responsible for designing Montevideo's international airport. He is currently working on the new French embassy in the city. AW

Mass Museum

USA

Eleven years after its conception, Bruner/Cott & Associates' Massachusetts Museum of Contemporary Art – the largest centre for contemporary visual and performing arts in the US – has opened to the public.

In 1987 Thomas Krens, now director of the Guggenheim in New York, and the art museum's current director, Joseph Thompson, began lobbying to transform the former site of industrial buildings into a museum.

The 5.3-hectare campus of renovated 19th-century factory buildings in North Adams comprises more than 20,000 square metres of galleries, theatres and art fabrication spaces.

Bruner/Cott & Associates,a of Cambridge, Massachusetts, designed the buildings and the phased site plan. A study for an unused scheme was earlier carried out by Frank Gehry, Venturi Architects and Skidmore, Owings & Merrill.

Thompson saw to it that the programme included visual arts as well as performing arts, positioning the museum as an economic catalyst for the region. BB

Letters

Cuba libre

From Riccardo Mascia, Hellmuth Obata + Kassabaum, Mexico City, Mexico

As an architect and outsider viewing Cuba through your Country Focus ("Risky business" *WA*76 pages 54-77), I was struck by the similarities between working in Cuba and Mexico. In fact, many of the difficulties encountered in Havana are not unique to the practice of architecture throughout Latin America.

One could say that Cuba, by virtue of its isolation, is uniquely positioned to take advantage of the lessons learned from the failed experiments of late 20th century urban design and architecture. Unfortunately, due to a lack of clear vision, it seems likely that Cuba will garb the opportunity.

Whether or not Cuba will place a priority on urban development and a mechanism to ensure its success, depends only on Cuba. But before that direction can be taken, the question is whether or not urban development can coexist with Cuban ideology.

There are many governments in Latin America who are confronting these problems, in part, because the question of political ideology has been aligned with market-based economics. As architects we can only help Cuba so much – the rest is up to them. Meanwhile, we are waiting until the basic issues are behind them.

Big enough to cope ... small enough to care

From Mark Dziewulski AIA, Sacramento, California, USA

With reference to the article on specialist retail design ("Where the customer is king" *WA*75 pages 72-87):

The piece argues that smaller practices find it hard to compete for work with the large firms in the sector. On the contrary I have found that being a small firm has given us [Mark Dziewulski Architect] many advantages in retail.

Even in the largest practice, projects only require a handful of staff. Clients who realise this soon see the advantages of personal contact. They also find it refreshing that we are as involved as they are with the financial success of a project. There can also be a lack of continuity of staff at big firms.

Sea here

From Frank A Dobson AIA, Principal, Jordan Woodman Dobson, Oakland, USA

In the April issue of *WA*, Martin Pawley ("Think sea. The future isn't only airports" *WA*75 page 102) points to a coming bonanza in marine architecture.

In the past six years, Jordan Woodman Dobson has had the good fortune of planning more that 45 container terminals throughout the world. This can be attributed to rapid growth in the global economy and a surge in trade.

A container terminal is not just a collection of trucks, container handling equipment, and stowed boxes. It is a system. Our architects work with simulation analysts, planners and engineers to integrate buildings into the overall terminal operating system. We've been thinking sea for years, and the future looks bright!

He Sphinx we're all right

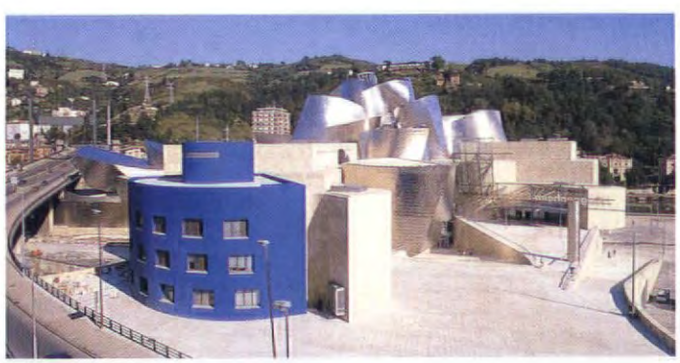
From Mounir Y Mostafa, Marsa Alam for Tourist Development, Cairo, Egypt

We commend your article ("Country Focus – Egypt" *WA*75 pages 50-71)) as being most thorough and comprehensive. It reflects the dynamic attitudes and expansion in Egyptian industry. Egypt has been identified as a future economic "star performer" and is being targeted by private and government investors worldwide.

We consider the recent and future developments featured as being even more superlative than described in your report.

WA welcomes letters from readers. Please send them to the editor via email: Nicola_Turner@tbg.focusnet.co.uk or fax: +44 171 560 4191.

Next issue



Above left: The Guggenheim in Bilbao, Spain by Frank Gehry. **Above right:** Dominique Perrault's Bibliothèque Nationale, Paris, France. **Far left:** The Church of Spiritual Light by Tadao Ando, Osaka, Japan. **Left:** The Petronas Towers, Kuala Lumpur, Malaysia by Cesar Pelli. **Right:** The Museum of Modern Art, Niteroi, Brazil by Oscar Niemeyer

Celebrating ten years of WA

To celebrate the tenth anniversary of *World Architecture* a jury of esteemed international architects including Richard Meier, Ken Yeang, Christoph Ingenhoven, Frank Duffy, James Burland, Daryl Jackson, Kathryn Findlay, Lee Polisano and Henri Ciriani, will each choose their five seminal buildings of the last decade, 1989-1999.

Will any of the buildings illustrated here make it through? Up to 40 pages of the double July/August issue will reveal all.

Plus...

All the regulars: News; News analysis; Legal and practice, Events; Books; Technical – Roofing; Polemic and more.

Analysis

Never ending story

The competition to build a memorial to the Jewish victims of the Holocaust was supposed to mark the end of 50 years of German guilt. Instead, it has provoked architects, politicians and anybody else who happens to have an opinion into a frenzied decade of U-turns, in-fighting and threats of litigation. As the German government prepares to take matters in hand, Adam Mornement finds out why "sorry" is such a hard word to say.

Over a decade ago, Lea Rosh, a German journalist, came up with the idea to honour the Jews murdered in the Holocaust. Since then, the Berlin Wall has fallen; Europe's most horrific exercise in ethnic cleansing since the Holocaust is taking place in Kosovo; Berlin has once again become the capital of Germany and the memorial is no closer to getting off the ground.

The sad reality is that although over 1,000 designs have been put forward, the decision that a memorial is needed is as close as anyone has got to agreeing on anything to do with it.

Battle lines

Later this month, the Bundestag (German government) will sit down to decide whether the memorial will take the form of:

- A conventional "monument-style" memorial, or
- A combination of monument and House of Remembrance – a Holocaust research centre.

The two options also define the battle lines between the public and private initiatives involved. Lea Rosh, who is backing the conventional memorial, is still the figurehead for the private lobby, but she and her supporters have made negligible progress since 1997.

It would be wrong to suggest that things had run smoothly for Rosh up to this point – former German premiere Chancellor Kohl saw to that – but in terms of pure design, the initiative had faced little in the way of competition up to this point. In fact, 1997 was a high point. It was the year when an international competition produced a shortlist of Daniel Libeskind and Peter Eisenman, as well as the lesser-known Parisian artist Jochen Gerz and Berlin-based architect Gesine Weinmiller. Unfortunately, that is a short as the shortlist ever got – at least officially.

It's my party

By its very nature, political interests have played a major role in the Holocaust memorial. But few could have anticipated just how hands-on this involvement would become.

Having over-ruled the construction of the winner of the first memorial competition – Christine Jackob-Marks in 1995 – Chancellor Kohl proceeded to assert his influence until he was defeated in the presidential elections of 1998. That Kohl favoured the work of Peter Eisenman was hardly the best kept secret – it certainly didn't pass the other shortlisted architects by.

In late 1997, stepping outside the structure of the complex organising committee, the former Chancellor held talks with Eisenman to discuss the possibility of him redesigning his original proposal – a luxury that was not afforded to the other competing architects.

The result – Eisenman II – was unveiled last year. And this was when things really got interesting.

Daniel Libeskind, architect of the highly-acclaimed Jewish Museum in Berlin – located just down the road from the memorial site – alleged that Eisenman II bore more than a passing resemblance to his own design for the Hoffman Garden – the external element of the Jewish Museum. Speaking to *WA*, Libeskind said: "Mr Eisenman's Holocaust memorial proposal is referential to the Hoffman Garden [Garden of Exile and Emigration] of the Jewish Museum. I find the displacement of symbolism a problem for the memorial's future."

It was not the first time the two architects had come to blows over a major Jewish-related commission. In 1995 Peter Eisenman was replaced by Daniel Libeskind as the architect of the new San Francisco Jewish Museum – "this clearly might pose a

CHRONOLOGY

1989
- Journalist Lea Rosh suggests the erection of a Holocaust memorial to the murdered Jews of Europe in Berlin.
- Daniel Libeskind wins competition to design the Jewish Museum in Berlin.

1990
After fall of Berlin Wall, a new site south of the Brandenburg Gate is suggested for Holocaust memorial.

1991
The Council of German Gypsies demands a memorial dedicated to all victims of the Nazi regime. Outrage provokes first of many public debates.

1992
After the Bundestag's decision to reaffirm Berlin's capital status, memorial initiative gains support of then-chancellor Helmut Kohl's federal government and the state government of Berlin.

1993
The Federal Government and Senate of Berlin provide US$8.6 million for the memorial.

1994
An open competition attracts 528 entries. Christine Jackob-Marks, a Berlin artist, wins. New York architect, Simon Ungers, is second.

1995/1996
Kohl decides he will not support Jackob-Marks's winning design. Decision delays progress by 18 months.

1997
- Following an international academic seminar about the general aims and iconography of the memorial, a new limited competition is announced.
- Out of 19 entries received, a shortlist of four is drawn up – Peter Eisenman/Richard Serra, Gesine Weinmiller, Daniel Libeskind and Jochen Gerz.
- A group of prominent politicians and intellectuals express their disagreement with the shortlist and the structure of the competition.

1998
- Following talks with Chancellor Kohl, Peter Eisenman presents his revised design for the memorial – Eisenman II.

professional rift," continues Libeskind.

The rift also served to highlight two other misconceptions surrounding the Holocaust Memorial: that Libeskind and Eisenman are the only architects on the shortlist, and that Jews are the only victims of Hitler's Nazi regime who deserve to be honoured.

Unfinished business

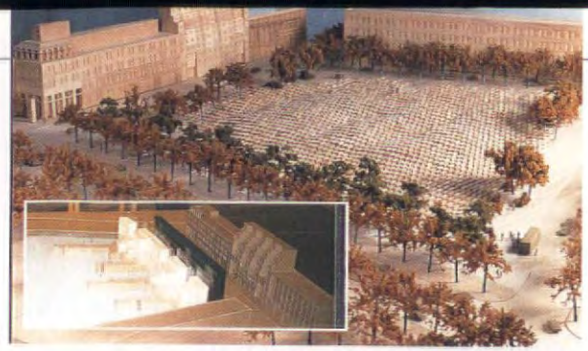
After the election of Gerhard Schröder in November last year, SPD culture minister Michael Naumann stepped into the fray.

Following on from where Kohl had left off, Naumann approached Eisenman to put forward a third design – for a combined memorial and research centre. This provoked the "other two" shortlisted architects to withdraw from the competition.

Jochen Gerz alleged that Naumann had appropriated his idea for a combined memorial, whilst Weinmiller joined Gerz in protesting against Naumann's right to ask only one of the four shortlisted architects to propose a design solution.

This undignified squabble was all played out against the backdrop of Daniel Libeskind winning international acclaim for his Jewish Museum – which opened in February.

And this pretty much brings us up to date. The Bundestag has promised to decide whether the memorial will take the form of a monument or a combination memorial later this month. It isn't over yet. WA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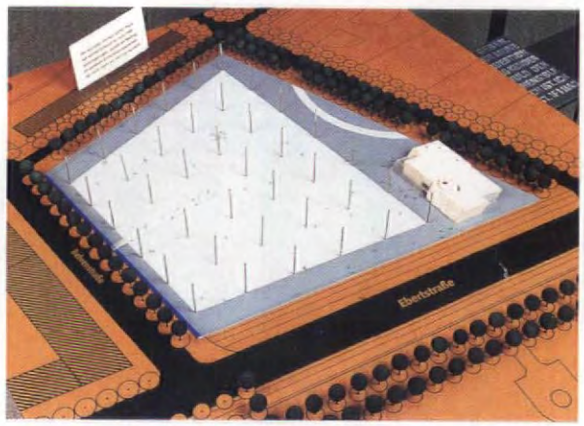

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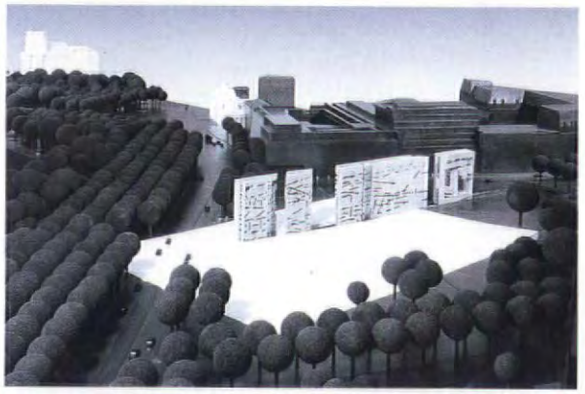
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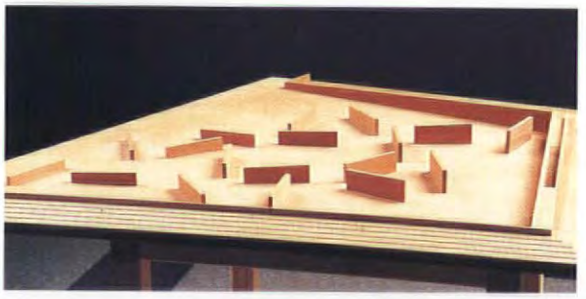
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1. Peter Eisenman

Eisenman I was unveiled in November 1997 – along with the other three shortlisted designs. Following talks with the commissioning committee and former chancellor Helmut Kohl, Eisenman produced Eisenman II (main picture) in 1998. The second attempt proposes that an area be covered by a grid of concrete pillars. What looks from the outside like just a "wheat field", develops its power when the visitor is immersed in the structure, which has "no entrance, no centre and no way out". Eisenman says: "The Holocaust cannot be remembered though sentimental nostalgia because it forever ruptured nostalgia from the memory. Its memory today can only be a living condition in which the past remains active in the present." A combination proposal, Eisenman III (inset), was unveiled in January.

2. Jochen Gerz

Regarded as conceptionally advanced, but aesthetically dubious, Gerz's design proposes an interactive memorial to which the visitor can contribute by leaving comments on the question: "Why did it happen?" The comments are collected in a small building. Last June, Gerz announced his decision to withdraw from the procedure, alleging that culture minister Michael Naumann had copied his idea for a memorial combined with an information centre.

3. Daniel Libeskind

Libeskind suggests a 140 metre-long and 210 metre-high multi-layered concrete wall, which the architect describes as "a system which enwrites its own dissolution into the visible". It is placed on a concave platform covered with white pebble stones, and looks towards the house of the Wannsee-Conference in south-west Berlin – the place where 58 years ago the murder of six million Jews was formally decreed. Libeskind's Jewish Museum, for which he won the competition in 1989, is complete.

4. Gesine Weinmiller

Weinmiller – the only female on the shortlist – suggests a gently tumbling plane on which 18 stone blocks are scattered. When penetrating them, the visitor ends up at a wall with just one exit. Against the advice of experts, Weinmiller is the only architect to incorporate a David's Star into her proposal – an idea which appealed to the general public. Last year Weinmiller and Gerz questioned Naumann's right to ask Eisenman alone to propose a design for the combination model.

- Libeskind voices allegations of plagiarism against Eisenman II, suggesting that it bears more than a passing resemblance to his own design for the Hoffman Garden at the Jewish Museum.
- Jochen Gerz threatens to withdraw from the competition, alleging that SPD culture minister Michael Naumann appropriated his idea for a combined memorial. Gerz and Weinmiller join forces to protest against Naumann's decision to ask Eisenman alone to propose a combined memorial.
- After election victory (November), Chancellor Gerhard Schröder announces that the Bundestag will take a firm stance with the memorial.

1999

- Naumann, presents a new alternative – a combination of "House of Remembrance" and a reduced memorial. Again, the design is by Eisenman (Eisenman III – his third attempt).The cost is estimated at US$103million.
- Daniel Libeskind's Jewish Museum opens to widespread acclaim.

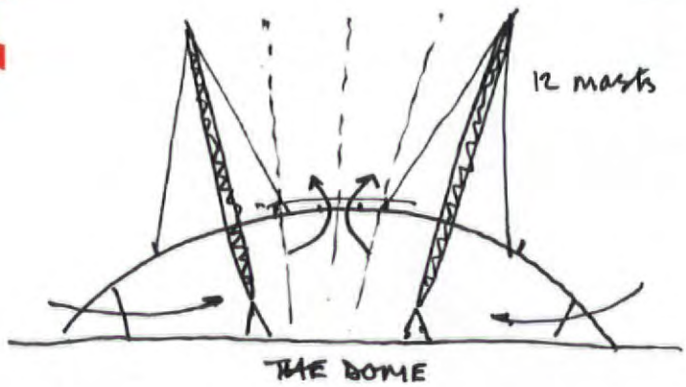
June: *Bundestag to make decision on the form of the memorial.*

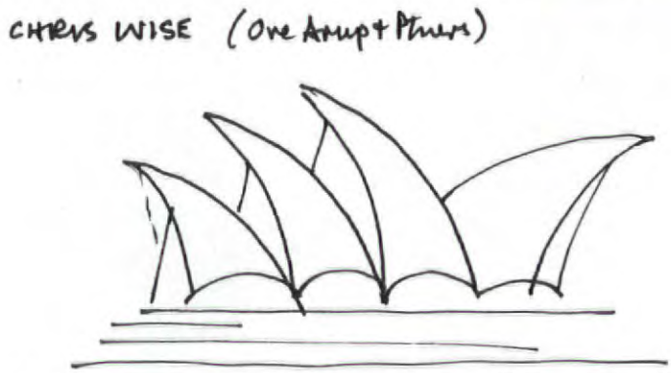
THE UPS AND DOWNS OF THE HOLOCAUST MEMORIAL

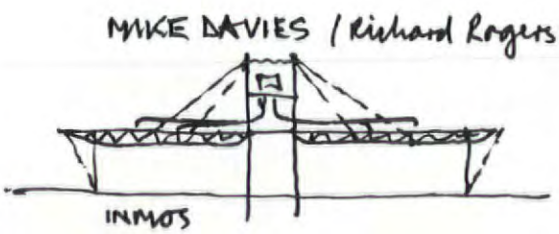
Analysis

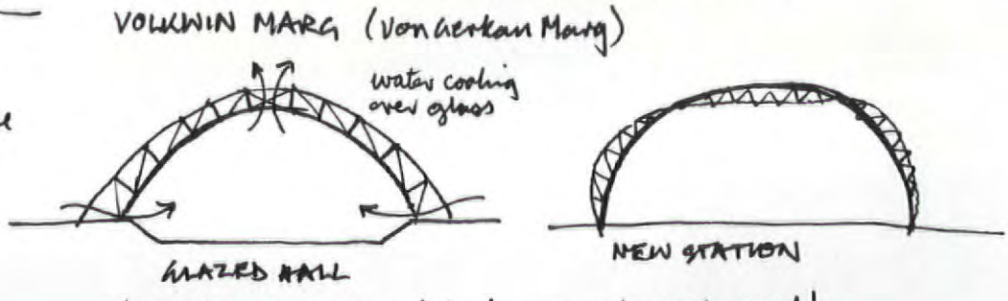
Chris Wilkinson, London-based architect of many high profile projects, including the Stratford station on the Jubilee Line (see pages 56-59) reports back from the international "Architecture with Technology" symposium at the Illinois Institute of Technology in Chicago.

Stargazing







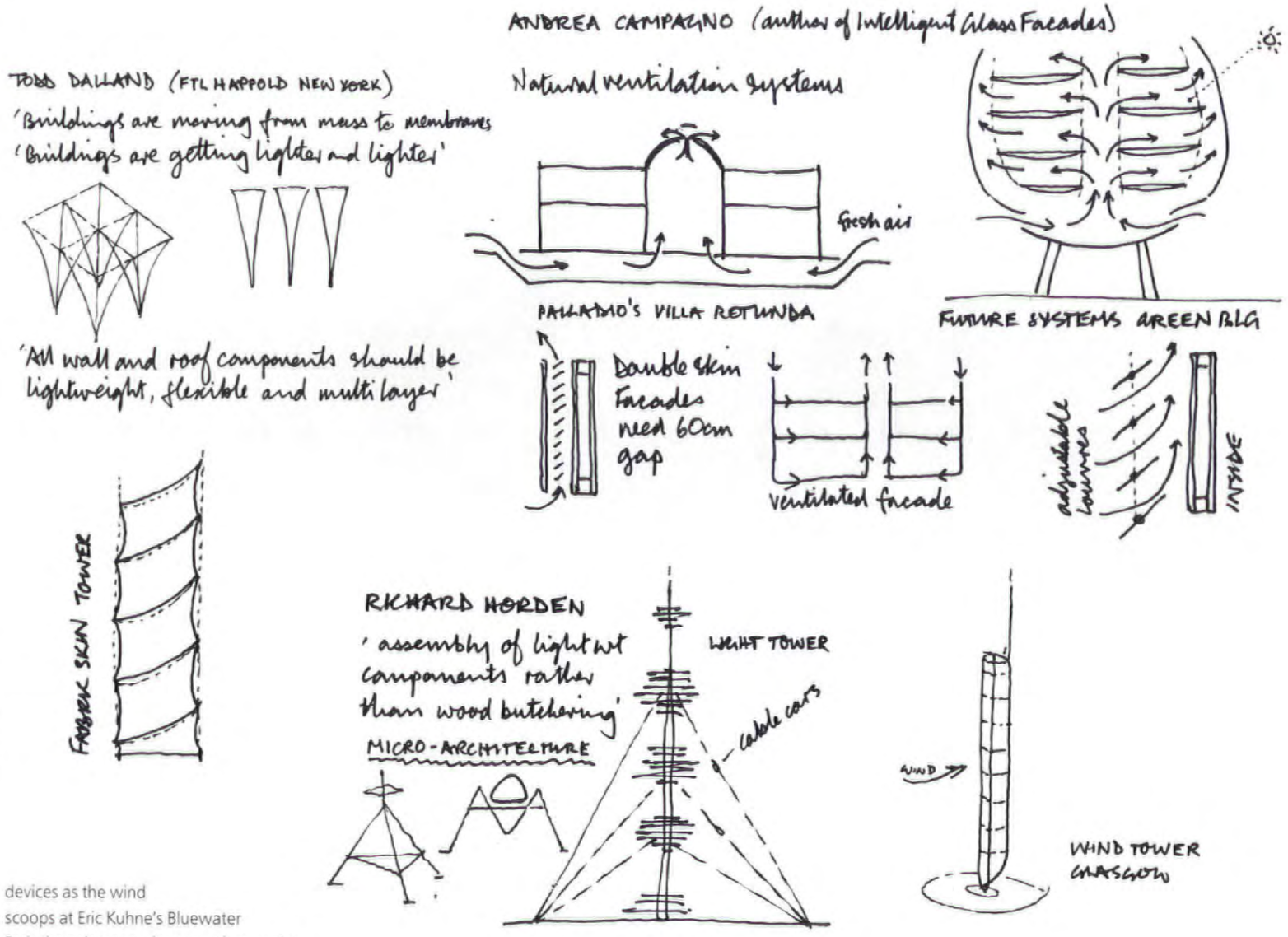


American architects recognise the contribution of European, but particularly British, architects in extending the boundaries of architecture through technology. The three-day symposium attracted more than 30 speakers from top architectural and engineering practices in Britain, Germany, France and Italy as well as stalwarts from the USA.

The idea was to address technological issues in the light of the environment, sustainability, new materials, lightweight structures, intelligent building systems, new glazing systems, technology transfer and the use of computers as a design tool. It felt particularly appropriate that this unique conference should be held in the US where the architecture is currently somewhat in the doldrums. Since the 1950s and 60s, when the modern movement flourished in the United States, the impetus for moving it forward has come from Europe, and Britain in particular. The trail blazing practices of Foster and Rogers from England, and Piano from Italy, have shown how a new and exciting architecture can be generated from close cooperation with engineering a broad technical base and a strong aesthetic confidence. Now many talented younger practices have spawned from these waters. Similarly, many significant engineering firms such as Ove Arup and Buro Happold have gone from strength to strength and Tony Hunt has emerged as a force to be reckoned with. The skills of these practitioners are being sought around the world.

Using the environment

Guy Battle of Battle McCarthy, the British environmental engineers, who is also a visiting professor at IIT, kicked off the proceedings with an informed speech about the importance of looking after the environment. "The environment is a strong force – so use it", he exclaimed, and proceeded to demonstrate how wind power technology can be used to provide natural ventilation by using such



All drawings by Chris Wilkinson

devices as the wind scoops at Eric Kuhne's Bluewater Park shopping complex recently completed in Kent, England.

Other environmentalists included Klaus Bode of BDSP and Patrick Bellew of Atelier 10 from Britain, Mattias Schuler from Germany and Ray Clark from the USA. Klaus Bode showed some interesting research into how careful analysis of the wind and solar shading opportunities can shape the form of the design solution, illustrating an experimental design for an office tower which was carried out with the architects Future Systems in London.

Patrick Bellew enthralled us with a treatise on termites' nests which are apparently designed to maximise on natural ventilation and minimise solar gain in order to achieve a constant temperature inside for the Queen. He also explained his new concept of "Labyrinth" cooling for Future Systems' Earth Centre in Doncaster, UK, in which a basement labyrinth has been incorporated as an air-cooling source for an exhibition building. The benefits of 'night flushing' through floor ducts was Mattias Schuler's theme and Ray Clark explained how environmentally friendly systems, including energy conservation and recycling are being incorporated in the refurbishment of the Renaissance Centre in Detroit by the Ford Motor Car Company. It was good news to hear that energy conscious design and sustainability are beginning to be considered in the USA.

"Lightness" and lightweight structures was high on the agenda. The British architect Richard Horden has dedicated his design work and teaching to exploring ways of achieving lightweight structures out of assembled components such as yacht masts which he refers to as "micro-architecture". He is now taking it even further into "micro gravity projects" for space station research at Munich University where he is a visiting professor. Todd Dalland of FTL Happold, New York, insisted that "buildings are moving from mass to membranes", claiming that "buildings are getting lighter and lighter".

Poetry of technology

Chris Wise of Ove Arup thrilled us with exciting structures of towers, bridges and buildings many of which have been carried out with Foster and Partners. He referred poetically to Ove Arup working with Jørn Utzon on the Sydney Opera House as a "heavenly" experience (see sketch opposite).

Helmut Jahn, the local Chicago based architectural superstar moved effortlessly from one international project to the next, each one bigger than the one before. But it was Volkwin Marg (of von Gerkan Marg) who reminded us that whilst we must move forward with technology we should also remember the past, and in the same vein my presentation brought up the need to keep in mind the basic fundamentals of architecture such as scale, proportion, the poetics of space and light as well as the "feel good factor".

It was left to Mike Davies of the Richard Rogers Partnership, project architect of the Millennium Dome (see pages 50-55) to inspire us with a fantastic voyage through his thinking which concluded with a wonderful piece of poetry about an intelligent glass facade:

"Look up at a spectrum-washed envelope whose surface is a map of its instantaneous performance, stealing energy from the air with an iridescent shrug, rippling its photogrids as a cloud runs across the sun, a wall which, as the night chill falls, fluffs up its feathers and turning white on its north face and blue on the south, closes its eyes but not without remembering to pump a little glow down to the night porter, clear a view-patch for the lovers on the south side of level 22 and to turn 12 per cent silver just before dawn".

The air was charged with enthusiasm at the end of the symposium with many lessons learned, particularly for the Americans, such as: the benefits of close co-operation between consultants, the need to consider environmental issues and sustainability as part of the design process and the potential for a new and exciting architecture emerging from a commitment to innovation and technology. IIT, under the guidance of Professor Peter Land, has brought these important issues to the forefront and the process must be continued. WA

Legal and practice

OPEN DOOR POLICY

Thinking of moving into China's immense construction market? Why not get a copy of China – Building for Joint Ventures? Jian Kai Yi extols its virtues.

In 1979, former Chinese premier Deng Xiao Ping set in train radical reforms in the world's most populous country. These reforms were aimed at turning an essentially inward-looking country, with which the rest of the world had little contact, into a major economic force.

To achieve rapid growth, China needed to acquire know-how and technology from the rest of the world. To obtain this they opened their doors. Opportunities to participate in China's economic growth were presented to a wide range of manufacturing, technology and service companies.

The word "participation" is important, as China's large population contains, in most respects, sufficient manpower and technical skills required of an advanced economy. China opened its door to participation in its economy, rather than free trade, with the purpose of supplementing its own skills with up-to-the-moment technical know-how in order to achieve growth at much greater rates than in developed economies.

There are a number of mechanisms by which China collaborates with western manufacturing, technological and service companies, but the most common are some form of joint venture arrangement. The Chinese governmental and economic systems differ in many respects from those in the west, and those who wish to exploit the opportunities in China must through a significant learning process.

Whole new world

China – Building for Joint Ventures is a valuable guide to anyone involved in the construction industry, and investors, wishing to work in China. It is a thorough study of the methods of collaboration by joint ventures, BOT and other routes available to investors, and is particularly valuable reading for those not already familiar with working in China.

Walker, Levett and Flanagan have managed to pack in a wealth of information, which is useful to investors and construction professionals alike. In the first four chapters

IT COULDN'T BE MORE BLACK AND WHITE

From 1 July legislation will be enforced to redress past imbalances in South Africa's architecture and construction industries.

Following South Africa's democratic elections of 1994, a Pilot Roster was introduced by the Department of Public Works (DPW) to begin the process of redressing former imbalances in the construction industry. The system was intended to distribute work more fairly and target historically disadvantaged firms and individuals.

Under the previous government, very few, if any, black consultants were appointed. Indeed, many white consultants were overlooked due to the practice of the pre-1994 DPW to appoint the same consultant firms again and again. Furthermore, there was no policy within the appointment process to achieve key government economic strategies other than the advantaging of the chosen racial group.

In June 1997, a commission was established to draw up a policy for the establishment of a permanent Consultants Roster. The Roster has now been prepared and embraces the proposals set out in the green paper on Public Sector Procurement Reform in South Africa pertaining to professional services.

"Under the previous government, very few, if any, black consultants were appointed. Indeed, many white consultants were overlooked due to the practice of appointing the same firms again and again."

The Roster establishes the general principals and procedures in support of a targeted procurement policy for statutory tariff appointments of consultants on projects where fees do not exceed US$330,000 exclusive of VAT.

Where fees exceed US$330,000, consultants will be appointed on the basis of a balance between price and competence.

Within the statutory tariff appointments, there will be three types of assignment:

- Routine assignments – where the tasks are of a straightforward nature.

ELECTRONIC FILE TRANSFER (PART 2)

Following last month's insight into the legal issues relating to the use of e-mail in the office, WA reports on how architects can protect CAD drawings transferred by e-mail.

Last year saw the publication of the report, *Electronic Data Interchange in the Construction Industry* (by the RIBA). Its scope is quite broad, and it contains a useful Code of Practice, but it passed with surprisingly little comment from architects.

But judging from recent enquires to the Construction Industry Computing Association (CICA), those architects that are aware of it are unclear on the conditions that should govern their exchanges of CAD data.

The report's section B2.6, Computer Aided Design Systems, mentions .dxf as the de facto file format for CAD data exchange – now debatable – and recommends the *European Quality Manual for Building Data Exchange* as further reading. It also includes the JCT supplemental provisions for EDI, clause two of which stipulated parties shall have entered into an EDI Agreement.

Architects will certainly wonder if such agreements are overkill for CAD exchanges. However, CAD data exchange is just another form of EDI, and will probably take place in conjunction with the exchange of other digital data.

A major construction management firm recently released a copy of the conditions governing the exchange of digital data on a major project. The document includes not only general provisions, but also additional technical specifications relating to different types of exchanges. The fact that an architect is asked to sign such an agreement should not in itself be cause for dismay. The concern is whether the terms are reasonable, particularly those that may result in overheads or added liability.

Firms must understand the limitations of their sending and receiving systems' data structures, determine how best to map data transfers, and ensure the procedures to be adopted are tested, properly implemented, and rigorously adhered to over the life of a project. This process doesn't relate well to contractual jargon, but it is

Published in association with the international section of the Practice Department of the Royal Institute of British Architecture. Keith Snook. Tel: +44 171 307 367. e-mail: Keith.Snook@member.riba.org

they set the scene by giving economic background and data related to China's growth in the last 20 years, and to participation in this growth by foreign companies. In chapters five to nine they deal with the construction industry, and explain the development of the construction market, the processes of design and construction, how construction contracts are procured, and the management of cost.

Many features of the Chinese construction industry will come as a surprise to those unfamiliar with it. For example, in China the procurement of construction is quite separate from that of design, and designers have little role in construction. The professional service sector is dominated by the design "institutes", most of which are state-owned. Throughout the book, the authors provide a substantial amount of data in easily digestible tables and figures.

China – Building for Joint Ventures gives the newcomer in particular an insight into the workings of the construction industry in China. By the nature of the study that has been the background to this book, it concentrates on facts and figures. After reading *China – Building for Joint Ventures*, those taking the next step in participating in the Chinese economy may be well advised to then make a study of a far more complex matter – Chinese culture.

China – Building for Joint Ventures (2nd ed). Walker, Levett and Flanagan. Hong Kong University Press, PRC. 200pp.To order a copy call Gardiner & Theobold (UK) Tel: +44 171 209 3000.

Jian Kai Yi was born in China. She spent six years working in a Chinese multi-discipline design institute and has been with British multi-disciplinary practice Buro Happold since 1989.

- Specialist assignments – in which the bulk of the service involves technically complex work, calling for skill and experience.
- Complex assignments – may include policy development and restructuring strategic planning.

Does that include me?

The Roster will be a single list of firms and offices covering the disciplines of architecture, quantity surveying and civil, structural, geo-technical, electrical and mechanical engineering. Information required will include the number of registered principals employed at the office, the disciplines and sub-disciplines in which the office is competent, and the geographical location of the office.

Firms that qualify for Targeted Professional Service Provider (TPSP) status will be given accelerated access to work opportunities. The qualification criteria is:

- At least two-thirds of the firm must be owned by and under the management of one or more previously disadvantaged individuals.
- The annual turnover excluding VAT does not exceed US$412,500.

Firms or offices obtaining a routine assignment having an estimated fee value, exclusive of VAT, of less than US$6,600, will remain unchanged on the Roster. In an effort to further accelerate TPSP's, they will be able to nominate not more than two localities in addition to their registered locality, at which it may want to open up an office to enable it to work in structured joint ventures with established firms.

The number of registered principals at an office will determine the fee value of a routine assignment that can be offered to that office.

In order to be registered on the Roster, a firm must have professional indemnity insurance cover for a limit of at least US$330,000. TPSP's will have to obtain the requisite cover as a condition of appointment.

In order to ensure that the appointment process achieves the socio-economic targets of government, firms applying to be registered on the Roster will need at least one designated consultant officially accredited by the DPW. This requires the person to become conversant with the "Delivery of Targeted Procurement" policy documents of the DPW and to write an examination to test their understanding of these policies.

By Llewellyn van Wyk, architect, Cape Town, South Africa.

preferable to have appropriate clauses included in the appointment documents of all project participants.

In practice the conditions may vary, but most agreements will cover:

- The formation, duration, amendment and termination of the agreement, and its relationship to any other agreements in force.
- The law that will be applied in the settlement of dispute.
- The testing necessary to establish and then monitor the adequacy of the data exchange procedures adopted.
- The operational procedures to be adopted and equipment to be used.
- What constitutes delivery – the provisions which should govern notification of failure, and the steps to be initiated in the event of failure.
- Recording and storage of data – all parties may be required to adopt specified procedures, and one party or a third party may be obliged to maintain a central data repository
- Limitation of liability for consequential losses.

It is logical for such agreements to take the form of a set of general conditions supported by additional technical sections as appropriate, but provisions governing 2D CAD data exchange, which occupy no more than two pages, do exist. With 2D CAD data, you might still argue that it is preferable to stipulate that CAD vector data is issued in support of and must be checked against paper drawings or raster images of such drawings – say in TIFF Group IV Compression format.

It all comes down to the circumstances prevailing, the participants' assessment of the risks involved, and whatever indemnity insurers may require. One insurer (who preferred to remain anonymous) suggests an architectural firm should at least maintain an audit trail on all electronic information exchanges and keep copies of data in the form in which it was sent or received. The data should be stored in a manner which would stand up to scrutiny in a court of law, and the systems necessary to access and present the information will have to be maintained and checked regularly – perhaps for a very long time.

By E Winterkorn BArch (Cornell) RIBA, of the CICA

Events

Lectures, congresses and conferences

Austria

scope1: information vs meaning

Information technology conference aiming to condense and present current research trends and applications. A large part of the conference will be devoted to the development of 3-D visualisation for the architecture, construction and property industries. At the Vienna Hilton Hotel from 30 September to 1 October. Contact Christian Dogl, virtual real-estate Ges mbH, Cladia Cavallar, Breite Gasses 3, A-1070 Vienna.
Tel: +43 1 526 29 67
Fax: +43 1 526 29 67 1
e-mail: cc@dc.co.at
http://www.dc.co.at/

Brazil

Structures for the Future – The Search for Quality

The conference of the International Association for Bridge and Structural Engineering (IABSE) takes place in Rio de Janeiro. The theme will be addressed in plenary and concurrent sessions, and international keynote speakers will report to the delegates. Technical visits and tours to structures of interest around Rio will be available. Runs 25-27 August. Organised by the IABSE Secretariat, ETH-Honggerberg, CH-8093 Zurich, Switzerland.
Tel: +41 1 633 2647
Fax: +41 1 633 1241
e-mail: secretariat@iabse.ethz.ch
Web: www.iabse.ethz.ch.conf.rio

Denmark

XXXVI World Congress of the International Federation of Landscape Architects

The theme is "Regional landscapes from Danish, Scandinavian and international points of view". Speakers will include prominent Scandinavian landscape architects Steen Høyer, Cristoph Girot and Sven-Ingvar Andersson. Runs from 26-29 June in Copenhagen. Organised by the International Federation of Landscape Architects, Convention Congress Service, Carit Etlars Vej 3, DK-1814 Frederiksberg C.
Tel: +45 33 31 08 47
Fax: +45 33 31 63 99

Finland

International Glass Processing Days Conference

Sponsored by the Finnish Association of Architects, the conference will bring together glass industry manufacturers, processors, architects and contractors from around the world. Takes place 13-16 June in Tampere. Information from Mr Jorma Vitkala, conference chairman.
Tel: +358 3 372 3216
Fax: +358 3 372 3180

India

The Theory and Application of the Principles of Vastu Design

A programme of lectures delivered to subscribers by e-mail, explaining the principles of the ancient Indian Vastu architecture (see WA74, page 29). Subscribers will have the opportunity to pose questions to the authors, leading Vastu architect Dr V Ganapati Sthapathi and Michael Borden of the Vastu Vedic Research Foundation. For enrollment information contact Mr Borden.
Tel: 00 1 515 472 2157
e-mail: Vastuved@hotmail.com

Architecture and design competitions

Austria

International Competition for the 4th Graz Biennial on Media + Architecture

Call for entries produced with new visual media (film, video, CD-Rom, internet) which innovatively deal with architectural spaces and urban issues. The entries will be exhibited at the Graz Biennial in November. The deadline is 30 June and the prize fund is US$25,000 (ATS300,000). Information from Graz Biennial on Media and Architecture, Hallerschloßstraße 21, A - 8010 Graz, Austria.
Tel: +43 316 356 155
Fax: +43 316 356 156
e-mail: art.image@thing .at
Web: thing.at/art.image

Finland

Paroc Fire Proof Panels Award 2000

International award with a prize fund of US$10,000, inviting designs for buildings incorporating innovative installations of fire proof panelling. Entries can be submitted until 1 December. Contact John Brauer Lynderup, Paroc Finland , FIN-21600 Parainen, Finland.
Tel: +358 204 55 6219
Fax: +358 204 55 6523
e-mail: john.lynderup@partek.fi

UK

World Habitat Awards

International ideas competition calling for programmes of improvements in the shelter and environment of poor and disadvantaged people before the year 2000. Two cash prizes of US$16,000 will be awarded to the winning projects. Preliminary entries are due by 1 July. Contact Building and Social Housing Foundation, Memorial Square, Coalville, Leicestershire, LE67 3TU.
Tel: +44 1530 510 444
Fax: +44 1530 510 332

USA

Roswell – A Place for Immigration and Imagination

Competition calling for designs for a housing development project to accommodate a theoretical influx of migrants, or "aliens", to the town. Registration is due by 10 June. Information from Court of Architecture (attn Competition Clerk), Box 1332, California 90232, USA.
e-mail: clerk@frank.org

JAPAN: COMPETITION

Membrane Design Competition 99

Architects are invited to present their designs for structures using membrane in a new way, through drawings, CAD or model photos. First prize is 1,500,000 yen, and entries are due by 9 September. For details contact: Membrane Design Competition 99 Office, Taiyo Kogyo Corporation 4-8-4, Kigawa-higashi, Yodogawa-ku, Osaka, 532-0012 Japan.
Tel: 00 81 6 6306 3154
e-mail: mh001600@mb.taiyokogyo.co.jp

Above: The future of membrane design? The Calexico Port of Entry, USA, by David Jackson Associates.

CANADA: EXHIBITION

Carlo Scarpa, architect: Intervening with History

An examination of Scarpa's approach to contending with the layers of history that mark the fabric of a city in his design, and his ability to weave new work into an old urban context. Until 31 October at the Canadian Centre for Architecture, 1920 rue Baille, Montreal, Quebec, Canada H3H 2S6.
Tel: +1 514 939 7000
Fax: +1 514 939 7020
e-mail: mmeilleur@cca.qc.ca

Above: Carlo Scarpa and the sculpture of Santa Cecilia at the Museum di Castelvecchio, Italy

Exhibitions

Cuba

The Havana Project - Architecture Again

This exhibition of architectural solutions to Havana's social problems by a team of internationally renowned architects, including Coop Himmelb(l)au, and Thom Mayne, has travelled the world during the last three years (see WA76 page 57). It opens in Havana on 27 October until 9 January 2000, at the Centro Nacional de Conservacion, Restauracion y Museologica, Convento de Santa Clara, La Habana.
Tel: +537 612 877
Fax: +537 335 797

France

singuler/pluriel – Architecture en Aquitaine 1995-1998

A selection of 57 recent innovative buildings in Aquitaine which respond to the region's changing social and cultural identity. Runs from 10 June to 31 October at the arc en rêve Centre d'Architecture in Bordeaux. A round-table discussion session takes place on the opening night 10 June. For details contact the arc en rêve Centre d'Architecture, Entrepot, 7 rue Ferrere, F-33000 Bordeaux.
Tel: +33 5 56 52 78 36
Fax: +33 5 56 48 45 20

Italy

Venice: The New Architecture

Presentation of the recent glut of building initiatives resulting from the redesign of Venice's urban plan, including proposals from Enric Miralles, Frank Gehry and David Chipperfield. Runs until 13 June at the Giorgio Cini Foundation, Venice. For information contact the organisers at ISP srl Tolentini, Santa Croce 191, I-30135 Venice.
Tel: +39 041 524 2792
Fax: +39 041 523 7837

The Netherlands

IBA Emscher Park – The Transformation of a Landscape

Billboard exhibition by Dutch artist Uwe Loesch, featuring ten-metre-square coloured boards showing built projects in the regenerated former industrial zones of the northern Ruhr region. At the Netherlands Architecture Institute, Museumpark 25, 3015 CB Rotterdam.
Tel: 00 31 10 4401200
Fax: 00 31 10 4366975
e-mail: info @nai.nl

USA

Micro Space/Global Time

A series of portfolios by practising architects including Neil Denari, Andrea Zittel and Coop Himmelb(l)au, focusing on the issue of teleworking; the linking of living quarters and workplace in the digital age. At the MAK Centre for Art and Architecture, 835 North Kings Road, West Hollywood, CA 90069.
Tel: +1 323 651 1510
Fax: +1 323 651 2340
e-mail: makartsociety@MAK.at
Web: http://www.MAK.at

Trade shows

Argentina

Expo-Cad 99

International CAD trade show aiming to link international exhibitors with delegates representing the South American market. To be held from 29 September to 1 October at the Centro Costa Salguero, Buenos Aires. Information from Juan Ignacio, Expotrade SA, Guatemala 5885 (1245), Buenos Aires.
Tel: +54 11 778 7070
Fax: +54 11 778 7171

Germany

Planet: Exhibition and Congress for Future-Orientated Planning and Building

A one-off combined congress and trade show covering the full range of products and services for the modern planning office, including media, data and telecommunication, software, planning tools, research and training. Takes place 22-25 June at the Exhibition Centre Berlin. Information from Reed Exhibition Companies, Heerdter Sandberg 32, 40549 Dusseldorf.
Tel: +49 211 556 281
Fax: +49 211 556 231

Kazakhstan

KazBuild

International building trade show expecting a combined attendance of 12,000. Runs from 7-10 September 1999 at the Atakent International Exhibition Centre, Almaty. Contact Mr Edward Strachan, International Trade and Exhibitions Group, 157 Abay Pr, Almaty 480091.
Tel: +7 3272 50 93 91
Fax: +7 3272 50 93 90

Mexico

A/E/C Systems Mexico 99

The third Mexican A/E/C Systems show. From 21-23 September at the World Trade Center, Mexico City. For information contact Show Management, A/E/C Systems International, 415 Eagleview Boulevard, Suite 106, Exton, PA 19341, USA.
Tel: +1 800 451 1196
Fax: +1 610 458 7171

UK

100% Design

Contemporary design show covering the full spectrum of interior design supplies. Contact 100% Design, The Barley Mow Centre, 10 Barley Mow Passage, London W4 4PH.
Tel: +44 181 742 7326
Fax: +44 181 742 3202
Web: http://www.giant.co.uk/100.html

Uzbekistan

Infrastructure Uzbekistan

New trade event covering the building and construction, telecommunications and transport industries. The building section, UzBuild 99, is designed to give international visitors direct and detailed knowledge of the Uzbek building market. At the UzExpocentr, Tashkent, from 12-15 October. Details are available from Iteca, 42 Timiryazev St, 5th Floor, 480057 Almaty, Kazakhstan.
Tel: +7 3 272 509 390
Fax: +7 3 272 448 3154
e-mail: strax@online.ru

PRC: CONGRESS

XX UIA Congress: Beijing 1999

This year's biannual International Union of Architects' (UIA) congress is the first to be held in Asia. It will run from 23-26 June at the Beijing International Convention Centre.

The theme of the conference is "Architecture in the 21st Century", and the proceedings will focus on six related sub-themes. The conference programme comprises a comprehensive mix of debate on both international and local issues.

Exhibitions

The major congress exhibition is "The Road of China's Architectural Cultural History". There will also be an exhibition on the development of the Chinese architectural idiom, and a presentation of entries into the congress' international student design competition, whose theme is Urban Housing in the 21st Century.

Lectures

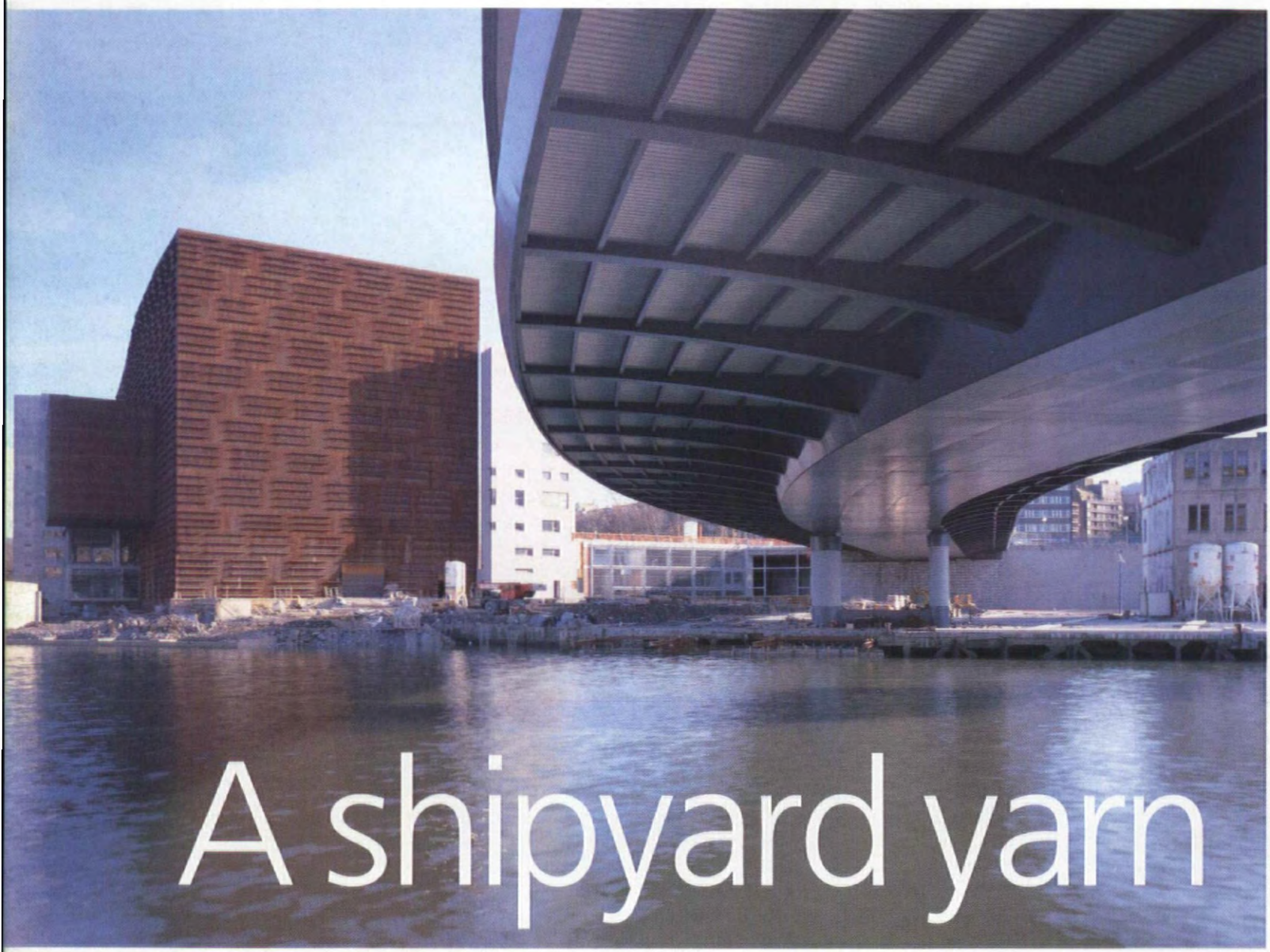
On 23 and 24 June notable international figures such as Tadao Ando, Phillip Cox, Jean Nouvel, Moshe Safdie and Alvaro Siza will lead conferences, and on 25 and 26 June a series of seminars and workshops on the six "sub-themes" will take place.

Festivities

The opening ceremony and the awards presentation for the UIA Gold medal and prizes are on 23 June. There will be a party for student attendees in the evening of 25 June, and the closing ceremony is on 26 June at the Ethnic China Culture Park.

For general info contact the International Union of Architects in Paris, France.
Tel: +33 1 45 24 36 88
Fax: +33 1 45 24 02 78
Registration enquiries to the UIA congress office in Beijing.
Tel: +86 10 649 24 782
e-mail: uiabeijing99@public.gb.com.cn

Building study



A shipyard yarn

Bilbao is now on the international map, thanks to the phenomenal pulling-power of the titanium-clad Guggenheim. A short stroll down river brings visitors to the recently opened Euskalduna Congress and Music Centre, by Federico Soriano and Dolores Palacios. David Cohn reports on Bilbao's "second major pillar" in the city's ambitious regeneration plan. Photographs by Iñigo Bujedo Aguirre

Facing page: Service/stern end of the "hull" clad in oxidised corten steel, and containing the auditorium, alongside the Euskalduna Bridge designed by Javier Manterola **Below:** Soriano describes the exterior lighting and signage devices as a "petrified forest" evoking the cranes of Bilbao's industrial past and reflecting the fantastic gardens illustrated on the floors inside the centre

Facing page: Curtain wall of coloured glass along handicapped access ramp affords river views of post-industrial Bilbao **Left:** Service elevation. Behind the ribbon windows function areas include restaurants and meeting rooms

Following the runaway success of Frank Gehry's Guggenheim Museum in Bilbao, the Euskalduna Congress and Music Centre is "the second major pillar" of the city's urban regeneration plan, in the words of its general manager, Joan Ortúzar. Opened in February, the 53,000-square-metre facility is designed to host both cultural and business events, from large-scale opera productions and orchestral and chamber music to a wide range of business meetings. Thus, while the Guggenheim has made Bilbao an international destination, the Euskalduna Centre is positioned to reap the economic benefits of this fame, and to set the bases for further economic growth.

In geographic terms, the two buildings also form "twin pillars", with the Euskalduna Centre located 300 metres down river from the Guggenheim. Both have been strategically located to focus and direct the redevelopment of the city's riverfront, once a thriving industrial centre but now largely abandoned. The Euskalduna Centre is located on a prominent site formerly occupied by the Euskalduna shipyards. The waterfront area between the two buildings, known as Abandoibarra, will shortly be redeveloped by Ria 2000, the public consortium that controls the land, to create a mixed-use complex master-planned by César Pelli. The Abandoibarra project was originally conceived in 1993 as a post-industrial corporate and financial centre. The lack of immediate demand for office space forced a remix of uses, while popular pressure forced an increase in park and open spaces from half to nearly two-thirds of the 350,000-square-metre area. As approved last month by the Bilbao City Council, Abandoibarra comprises a riverfront park linking the Guggenheim to the Euskalduna Centre; a 30-storey office tower for the Bizkaia provincial government; a 25,000-square-metre shopping and recreation centre designed by Robert Stern; a luxury hotel, another 20,000 square metres of office space and 800 housing units, and two university facilities. The site adjoins the Bilbao Museum of Fine Arts, currently undergoing expansion.

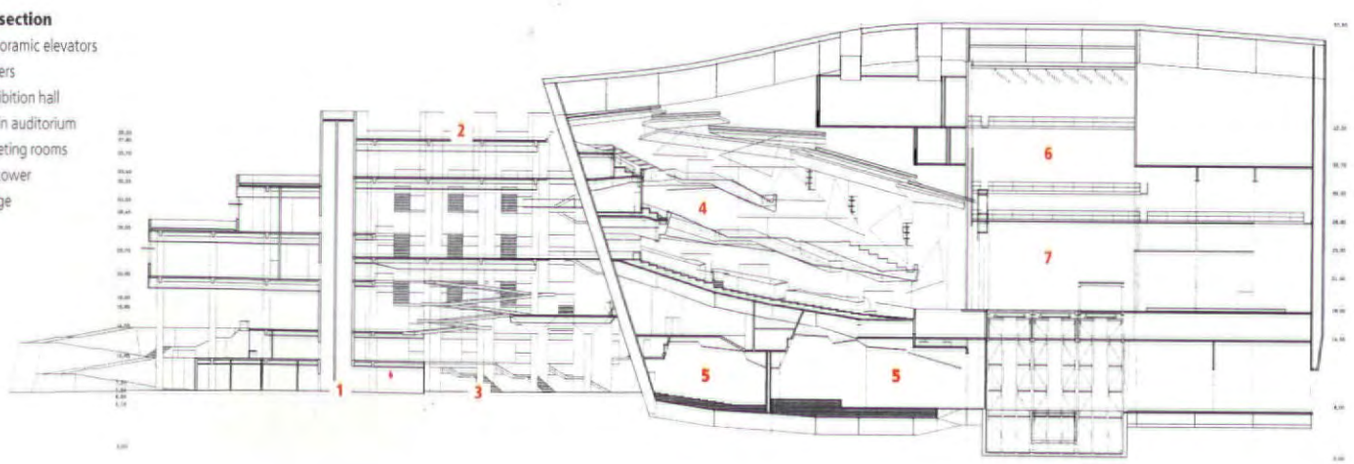
In turn, Abandoibarra is a template for the redevelopment of the entire six-kilometre riverfront stretching to the sea during the next 15 years, according to a preliminary plan which could transform the Nervión River into the new vertebra of the metropolis, its "Fifth Avenue" in the words of Santiago Calatrava.

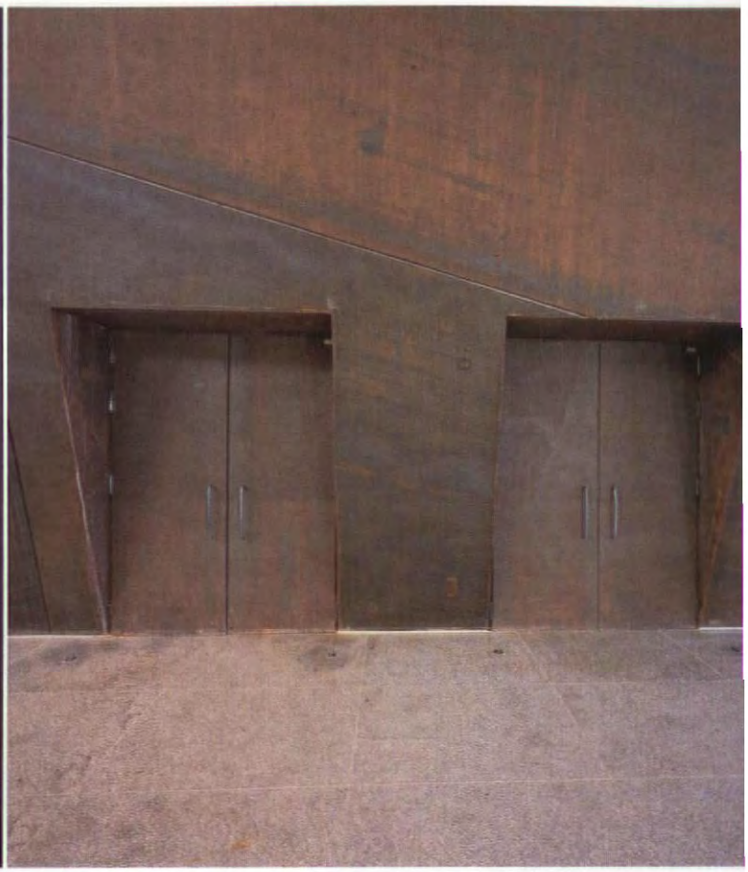
Design challenges – opera in a shipyard

In keeping with the contagious spirit of optimism and high-stakes risk-taking marked by the Guggenheim venture, the design for the Euskalduna Centre was awarded through an open competition in 1992 to a young Madrid couple, Federico Soriano ▸

Key to section

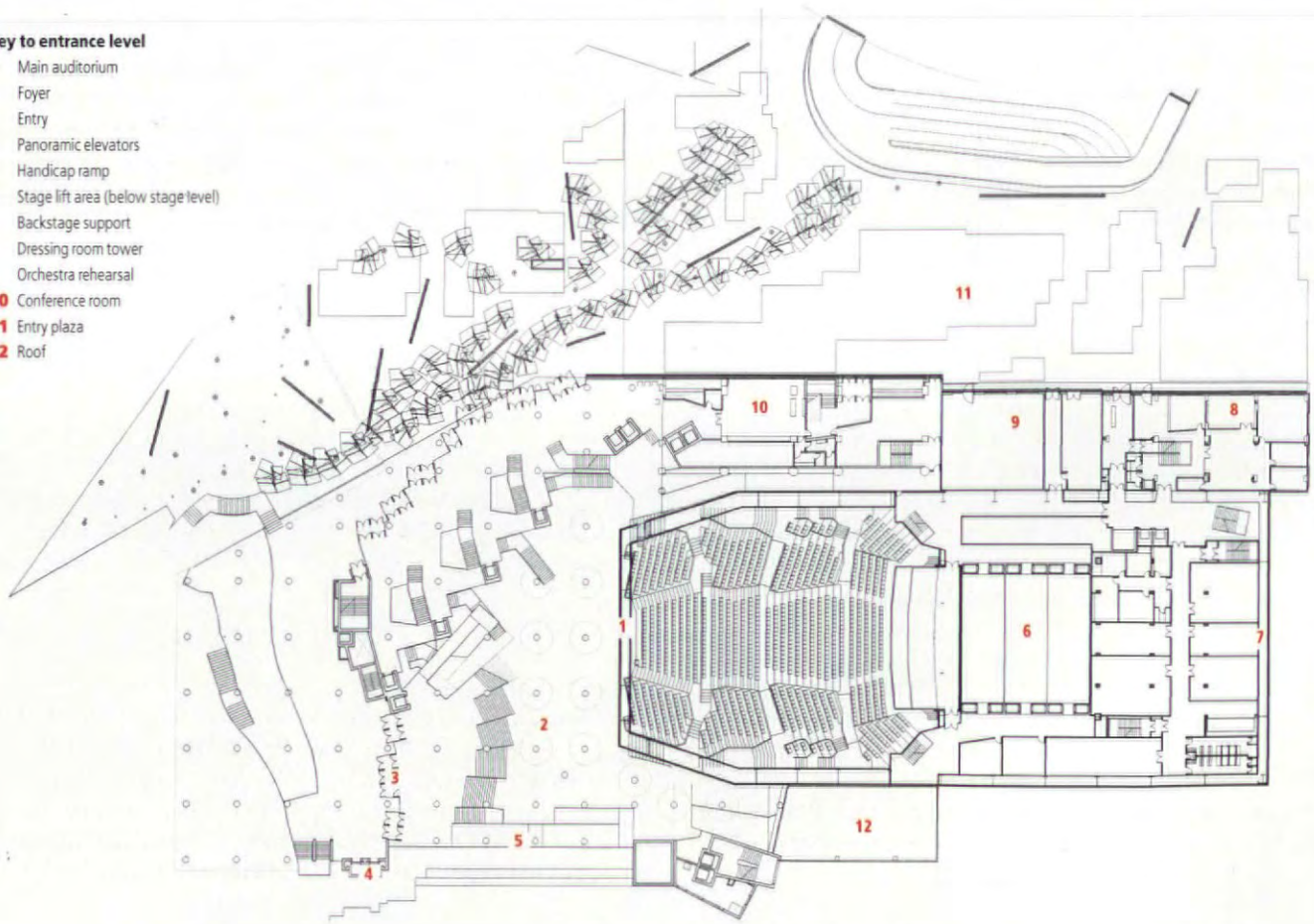
1 Panoramic elevators
2 Foyers
3 Exhibition hall
4 Main auditorium
5 Meeting rooms
6 Fly tower
7 Stage

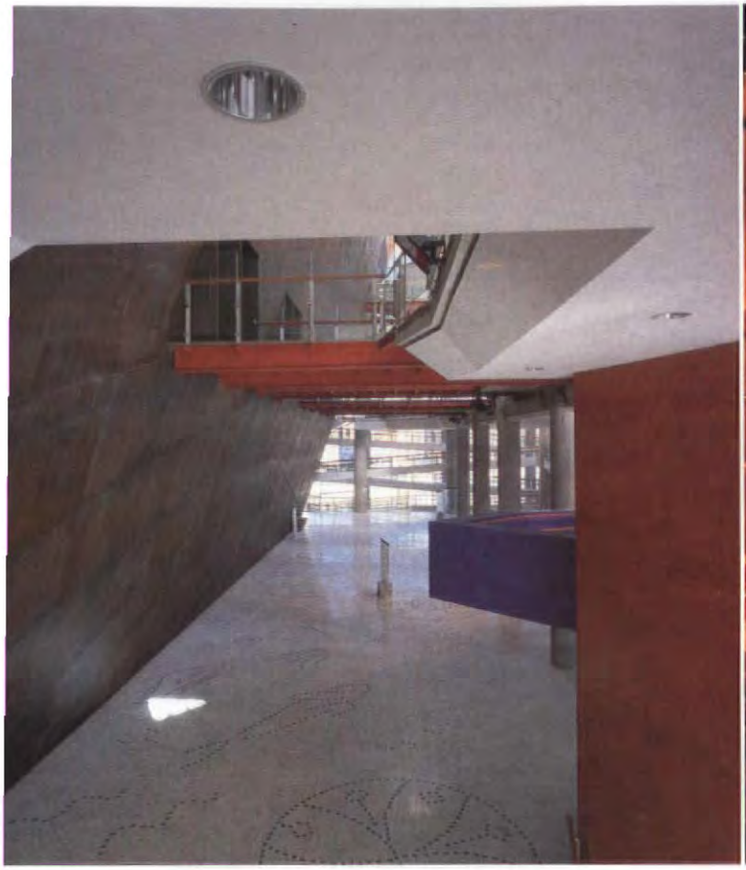




Key to entrance level

1 Main auditorium
2 Foyer
3 Entry
4 Panoramic elevators
5 Handicap ramp
6 Stage lift area (below stage level)
7 Backstage support
8 Dressing room tower
9 Orchestra rehearsal
10 Conference room
11 Entry plaza
12 Roof





and Dolores Palacios, with little experience in built projects. Both in their late thirties, Soriano and Palacios are active critics and theorists who edit *Fisuras*, their own small press journal, and contribute to other publications. Noted risk-takers themselves, the couple used the competition and subsequent building project as a laboratory for conceptual experiment, achieving interesting results. In formal terms, their design goes against the minimalist current of contemporary Spanish architecture, opting instead for a more complex formal development, with affinities to the work of Enric Miralles or their contemporaries Alejandro Zaera and Farshid Moussavi, authors of the competition-winning Yokohama Cruise Ship Terminal of 1995.

In conceptual terms, they seek to apply non-architectural "readings" to design problems, "to see if new meanings emerge", says Soriano. In the Euskalduna project, these "readings" extend from a story-like metaphor which animates the basic design concept — the idea of the auditorium as an unfinished, rusty hull from the former shipyard, surrounded on three sides by the dependent foyers and services like construction scaffolding. The auditorium shell was constructed by a local shipyard using naval structural techniques. The "hull", finished in oxidised corten steel and rising 52 metres above the river, contains a main auditorium seating 2,200, with a chamber music hall seating 600, and two smaller meeting rooms on a lower level. Its angled walls offer an effective image for the special isolated realm of the opera hall: two metres thick for acoustic isolation, they are separated from the surrounding foyers by a vertical void crossed by gangways to the different seating levels.

Turning the story into reality

The hull rests on a concrete mat foundation supported by piles, recounts Enrique Sanus, construction manager for the three contractors involved. Its walls are cradled by a secondary structure rising from this mat much like a ship raised in dry dock. The hull's structure of ribs and horizontal beams was designed using naval engineering principles. Soriano explains: "In a boat, the vertical ribs resist the pressure of the water, so they function much like beams, while the horizontal beams function more like columns. Similarly, our columns had to resist significant bending loads. And the structural problem for our beams was not so much the weight of the slabs as it was the long spans and bending forces. Also like a boat, our hull has no expansion joints. Dilations and contractions are figured as another structural load."

The four-level 8,000-square-metre foyer area, including a 2,000-square-metre exhibition hall on the lower level, is broken into staggered floor trays, arranged on half levels so as to reveal diagonal views through the space.

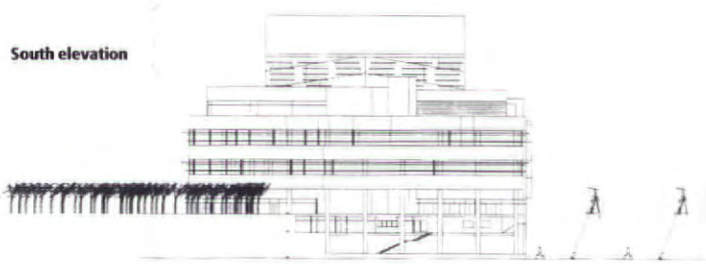
Restaurants, bars, meeting rooms, and offices are located on upper levels around the perimeter of the foyer, with roof terraces looking towards the Guggenheim to the south. The floor trays are connected by multiple runs of stairs, finished in a striking blue artificial stone, and by a scattered line of red elevator shafts. A curtain wall of coloured glass along the handicapped access ramp opens the foyer to ample river views. The terrazzo flooring, the largest and most visible surface in the foyers, decorated with large figures of fantastic animals,

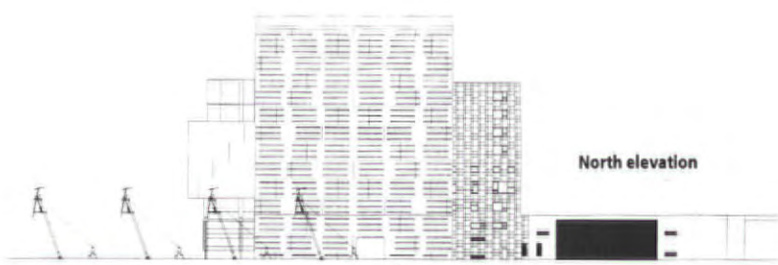
Facing page, above left: Exhibition hall level below the foyer, with the sloping wall of the auditorium on the right
Facing page, above right: Doors leading into the auditorium
Above left: Bridge/gangway leading into the auditorium. The terrazzo flooring is decorated with large figures of fantastic animals outlined in brilliant blue glass
Above right: Main auditorium with angled wall, beech wood panels and oak floors can convert to three acoustic environments

▸ outlined in pieces of brilliant blue glass. The figures are intended to suggest a magic garden, extending from sea creatures on the lower levels to creatures of the woods, mountains and sky on succeeding levels. Many are based on prehistoric cave paintings from the region or local legend.

The main auditorium is finished in beech wood panels and oak floors. The orchestra seating is broken up into different levels to disperse sound and create intimacy. The hall was designed for the long reverberation times required for opera, says acoustic engineer Higini Arau. An acoustic shell closes the stage for symphonic music, reducing the air volume of the hall and thus appropriately modifying its reverberation time. For meetings, the electronic amplification is designed to make the necessary acoustical adjustments. Thus, the hall can convert to three different acoustical environments.

The 2,000-square-metre stage area is served by an eight-storey dressing room tower. Other backstage facilities include rehearsal rooms for a full orchestra, choir, ballet and opera, as well as soloists. The cross-shaped stage, with sections that descend on hydraulic lifts to a service level, allows three full sets to be quickly interchanged.





Staying afloat financially

The government of Bizkaia provided 80 per cent of the US$86 million cost of the centre. According to general manager Ortúzar, it operates the centre with a very small staff and minimal budget. The "ambitious" facility nevertheless requires government subsidy for several years. When Ortúzar joined the project three years ago, he modified the programme to place more emphasis on business events – a more secure source of revenue. The number of meeting rooms was increased to 10 and the exhibition hall was expanded. Site work, including connections to the future Abandoibarra development, is still under way.

Merit in metaphor

Soriano and Palacios emphasise that they are not interested simply in the metaphor of the abandoned boat in the former shipyard, or in the nuts and bolts of naval engineering. Rather, they are interested in the formal object that results from these strategies. Critics have accused them of being opportunistic in their metaphoric storytelling, appealing to popular sentiments of loss and identity, for example, in their shipyard yarn, which was included in their competition statement. Soriano contends that this metaphor has little to do with the actual experience of the building, but perhaps he underestimates the power of mental images to influence our reading of the physical world.

Soriano says he feels no allegiance to either a facile populism or to the more traditional professional isolation of architectural discourse. He points instead to the example of filmmakers such as Alfred Hitchcock or Orson Wells, who were able to combine the popular appeal of their works with daring experimental techniques. Such an ambiguous position, he points out, is potentially much more radical in its formal results and impact than a conventionally avant-garde posture – an assertion that the Euskalduna Centre amply confirms. WA

Clients
Provincial government of Bizkaia
Contractor
Necso, Tecsa & Otaduy
Acoustics
Higini Arau
Structural engineers
Sener Ingenieria
M&E engineers
Goymar S.A
Stage design consultants
Chemtrol Espanola; Thyssen

Facing page, above: Entry plaza **Facing page, below:** Floor trays are connected by multiple runs of stairs finished in blue stone, and by a scattered line of red elevator shafts
Above: River elevation showing coloured curtain wall to the left and protruding "shoulder" of auditorium's stage

Regional focus – United Kingdom

Welcome, Willkomen, Bienvenue

British architecture is flourishing as never before. Yet only ten years ago the profession was in the doldrums – architects and their buildings were under public scrutiny, even the Prince of Wales was attacking contemporary design standards. Adam Mornement reveals how things have changed, fuelled by Lottery money, new government initiatives and public support .

REGIONAL FACTFILE - UK

The land: The island nation of the United Kingdom lies in the Atlantic Ocean north-west of continental Europe. The regions that make up the British Isles are England, Scotland, Wales, and Northern Ireland with a total area of 244,820 square kilometres. The UK's only land border is with the Republic of Ireland.

Climate: The UK has a temperate climate warmed by the Gulf Stream current and south-west winds.

Population: 59,008,634 (1997), Urban 92%.

Ethnic composition: English (81%), Scottish (10%), Irish (2%), Northern Irish (2%), Welsh (2%), other (3%)

Time differences: The UK is five hours ahead of Eastern Standard Time. Greenwich, England is the site of Greenwich Mean Time (GMT). Add one hour for summertime.

Telephone: Dialling in code is 44; dialling out code is 00.

Currency: The British Pound (£) has 100 pence.

ECONOMIC DATA

Consumer Price Index: 1990=100

1995	118.2
1996	121.1
1997	124.9
1998	129.2
1999 (Feb)	129.8

Exchange Rates: UK£ per US$

1995	0.645
1996	0.589
1997	0.600
1998	0.603
1999 (April)	0.627

Information provided by Hanscomb

Peter Mackinven

From top: Daniel Libeskind's controversial design for the extension to the Victoria & Albert Museum in London. The German architect, in association with Cecil Balmond of Ove Arup & Partners, developed the design from "fractal" technology (US$125 million, completion 2004); the Welsh Millennium Centre, by Cardiff-based Percy Thomas Partnership (US$115 million, completion by the end of 2001); CAD-view of Foster and Partners' Gateshead Music Centre. The project is part of the huge Gateshead Quays development on Tyneside, on the north-east coast of England (US$100 million, completion 2002); model of the Lowry Centre in Salford, Manchester by Michael Wilford & Partners (US$95 million, completion April 2000)

Richard Davies

Only five years since its foundation, the National Lottery has become to British architecture what Rupert Murdoch's BSkyB empire has become to British soccer over the same period: benefactor and guide. Just as a massive influx of money has allowed British soccer to shed its reputation as a badly-managed haven for hooliganism, so British architecture has been revitalised by a level of financial support which the profession could previously only have dreamed of. In their fields, both are now among the most-watched and most cosmopolitan in the world.

The Lottery has not been the only influence behind the "rebirth of British", but its influence has allowed architects to do what they do best – build buildings – and in the process, provided a huge injection of self-belief to a recession-ravaged and increasingly isolated industry.

The 1990s has also been a time of transition. The recession exposed the construction industry for what it was: poorly-organised and inefficient. The fall-out from the early part of the decade is only now beginning to be felt. Architects have been forced to streamline, to keep up with changes in service and manufacturing industries. The writing is on the wall for small practices. Even the term "architect" is under threat – the US-style, all-encompassing "designer" may be only years away.

But right now, Britain has never had it so good. Young architects are getting the opportunity to build; established British names have been attracted back, foreign architects have been invited in, and architecture is no longer dependent on the ramblings of the Prince of Wales to attract the attention of the general public.

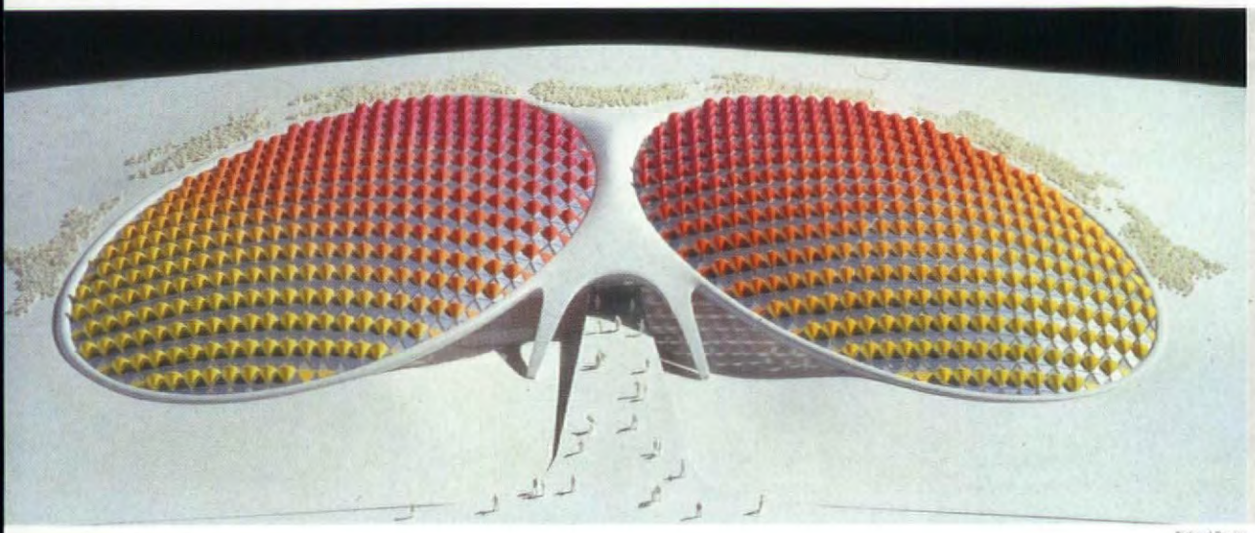
Unrecognisable

From the outset of the Lottery (December 1994), the government pin-pointed the need to upgrade Britain's ailing cultural infrastructure. In the years since, a quarter of all revenue generated by sale of Lottery tickets has been divided between six sectors, known as "good causes": the arts, sport, heritage, charities, projects to mark the millennium and a "new opportunities" fund for science and technology. To date, over US$2.5 billion of Lottery money has been ploughed into reconstructing Britain.

"Architects had to 'make do' for too long. [In 1994] we encouraged architects to think big, to try out ideas that would previously have been too expensive," says Bridget Sawyers, architectural officer of the Arts Council, the good cause with the greatest say in new-build projects. Today, the contrast between the pre-1994 construction climate couldn't be more extreme.

In the 1980s, the most effective means of getting major public buildings built was still based on the centuries-old system of patronage. The construction of the new Sainsbury Wing of the National Gallery in London's Trafalgar Square (designed by US practice Venturi Scott Brown) one of the architectural headline-grabbers of the late-1980s, would not have happened if a wealthy benefactor had not been lured by the prospect of immortalising the family name.

Ten years later, there are new-build museums, dedicated to inclusive and contemporary themes, opening in towns up and down the country. It is hard to imagine, for example, that the city planners looking at the Earth Centre in Doncaster (designed by Future Systems) or the Centre for Popular Music in Sheffield (designed by Branson Coates), would have got beyond ▸



Richard Davies

From left: The first phase of the Future Systems-designed Earth Centre, Doncaster, opened in April (US$65 million, completion of third phase 2004); Trinity Bridge, Salford Manchester by Santiago Calatrava (completed 1996); BDP's Marks and Spencer, one a number of new-build projects in the redeveloped Manchester city centre (US$130 million, completion by the end of this year)

Europe's regional headquarters... and more

Looking at the number of foreign architects with offices in the UK, it's hard to remember a time when globalisation was little more than a footnote in academic theses, and Margaret Thatcher's Conservative government had ensured that Britain's "island mentality" remained intact. But this was how things were – xenophobia was nothing to be ashamed of.

London has an advantage that no other European city can boast – global multi-nationals regard it as "Europe's regional headquarters". Only Frankfurt represents any sort of challenge to London's supremacy as the continent's financial nerve-centre. At the start of the 1990s London's Docklands, a mass of corporate offices in glass and steel centred on Canary Wharf, provided the test case for many foreign architects in the UK. Accordingly, the huge US architects – RTKL, HOK, KPF, Gensler, SOM, Swanke Hayden Connell, HDR – now all have offices in London.KPF's Lee Polisano cites London's "impressive talent pool", Anglo-Saxon culture and proximity to Europe as reasons for setting up shop.

But now Britain has more to offer foreign architects than corporate office work. Public/private funding mechanisms –notably the Lottery – have given clients the opportunity to search for "fund magnets" (aka signature architects) internationally. Daniel Libeskind, Niels Torp, Erick van Egeraat, Herzog & de Meuron, Jean Nouvel, Frank Gehry, Enric Miralles, Ken Yeang and Ralph Erskine. All these and more have thrown ideas into the cultural melting pot that is British architecture at the end of the 1990s.

►the, "that looks a bit weird" stage in the 1980s.

Lottery funding is finite. "We have a guarantee that the existing mechanism will continue until 2006," says Sawyers. After this, it is not clear whether a proportion of funds will be dedicated to architectural projects. The Labour government has indicated that funds should be channelled towards encouraging people to use the buildings that have been built.

Outside chance

In the 1980s, the best chance that regional towns had of getting new buildings was to hope that the council would put up the new primary school they'd been promising for so long. Now cities throughout the British Isles are in a position to use the built environment to develop their national and international standing. For this the nation must thank the Gregorian calendar.

Although a spurious link – you can count the number of "millennium projects" which will be complete by the millennium, on one hand – the happy coincidence of Lottery funds appearing in the build up to 2000 has provided the perfect reason for cities to rebrand and fight the threat of out-of-town developments.

Birmingham, England's second city, has been particularly active in this respect. For years, the Midlands city was a laughing stock – a concrete jungle serviced by a spaghetti junction. It has now been re-branded as "Europe's meeting place", attracting international conferences and sports events.

Andrew Putler

Hayes Davidson

John Donat

MICHAEL WILFORD

Since the death of his partner, James Stirling (1992), Wilford has gone from strength to strength. Michael Wilford and Partners won the Stirling prize in 1997 for the Stuttgart Music School, Germany.

What has been the greatest influence on British architecture during the 1990s?

Government policy, the National Lottery and methods of procurement.

Is the British architectural community "xenophobic"?

That depends on whether you're talking about the English, Irish, Scottish or Welsh. It varies.

What changes could be made to improve standards in British architecture?

Abolish design/build and the Private Finance Initiative. Banish lawyers and accountants.

Who are the architects to look out for in the future?

Sutherland Hussey and Proctor Matthews.

KEN YEANG

Kuala Lumpur-based Hamzah and Yeang has wanted to build in Britain for years. The firm is a member of a team designing the headquarters for the UK Sports Institute in Sheffield.

What has been the greatest influence on British architecture during the 1990s?

The knowledge-based approach to design, exemplified by the passive low-energy, ecological approach used mixed-modes.

Is the British architectural community "xenophobic"?

No, I do not believe that it is.

What changes could be made to improve standards in British architecture?

Design and creative standards in British architecture are at an all time high.

What's your favourite building, built in Britain during the 1990s?

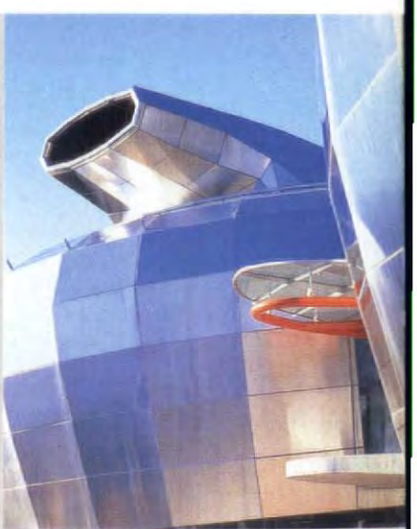
Piers Gough's public toilet in Westbourne Grove, London.

HOK's London office is designing Britain's tallest building in the city centre – Arena Central – and Nicholas Grimshaw and Partners has designed Birmingham's Lottery-funded millennium project. The press material for Millennium Point, a huge urban aircraft hangar, describes it as, "the focus of a new learning initiative for young people", which many have interpreted as "nobody's decided what to do with it yet".

And here's another quirk of Lottery funding: there's so much money available that buildings are going up first, and people are deciding what to do with them second. The initiative set up to run the venture, also took the decision to turn Millennium Point into a design/build project half-way through – taking responsibility away from the architect for its actual construction. For architects, public/private funding mechanisms are one of the downsides of architecture in the 1990s – more of that later.

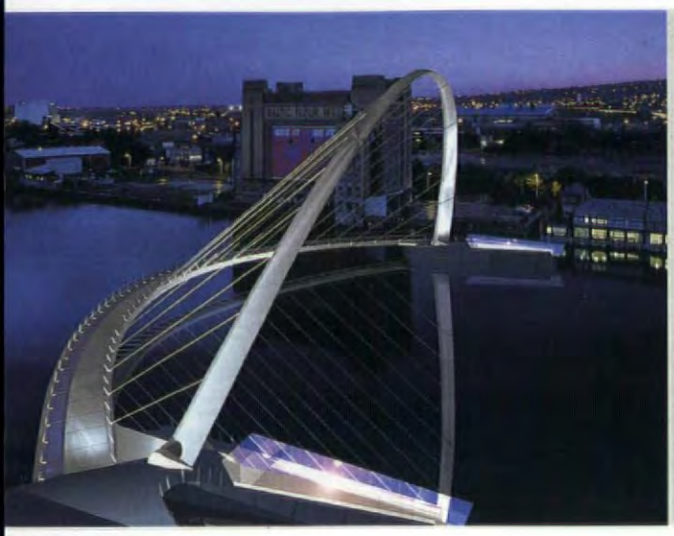
Manchester's city planners are proving that there's more to the self-styled "capital of the north" than an unpleasant industrial legacy. Even if the IRA bomb of 1996 had not destroyed a large area of the city centre, there would still have been opportunities aplenty for architects.

The Lowry Centre in the Salford district of Manchester, by Michael Wilford and Partners, a major arts development, is breathing new life into a once derelict industrial landscape. The Lottery-funded development has also allowed one of Britain's leading architects to build in Britain again. During the 1980s and early 1990s Michael Wilford – then practising with James ▶



From left: "The Deep", Hull's millennium projects, designed by Terry Farrell and Partners (US$60 million, completion spring 2001); Arena Central, in central Birmingham by HOK's London office (pending planning approval – estimated cost US$495 million, estimated completion date 2003); Imperial War Museum of the North, Salford, Manchester by Daniel Libeskind (US$48 million, completion 2002); detail of Branson Coates' Centre for Popular Music, Sheffield (US$14, complete)

Graham Gaunt



From left: Chris Wilkinson Architects' Baltic Millennium Bridge, part of the Gateshead Quays development (US$30 million, completion 2001); The Photographer's Gallery by Dutch architect Erick van Egeraat, one of many foreign architects attracted into the country by the opportunities represented by Lottery funding (US$6.6 million, completion 2001); Odyssey Millennium Project, Belfast by Consarc Design Group (US$145 million, completion by the end of 2000); Millennium Point, Birmingham, designed by Nicholas Grimshaw and Partners (US$180 million, completion 2001)

▸Stirling – generally built abroad.

On the other side of the Manchester Ship Canal, Daniel Libeskind's Imperial War Museum of the North (completion 2002, US$48 million), will add a further touch of glamour to the area. Also in Salford, Santiago Calatrava's Trinity Bridge (*WA*53 pp92-93) has already opened up the area to Manchester's business district, with the architect's trademark constructivist elegance.

In the north-east, Newcastle and Hull are also rebuilding. Foster and Partners and Chris Wilkinson Architects are both contributing to the US$250 million Gateshead Quays cultural development. Respectively, the architects are building the Music Centre (US$100 million, completion 2002) and the Baltic Millennium Bridge (US$30 million, completion 2000).

Hull, Britain's fifth biggest city, is suffering from a major image problem. So Terry Farrell, an architect perhaps best known for his work in Hong Kong, has been drafted into design the millennium project – "The Deep", a US$60 million, titanium-clad, marine-themed visitor attraction. It is only one of a multitude of projects that the city council is spending US$1.65 billion on over the next ten years.

But no one should be fooled into thinking that Lottery funds have helped dissolve Britain's traditional north-south divide. Approximately 80 per cent of all Lottery funds have been dedicated to London projects.

A J Barratt

NIELS TORP

Oslo-based Niels Torp is the architect of British Airways' "Waterside" headquarters, near Heathrow, London.

What has been the greatest influence on British architecture during the 1990s?

The National Lottery.

Is the British architectural community "xenophobic"?

No, I think it's very welcoming – at least in my case.

What changes could be made to improve standards in British architecture?

One or two local authorities could be more helpful, but apart from some needlessly restrictive roof railing legislation, things are pretty much as good/bad as anywhere else.

What's your favourite building, built in Britain during the 1990s?

Millennium Dome, Ralph Erskine's Ark and David Chipperfield's River and Rowing Museum.

Clive Bards

MICHAEL WILFORD

Terry Farrell and Partners has offices in London and Hong Kong.

What has been the greatest influence on British architecture during the 1990s?

The National Lottery.

Is the British architectural community "xenophobic"?

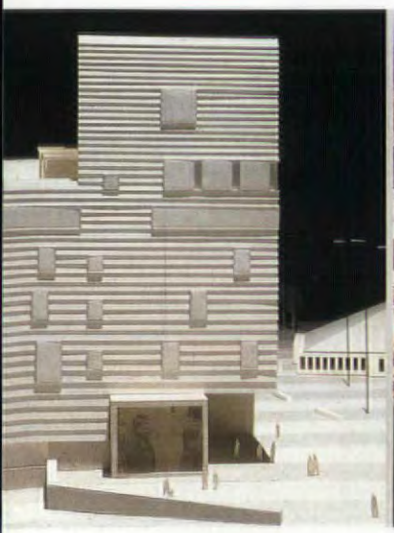
Yes – but it is no different in the USA, Korea, Japan... All the time it is diminishing.

What changes could be made to improve standards in British architecture?

The planning system's control of aesthetic issues doesn't work to the advantage of quality architecture.

In your opinion, who are the architects to look out for in the future?

Doug Streeter and Aidan Potter.



Christopher Hill Photographic

New Labour, new architecture

In different ways, governmental impact on British architecture during the 1990s has completely shaped its identity. The Lottery was set up by John Major's Conservative government (1991-1997). But of greater lasting significance is *Rethinking Construction*, a Labour government-commissioned report on the state of the British construction industry, published in June of last year. It may bring about the greatest seismic shift in British architecture since the profession came into being. Architects and architecture are under threat.

Rethinking Construction was put together by Sir John Egan, chief executive of the British Airports Authority (BAA), with a group of leading commercial clients, all determined to get a better deal from construction. "We spend US$825 million a year on construction. But the regulatory formula governing BAA means we receive less money ourselves each year, and with construction heading up as a cost, we decided we wanted improvement from the industry. For us this a real imperative, a real business need," says Simon Murray, BAA's group technical director.

For architects, the message is simple: streamline and increase productivity, or suffer the consequences. The report suggests that the separation of design from the rest of the project process is a fundamental problem; that too many buildings perform poorly in terms of flexibility, maintenance costs and sustainability, because these issues are not addressed properly during design. There is also the suggestion that designers – the term "architect" is used only once throughout the 40-page report – should integrate suppliers and sub-contractors into the project team. It's also suggested that Britain's horde of one- and two-person practices amalgamate into seven- and eight-man outfits, to provide better service for clients.

Reacting to *Rethinking Construction*, Richard Saxon, chairman of BDP, Britain's largest practice, said: "If we do not set up a more focused approach to supply chain alliances we will be finished. I am trying to move us from an informal series of specialists under one brand, towards a more formal series developing their own brands". With the biggest in the business taking the lead, industry-wide change is more of a "when" than a "maybe".

The decade of globalisation

"The threat of the new" doesn't just come from within.

The global village, an idea not readily accepted in the UK, is an increasing reality. Tony Blair's Labour government may be resisting membership of the euro, but it is widely acknowledged that full integration is only a matter of time. Accordingly, the impact of foreign ideas on the British construction industry, and British ideas on a global scale, are already being felt. ▸

Hayes Davidson

From left: Walsall Arts Gallery, a Lottery-funded arts development in a neglected urban area by emerging London-based practice Caruso St John (US$30 million, completion spring 2000) ; aerial view of London from the top of Wates City Point, a tower being designed by Sheppard Robson (US$200million, completion autumn 2000); Tate Gallery at Bankside, London by Swiss architect Herzog & de Meuron (US$215 million, completion by the end of this year); Niels Torp's "Waterside" headquarters for British Airways, near London's Heathrow airport (US$330, opened last year)

Peter Cook

► A small but growing number of UK firms are expanding internationally. Since 1993, Aukett Associates, one of only two publicly-floated British practices (see also WML pp 66-73), has developed a pan-European network of architecture and design firms, both to protect against future economic downturns and to establish links within an expanding Europe. Aukett is not alone. In *WA*'s last survey of the largest architects in the world (*WA*72), six of the ten firms most active in Western Europe were British.

To an extent, the climate of British architecture in the 1990s has played into the hands of foreign firms – particularly the Americans. The Private Finance Initiative (PFI), a hang-over from the Thatcher years of privatisation, combined with the aims of *Rethinking Construction*, has encouraged an interactive and cross-disciplinary approach long-established in the States. Most of the major US firms – HOK, RTKL, Gensler, SOM, KPF and Swanke Hayden Connell – already have offices in London (see page 44).

In February, Nebraska-based healthcare specialist, HDR Architecture Inc (48th largest architect in the world – *WA*72) chose London as the location of its first overseas office. Explaining the rationale, David Pokora, executive director of HDR's London office, says: "The office was established to capitalise on the opportunities presented by the PFI. The healthcare system in the US is forward-thinking, it hasn't been placed in a straight-jacket for 30 years. PFI has broken the [National Health Service] mould. It allows new entrants." HDR is already working on the Princess Margaret Hospital in Swindon, Wiltshire.

Andrew Vander Meersch, chief executive of Stockley Park, the UK's flagship business park near London's Heathrow Airport, came straight to the point. For the third phase of the development, he wants to bring in US architects, because they can provide the "change, freshness and new thought process" required. "I'm desperate to find architects who can provide for the needs of today." An invited competition is likely to boil down to a play-off between KPF and SOM.

Border patrol

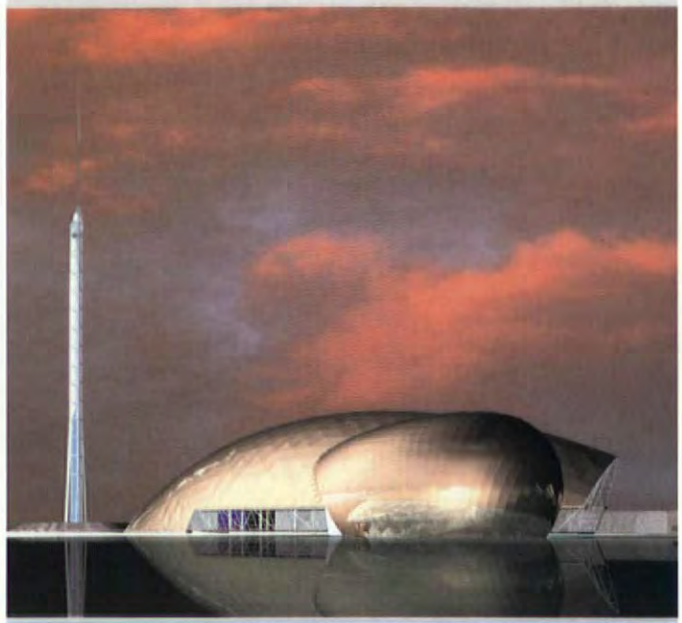
One of Tony Blair's pre-election promises was the devolution of self-rule to Scotland and Wales. Surprisingly, for buildings of such extreme national sensitivity, neither of the architects who won the competitions to design the buildings were Welsh or Scottish.

Catalan duo Enric Miralles and Benedetta Tagliabue, working with British giant RMJM, are designing the Scottish assembly. Described as an "upturned boat", the US$83 million (and rising) project is due to be complete by the autumn of 2001. With time and budget tight, progress has been far from smooth. One project manager, Bill Armstrong, has already resigned.

Time will tell whether devolution has a bearing on the fortunes of local architects, but in the meantime practices from south of the border, and further afield, are finding rich pickings in Scotland. The Museum of Scotland in Edinburgh, by London-based Benson & Forsyth (pp 64-65), opened to great acclaim earlier this year – the Prince of Wales doesn't like it, but that's all right because no one listens to him anymore.

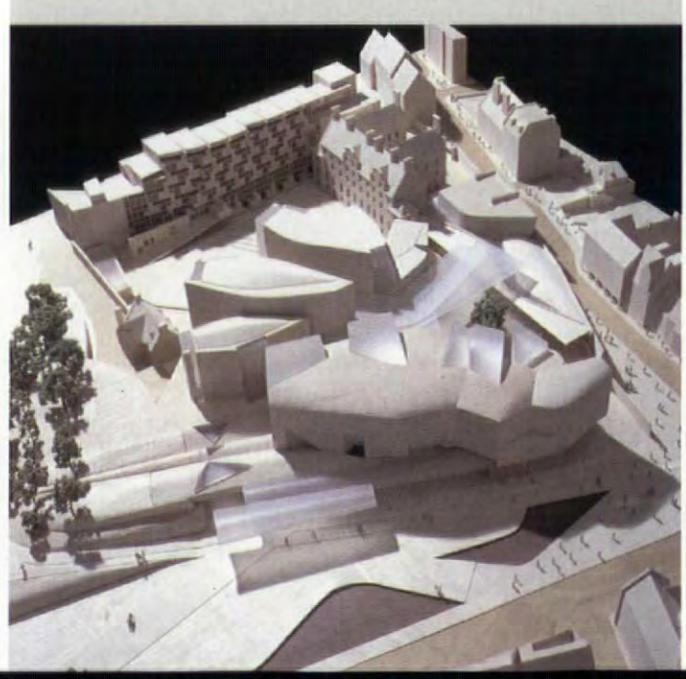
Richard Rogers Partnership won the competition to design the new Welsh Assembly in Cardiff. The largely transparent building has been designed as to maximise daylight and reduce energy consumption. (US$33 million, completion April 2001).

Wales' millennium edifice is the work of Cardiff practice Percy Thomas Partnership. The Welsh Millennium Centre has



Nigel Young

From top: Glasgow Science Centre – the main structure is by BDP, Millennium Tower (on the left) was designed by Richard Horden (total cost for Centre US$44 million, completion 2001); in situ CAD view of Foster and Partners' Greater London Authority headquarters, next to London Bridge (cost undisclosed, completion by the end of 2001); Enric Miralles and Benedetta Tagliabue's design for the Scottish Parliament in Edinburgh (US$83 million, completion autumn 2001)



its roots in the early-1990s farce that was Zaha Hadid's Cardiff Opera House. After years of mis-management, Hadid's proposal was eventually overlooked. Percy Thomas took over the reins three years ago and has now come up with an idea that is buildable, popular, understood by the local people and "unmistakably Welsh" – slate from Welsh slag-heaps will clad the walls, and a huge steel shell, produced from Welsh ship-yards, will envelop the building.

Arguably the most significant difference between Hadid's Opera House and the Percy Thomas proposal is the Millennium Centre's business plan. All Lottery-funded projects must justify the funds they receive in terms of long-term benefit to local populations, and potential revenue generation. Whereas the Opera House was designed for nothing but opera, not a creative medium generally associated with mass appeal and blockbuster profit, the Millennium Centre incorporates a museum, a lyric theatre, office space, a youth hostel, dance space and a main auditorium.

Don't look back

Looking to the future, the government is advertising for an "Architecture Champion". Answerable to the Department of Culture, it has not been made clear what the role of the champion will involve – seeing that new policies, as they relate to architecture nationwide, function in the intended manner, is likely to be the broad remit.

The role of Mayor of London is better defined. The decision to appoint a City Mayor, another product of the Blair administration, is a clear attempt to mimic successful city planning policies implemented around the world in recent years – notably, by Pasqual Maragall, Mayor of Barcelona. The Catalan capital is held in such high esteem in London that the Royal Institute of British Architects recently broke with 150 years of tradition and awarded Barcelona, as opposed to an architect, its Royal Gold Medal for 1999. The new Mayor of London will be in place by July 2000.

Sir Norman Foster, surely number one contender for "British architect of the decade", will design the new Greater London Authority headquarters. Foster and Associates won the commission earlier this year. The manner in which it won says much about the future for British architecture. The behind-the-scenes struggle between the two proposals – the other was by Alsop & Stormer – centred on the relative merits of the "packages" put together by the developers leading the competition. The decision to run a developer-led competition meant that the winning location's long-term potential for future commercial development was effectively the foundation upon which the decision for the first government building of the twenty-first century was based – further evidence that the public/private competition and funding systems are the way of things to come.

But as the decade comes to a close, not everything has changed. Lord Richard Rogers and Sir Norman Foster, who came into the 1990s on the respective highs of the Lloyds Building, London and Hong Kong and Shanghai Banking, Hong Kong, are still dominant. Rogers' Millennium Dome (see page 50) is nearing completion – he is also Tony Blair's advisor on architecture; while Foster can list Chek Lap Kok airport and the Reichstag as just two of his credits in recent years credits in the late 1990s. Time moves on, but it still helps to have friends in high places. WA

GENERAL CONSTRUCTION INFORMATION provided by Hanscomb

Procurement of construction: Traditional methods of construction involving standard contract forms still dominate (Joint Contract Tribunal "JCT," Institute of Civil Engineers "ICE"). Under these the architect is retained as lead designer coordinating his work with the engineering disciplines. A cost consultant or quantity surveyor is also commissioned. In May 1998, the Housing Grants, Construction and Regeneration Act 1996 became law. The legislation introduces industry wide adjudication as a quicker and more economic solution to disputes. Professional Construction Management, where all the risk is transferred to the client, is gaining support predominately on complex projects where time and quality are high priorities.

Rates of inflation: The rate of inflation in the construction industry is estimated at 3-4% for 1999 and 2-3% for 2000.

Design professions: It is now widely, if reluctantly, accepted among consultants that competitive fees are a permanent feature of their work. Clients and professionals alike for the most part now disregard recommended fee scales, published by the professional institutions. The result has been lower overall fees, but also in many cases, reduced services, less detailed designs, fewer design reviews and increased claims for additional fees.

Contractors: There are a number of contractors, most of whom are responsible for the sub-contractors, who operate nationally and internationally including BICC, Trafalgar House, Tarmac, AMEC, Bovis, Mowlem, Laing, Taylor Woodrow, HBG and Costain. Many smaller contractors operate on a regional basis. Most public sector clients are governed by European Union legislation to advertise projects for tender over a certain value. Concern has grown that tender lists have become excessive, particularly for publicly funded projects.

Governing codes and standards: The British Standard Specifications (BSS), equivalent to the US ASTM standards, is the standard that applies to the building products and materials.

CONSTRUCTION COST GUIDES

Pricing manuals: There are several pricing manuals published for England. Some of the major publications are: Spon's Architects' and Builders' Price Books, Laxtons Pricing Book, Wessex Pricing Book.

USEFUL ADDRESSES

Royal Institute of British Architects
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London, W1N 4AD
Tel: +44 171 580 5533. Fax: +44 171 637 0782

Royal Institution of Chartered Surveyors
12 Great George Street
London, SW1P 3AD
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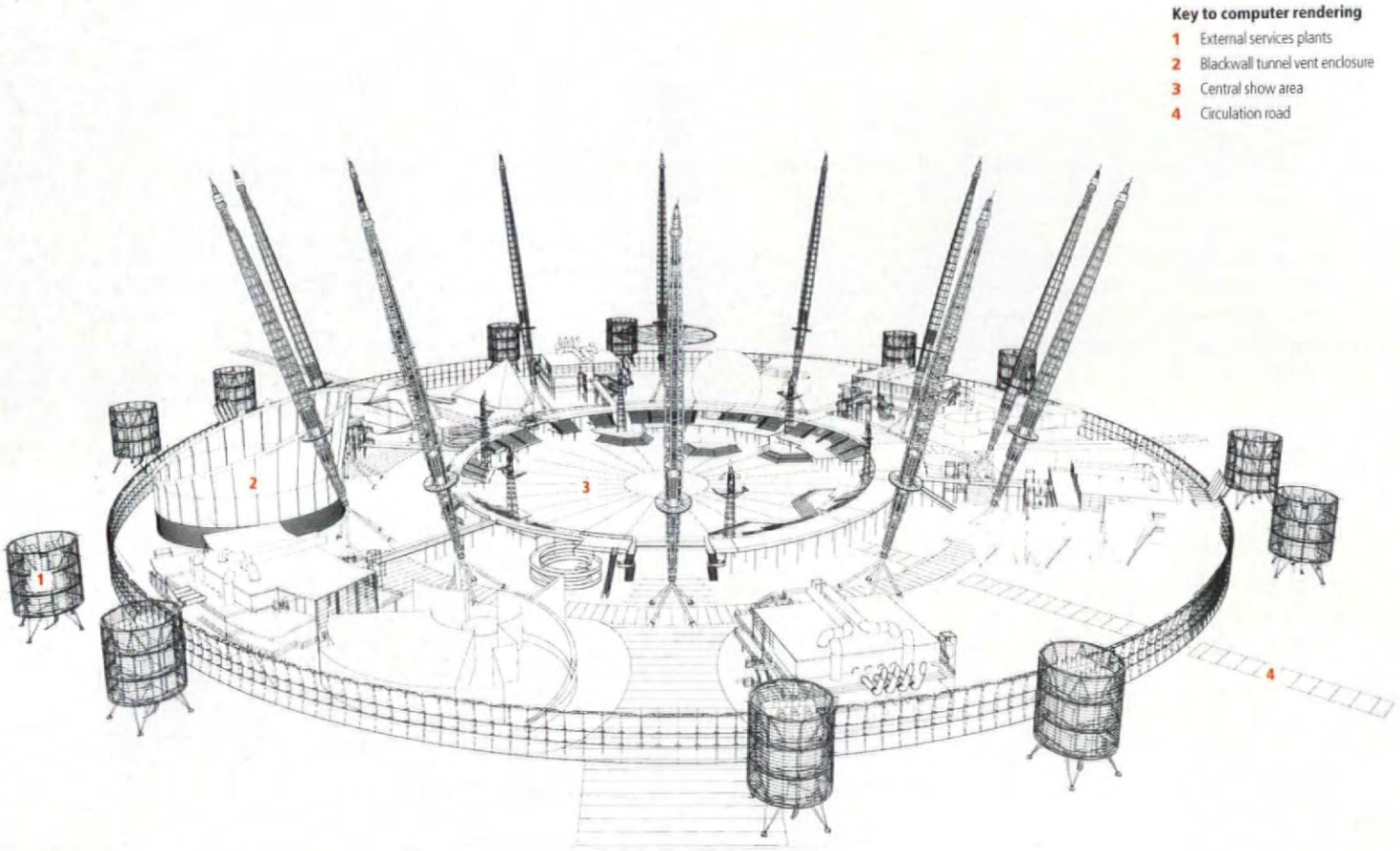
WA *wishes to thank* Hanscomb *for assisting in the presentation of the information contained in this report.*



There's no place like dome

The Millennium Dome in the UK has attracted many unflattering descriptions, including "just a big flat pancake", but in terms of its functional design, it is a triumphant success; and beautiful in the way that suspension bridges are beautiful. Colin Davies traces the evolution of the notorious project.

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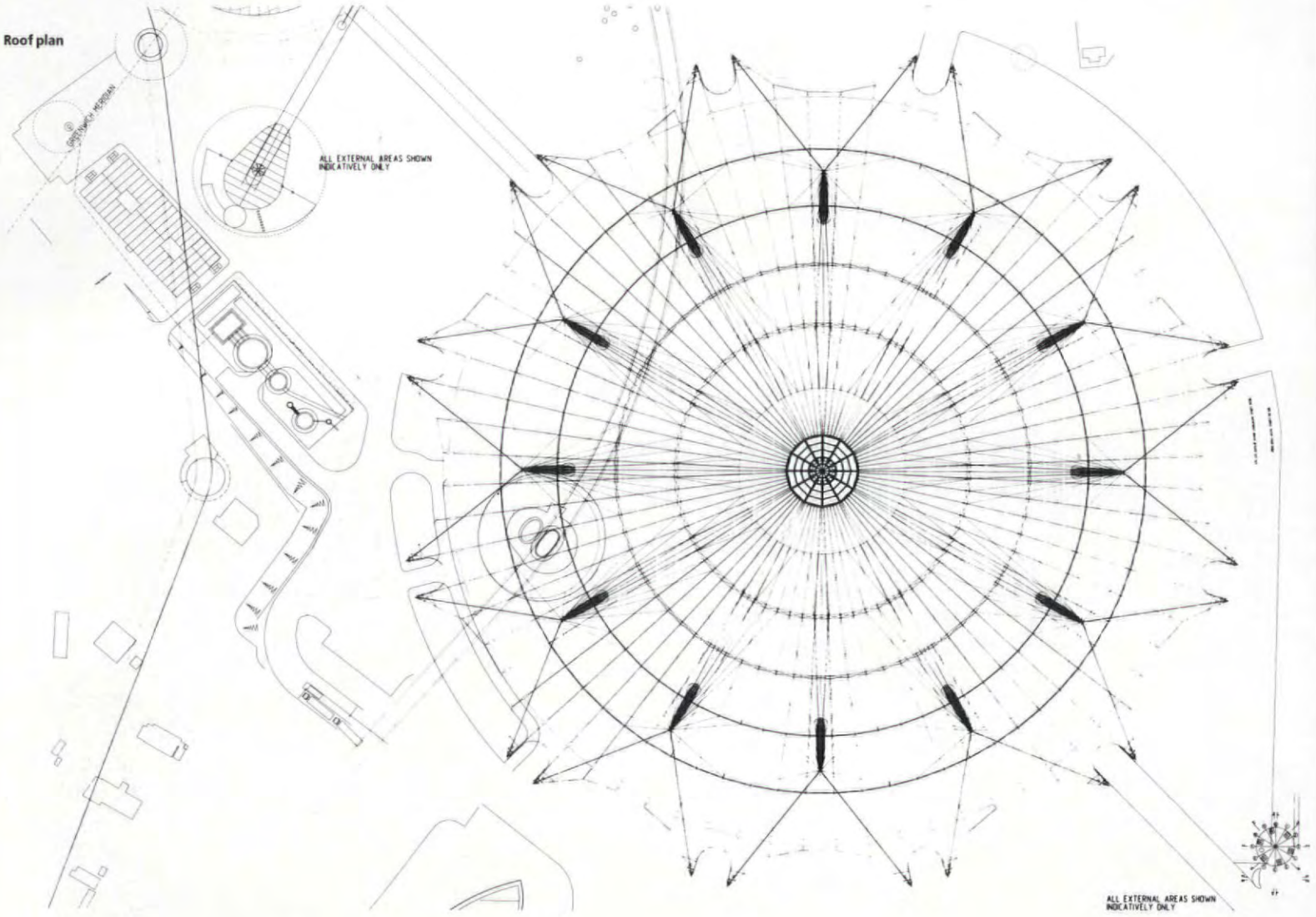
The UK's millennium celebrations have been concentrated in the public's mind with a single structure – the Millennium Dome. The huge exhibition complex has become the focus of attention, which means, more often than not, the focus of criticism. Pick up a British newspaper any day of the week and you will find an article attacking it for being too big, too expensive, too commercial, too secular or too philistine. Critics rarely distinguish between the dome itself and the 12 themed exhibits or "zones" that it will contain. It is easy to forget that preparations for the year-long party were well advanced before anybody ever thought of housing it in a dome. In 1995, the design company Imagination was appointed by the Millennium Commission to make proposals for a national exhibition on an unspecified site. While Imagination was working on its concept, the Richard Rogers Partnership (RRP) was appointed to prepare a masterplan for the development of the Greenwich Peninsula – a 121-hectare Thames-side site in south-east London, owned by British Gas and severely polluted by the waste from decades of coal gas production. The peninsula was an abandoned and forgotten part of the city – even the massive Docklands redevelopment of the 1980s had passed it by.

Part of the RRP brief was to liaise with Imagination, with the view that the Greenwich site could be chosen for the millennium exhibition over the other frontrunner, the National Exhibition Centre in Birmingham. Mike Davies, the RRP partner in charge of the masterplan project, never had any doubt that the exhibition would come to Greenwich, for at least three good reasons. First, it seemed unthinkable that the celebrations should take place anywhere else than in the capital city; it was calculated that 27 million people lived within one-and-a-half hours' travelling distance of the Greenwich site. Second, the exhibition would leave a useful legacy: the transport and services infrastructure necessary for the exhibition would put the peninsula back on ▶

Above: Aerial view of the Millennium Dome on the Greenwich Peninsula
Facing page, below: Night view highlighting the characteristic scalloped rim

Roof plan



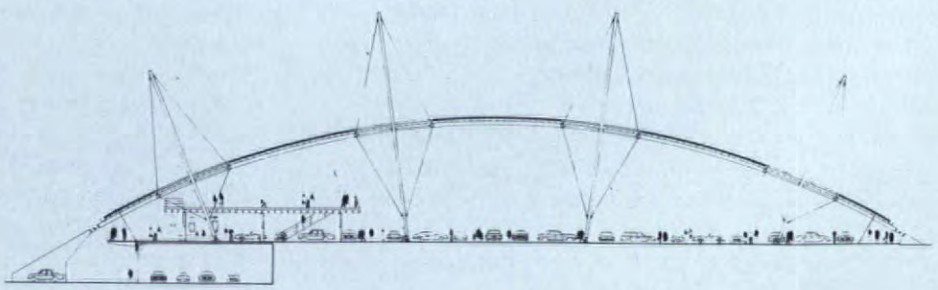
► the map and open it up for future development. The third reason was symbolic. The Greenwich Meridian actually passed through the site. The new millennium would literally start right there. But still, no one had envisaged a dome at that stage.

Covering up

Davies is full of praise for the work that Imagination did. "Their concept was quite brilliant," he says, "a populist vision which seemed to transcend conventional design thinking". But after the first big presentation of Imagination's ideas in May 1996, it soon became clear that there were practical problems. The plan envisaged a building of 13 separate pavilions, all fully insulated and weather-proofed. It was clear that this would be both too expensive and too time-consuming. And then there was the problem of the site's geography and climate. Exposed to biting north-easterly winds, the Greenwich peninsular is often a cold, wet and uncomfortable place. The millennium exhibition would not just be a summer festival, but would last the whole

Left to right: Precedents to the dome structure in RRP's work: Inmos factory, South Wales (1982); computer rendering of section of car showroom at Massy, France; Fleetguard factory, Quimper, France (1981)

Ken Kirkwood



year – starting in the middle of winter.

A radical rethink was required, and time was already pressing. Might it be possible to roof over the pavilions with a large, lightweight structure? This would shelter the whole site from the wind and rain; there would be no need to weatherproof the pavilions, which could then be much simpler, cheaper structures; and time would be saved on the detailed design of the pavilions. But was it possible? Davies, and Ian Liddell of engineering company Buro Happold, thought it was. Both had wide experience of lightweight, long-span structures. For them, covering the whole exhibition area seemed the obvious thing to do.

Looking now at the gleaming white, upturned saucer of the dome, with its crown of yellow painted steel masts, it is natural to assume that its function is mainly symbolic. Domes, after all, traditionally evoke cosmic or religious associations. The centralised plan culminating in a dome has been seen as the ideal form of the Christian church ever since the Renaissance. However, the fact is that the Millennium Dome's form arose spontaneously from an analysis of practical requirements.

"In our kind of architecture", says Davies, "the architects, the engineers – both structural and mechanical – have to inform the concept right from the start, contributing ideas and expertise in design team meetings. A kind of shorthand develops and after a while, it is hard to say who contributed which ideas".

Perfect circle

A circle seemed like the most suitable plan form for the site. The requirement for about 100,000 square metres of exhibition space (twice the size of the capital's Wembley Stadium) produced a circle 365 metres in diameter. Placed against the looping shoreline of the Greenwich Peninsula, it sat as comfortable as an egg in a nest. A rectangular plan form might have been just as cheap and easy to erect, but would not have fitted so neatly on the site. A free-form plan, like Frei Otto's pioneering tent structures for the 1972 Munich Olympics perhaps, might have been made to fit the site but would not have had the benefit of geometrical simplicity and repetition. Projecting the circle into three dimensions naturally produced a dome. A semi-circular dome would have been unfeasibly high, so a shallow, saucer dome was the obvious answer. The dome could not possibly span the whole 365 metres without intermediate supports, but it would be advantageous if the number of internal supports could be kept to a minimum.

For Davies this was a familiar problem, and he had a ready- ▶

Ken Kirkwood

QA Photos Ltd

Installation of Schindler duplex lift frame at the dome. The frame weighs approximately 12 tonnes and had to be floated up the River Thames by barge from Southampton

Grant Smith

made solution: the dome would be supported not from below, but above. It would be suspended by tension cables from a ring of twelve steel masts. There were many precedents for this type of structure in RRP's work; for example, the Fleetguard factory at Quimper in Brittany (1979), the Inmos factory in South Wales (1982), and especially the unrealised project for a car showroom at Massy in France which had a shallow arched roof suspended from four rows of inclined masts.

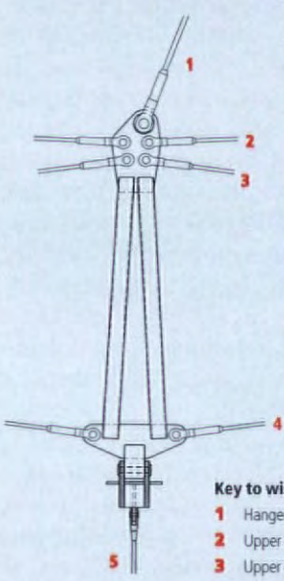
Lightweight solution

So, with the challenges of the brief and Davies's track record with support structures, the form's design appeared obvious. But Davies was not blind to its symbolic potential, which would give Greenwich Peninsula a clear identity. "It would have its own image. It would be iconic." But what would the building be made of? This was where Buro Happold's Liddell came in. "We have been developing cable net and tent technology ever since Ted Happold left Ove Arup & Partners and set up this practice." In these structures, rigidity is usually achieved by curving the fabric or cable net in two directions so that down loads are resisted by the warp, and up loads (from wind) by the weft. But a tent or cable net structure is much more efficient if both up and down loads can be resisted by both sets of cables or yarns, as they are in a marquee. Liddell reasoned that the greater efficiency of the marquee-type structure would pay big dividends, considering the dome's vast scale.

When is a dome not a dome?

"Structurally, the dome is not really a dome," explained Liddell. "But neither is it really a tent, because the fabric is not an essential component of the structure. It simply rests on a suspended net of straight cables."

In the completed structure, the fabric is Teflon-coated glass fibre, which is longer-lasting and more ecologically sound, albeit more expensive, than the alternative PVC. A second, lighter skin is suspended below the cable net as a barrier to condensation and water penetration. The external surface of the dome appears to be curved, but actually it is faceted. Radial cables, 232 millimetres in diameter, span about 25 metres between each suspension point and extend from a cable ring at the centre of the dome to a right of catenary cables at the perimeter. These catenaries are anchored to the ground at 24



Key to wishbone elevation

1 Hanger cable to mast top
2 Upper circumferential cable
3 Upper circumferential x-brace cable
4 Lower circumferential x-brace cable
5 Macalloy rod to lower circumferential

Key to wishbone section

6 Hanger cable to mast top
7 Primary twin radial cables
8 Macalloy rod to lower circumferential

QA Photos Ltd

points to create the dome's characteristic scalloped rim. The spacing of the main radial cables is maintained by circumferential cables, which are raised above the fabric surface to allow rainwater to flow under them. The whole net is held up by cables attached to the tops of the composite steel masts, and held down by cables attached to the feet. So that these internal cables do not obstruct the interior, the masts are raised on pyramidal bases, big enough to drive a double-decker bus through.

Buro Happold was also responsible for the design of the environmental services. Plant, such as tanks, pumps and electrical transformers, is housed in 12 cylindrical perimeter structures outside the dome. These are connected to six "node" buildings inside the dome which contain a total of 700 toilets and 20 restaurants, as well as air-handling equipment. Fresh air enters the dome mainly through the big "up and over" doors at the perimeter and is extracted by 1.8 metre diameter fans mounted inside the structural masts. Services are distributed in an underground network of ring and branch ducts.

Despite its singular, unified form, almost every component of the dome is repeated many times, from the cables and fabric panels of the roof to whole buildings like the nodes or the services cylinders. This was a deliberate strategy. It shortened the time required for detailed design, it meant that components could be mass produced in factories, and it ensured rapid site assembly. Take, for example, the 144 fabric panels, fixed by a team of 80 "rope access workers" recruited from the ranks of rock climbers in Wales and the north of England. The first few panels were treated as prototypes on which to test the technique and streamline the process, but thereafter the installation proceeded very rapidly – up to three panels per day, some of them covering 1,000 square metres. But Bernard Ainsworth, the project director of the McAlpine/Laing construction management consortium, points out that although the dome is not a complex building, it is logistically challenging. "Large-scale repetitive construction leads to a steep learning curve and productivity is high. But if you get something wrong, the mistakes can multiply at an alarming rate."

There were no fewer than 60 contractors (not sub-contractors – all were contracted directly to the client) involved in the project, with up to 20 on site at one time. The major contractors, such as Watsons of Bolton, which supplied the steel masts and cable net, or Birdair of Buffalo, New York, which supplied the fabric, were also responsible for detailed design, producing the final shop drawings and devising their own construction methods in consultation with the architects and engineers. Contractors and consultants all shared one extensive site office, and worked using a common information system. And all the time, that date – 1 January 2000 – has loomed, concentrating minds and encouraging teamwork.

It is ironic that this essentially practical structure, built with the cost per square metre of a retail warehouse, should have become the national symbol of the millennium. But the dome should not be judged simply on formal or aesthetic grounds; it should be judged as a piece of functional design, in which terms it is triumphant success. The parallels with another great national exhibition structure are striking. That ingenious gardener and greenhouse builder Joseph Paxton rescued the Great Exhibition (1851) from disaster with a bold proposal for a simple, cheap, industrialised structure, applying the technology he was familiar with on an unprecedented scale. The contents of the Great Exhibition are now largely forgotten but everybody remembers Crystal Palace. WA

Facing page, above: More than 90,000 square metres of fabric has been cut into 144 panels, each weighing approximately 1,000 kilogrammes, and attached to around 70 kilometres of steel cables; **Facing page, below**: Wishbone nodes connect radial cables to circumferential cable rings, which are lifted above the fabric **This page, above:** Seating being installed in the dome's central arena. The Millennium Show will run in the central arena up to five times a day to audiences of 12,000 at a time

COSTS

Site, structure and associated infrastructure:
US$453.75 million
Dome structure:
US$66 million
Roof:
US$19.8 million
Exhibits and attractions:
US$315.15 million
Operation and running costs for one year:
US$133.65 million

CREDITS

Client:
The New Millennium Experience Company Ltd; Millennium Commission
Planning supervisors: **Ove Arup & Partners**
Structural and mechanical engineers:
Buro Happold Consulting Engineers
Fabric roof: **Bird Air**
Main steel structure: **Watson Steel Ltd**
Fire consultants: **FEDRA; Warrington Fire Research Consultants**
Civils and remediates: **WS Atkins**
Construction managers:
McAlpine Laing Joint Venture
Environmental engineers: **Battle McCarthy**
Quantity surveyors: **Boyden & Co; Gardiner & Theobald; Ove Arup & Partners**
Acoustic consultant – Phase 1:
Sandy Brown Associates
Building control:
London Borough of Greenwich

Success in a tube

The 11 new stations that make up the extension to London's Jubilee Line have produced some of the most exciting and technically innovative architecture in the country – not least because many of the designers were unknown before they went underground. Nicola Turner reports.

Britain's residents and visitors still come to Canary Wharf, in the capital's Docklands to the east of the City, in the same way that they might visit the Tower of London or Hampton Court. To gaze at Cesar Pelli's giant tower and wonder at the mounting construction sites in the area is for many a transporting experience quite unlike anything else the capital has to offer. By the end of this year there will be two more targets on the tourist hit list: the Millennium Dome, naturally, and perhaps more surprisingly, the giant and dramatic spaces of the new Jubilee Line stations that stretch into London's east end.

Unlike the chicken and the egg, it is possible to unravel the seemingly inextricable links between the Millennium Dome and Alsop and Störmer's "muscular subterranean cathedral" – the new North Greenwich Station on the Jubilee Line. Most people assume that the station followed the dome, but in fact the former was in place first and acted as a catalyst for the development of Richard Rogers millennial tent.

In vibrant blue, North Greenwich is the only coloured station on the line and perhaps the most remarkable. Originally conceived with an open concourse, the station was covered to capitalise on potential development above ground. Despite this adaptation, the vast chasm-like space still engenders a feeling of light and space quite unlike any existing underground station. Free-standing stairs and elevators plug into the concourse (which is suspended from the roof slab, itself supported by vast raking columns) and feed passengers onto the platforms below. The station houses three parallel tracks with track crossovers at each end of the platforms. The imagery of the suspended concourse as a giant hull of a ship with a stainless steel-clad underbelly, is enforced by the liberal use of a vivid blue on the mosaic tiles wrapped around the concrete columns, and the 300-metre-long glass wall which hides the cabling. The effect of the colour under artificial light was tested with a six-metre-long painting by Will Alsop, who often uses art in the conceptual design phase of his projects.

At Canary Wharf, Foster and Partners has designed the largest and most expensive new station, which disgorges passengers at the foot of the practice's Citibank tower, currently under construction. The volume of this station, 24 metres deep and 280 metres long, is greater than the Canary Wharf tower. Five wide banks of escalators are designed to serve 16,000 people an hour. This is also a cut and cover station, and includes a crossover junction. Above ground, three glazed curved roof canopies of the station's entrances are set in a landscaped park and are reminiscent of the Bilbao metro system's "Fosteritos", similar canopies designed by the architect.

Unlike the relative simplicity of the cut and cover stations, some of the other stations presented uniquely challenging engineering tasks, akin in some cases to "heart surgery", according to the Jubilee Line Extension (JLE) project's chief

MEET THE MAN

Martin Pawley interviews Roland Paoletti

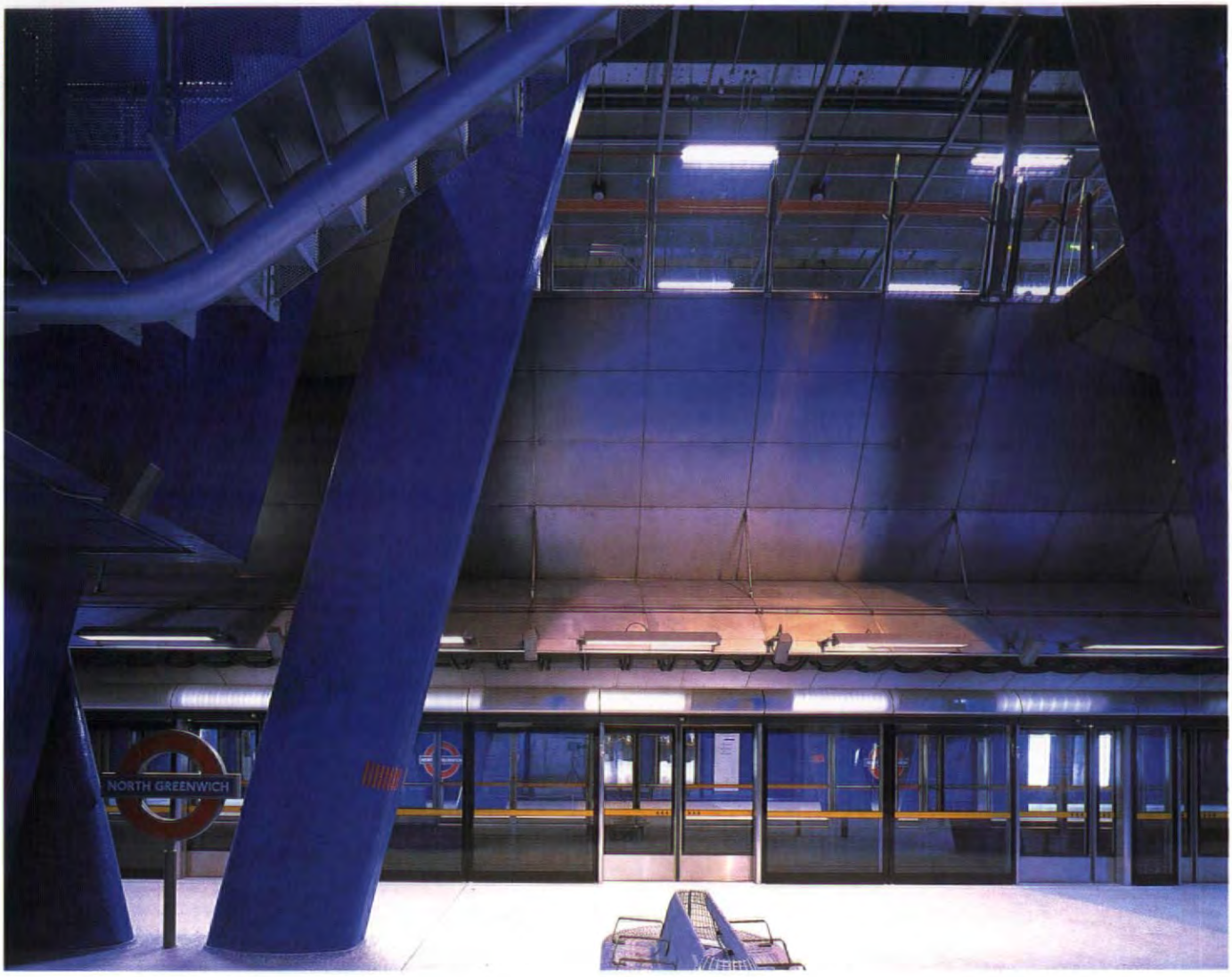

Frank Grainger

"These stations are magic when they are half complete," enthuses the chief architect of the Jubilee Line Extension (JLE) project. "Great echoing catacombs dimly lit by strings of contractors lights. They will never look so wonderful again."

Roland Paoletti is standing in the vast concrete labyrinth that is London's new Westminster underground station, part of the JLE, which lances east via the great commuter stations of London Bridge and Waterloo, out to Canary Wharf and thence to deepest East London.

Dangling contractors bulbs do indeed cast fantastic patterns of light and shadow on the gigantic angled escalators that emerge from voids above and below. Paoletti savours the moment, leaning on the aluminium crutch he must use to help him get about.

"What is an underground station?" he demands of the journalist he is showing around. "Is it a vehicular underpass with people, or a building with trains in it?" The question goes unanswered, for few have the temerity to second-guess an architect who was deeply involved in the design of 36 underground stations for the Hong Kong Mass Transit Railway in the 1980s, and then came to London to supervise the design of 11 new and refurbished stations on JLE, the first new underground line for 25 years. In the end Paoletti provides the answer himself. Every underground station is both of these things, he says. The whole subterranean world of platforms and concourses is in reality the interface of two worlds, one public, one private,



Dennis Gilbert/VIEW

Left: The blue mosaic tiles on the concrete columns, and the steel-clad underbelly of the suspended concourse at Alsop and Störmer's North Grennwich station

architect, Roland Paoletti. MacCormac Jamieson Pritchard had to design Southwark Station to sit under the Waterloo East railway viaduct, while at Westminster, Michael Hopkins & Partners has weaved escalators among the giant struts holding up the New Parliament Building above, also by his practice.

It was because of these technical difficulties that Paoletti actively sought problem-solvers. For all the stations, he had to have architects who understood the complexities of engineering. Although established names such as Richard MacCormac, Sir Norman Foster and Sir Michael Hopkins appear on the list, at Bermondsey he hired Ian Ritchie, an architect who Paoletti describes as a "little cult figure in the underworld of architecture at the time". Thought by Richard Rogers to be "brave" to take on the JLE project, let alone with relative unknowns, Paoletti remarks that as long as you are an expert yourself it should be easy to spot architects capable of the task. ▶

5

and the dividing line between them is the edge of the platform. Beyond the platform's edge, is an underpass, a tunnel system designed by engineers, an arcane world of railway technology populated by thundering trains.

In considering the great cost and controversy surrounding the JLE, most Londoners fail to understand what a phenomenal enterprise it is. For this the word "extension" may be partly to blame. It suggests a minor work, an afterthought, where nothing could be further from the truth. With the abandonment of the Pool of London in the 1960s in favour of a new container port downstream, a 22 square-kilometre tract of land opened up for redevelopment – the largest slice of inner London to fall vacant since the Great Fire of 1666. The problem was that this location was harder to get to and from by public transport than anywhere else in inner London.

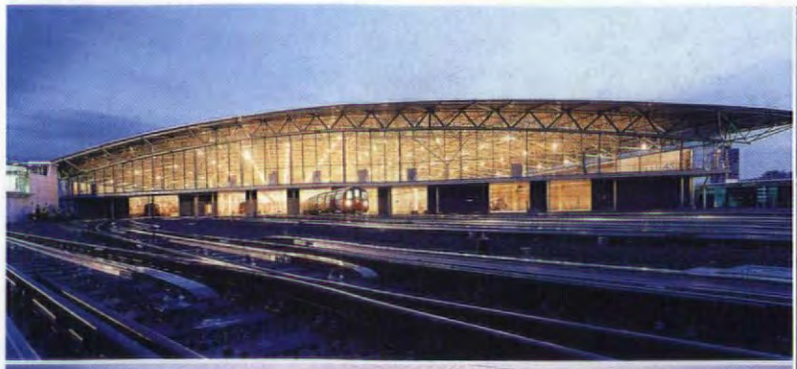
The issue of improving access to Docklands smouldered for 20 years before the decision to go ahead with a fully fledged underground railway was taken. Before that, transport planners thought in terms of low-cost surface systems – roads and buses, or trams using old dockyard railway lines. Finally, the Docklands Light Railway (DLR) was built. The modest overground light rail system came into service in 1987.

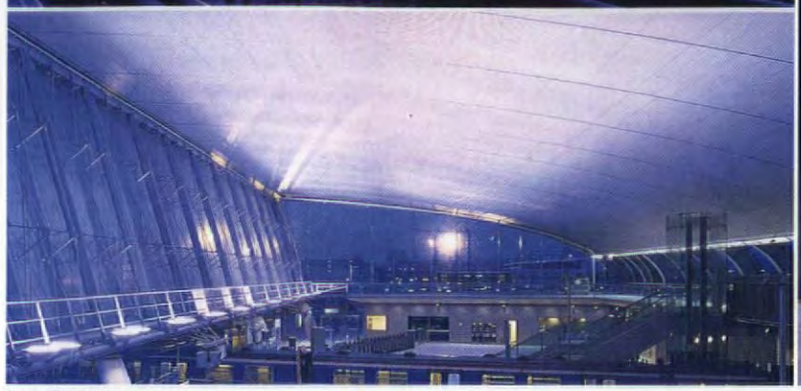
The word "extension" may be partly to blame for the controversy surrounding the JLE. It suggests a minor work, an afterthought, where nothing could be further from the truth.

6

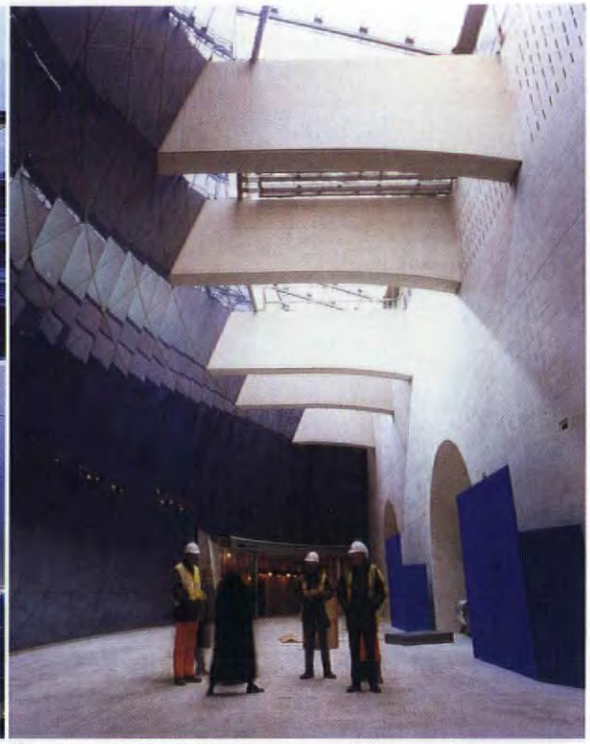
In a perverse way it was the DLR, rather than the urge to extend the London Underground network, that fathered the Jubilee Line Extension, for its evident shortcomings brought the advocates of alternative public transport to their senses. The DLR had been billed as being quick, automatic and cheap. In the event, it was simply ▶

QA Photos/JLE





Dennis Gilbert/VIEW



JLE

Clockwise from top left: Chris Wilkinson Architects' Stratford Market Depot illuminated at night; the intermediate concourse at MacCormac Jamieson Pritchard's Southwark station; the soaring roof and tilted glazed facade of Stratford station
Facing page: One of the glazed entrance canopies at Canary Wharf, the largest of the JLE stations, by Foster and Partners

▸ Ritchie was chosen on the basis of a small prefabricated house in France. Paoletti says: "I wanted the best people, and they were not necessarily those who were established."

Paoletti had to fight to get architects interested in the JLE. He remembers Will Alsop being "enormously disinterested", and unable – like many of his contemporaries – to see how architects could be involved in what was essentially an engineering task. The only firm to answer the advertisement for the project was Troughton McAslan (now John McAslan and Partners), responsible for the design of the Canning Town station on the site of an old Thames iron yard. The station provides an interchange between the Jubilee Line, Docklands Light Railway and the North London Line, as well as a new bus interchange station. Three parallel linear structures are each linked by a sub-surface concourse. The compact double-decker solution was necessitated by the narrow slice of land between the road and the river. The design shares some of the High-Tech methodology and materials of Canary Wharf, North Greenwich and Stratford stations, with glass cantilevered roof canopies and curved aluminium cladding panels.

In contrast to Canning Town, Van Heyningen and Haward's West Ham station is a more humble affair, in glass block and brick. So understated, in fact, that the architects had to defend the design to the local council, which felt it was being short-changed by being given something that did not live up to the High-Tech design of what it perceived to be the "richer" stations. The design survived once the critics understood that each station forms what Paoletti describes as "a tune, like a piece of jazz". The attention to detail in all the stations, including those by the JLE's own team, is unsurpassed, and has in no small measure raised the standard of British architecture.

▸ inadequate. Its stations were identical structures in concrete, steel and polycarbonate, assembled from kits of parts, unmanned, minimal and ill-equipped. There were only two escalators in the entire system.

Whether there is a direct connection between the poor impression these austerity stations made and the infinitely more generous provision that was to be written into the specification of the stations of the JLE may be open to question. What is certain is that the unexpected arrival of the enormous Canary Wharf office development, with its projected 65,000 jobs, raised the transport stakes to a level where no alternative to an extension of the underground would do. Within three years of the opening of the DLR, the below-ground JLE was approved to augment it.

Paoletti was appointed in the same year. Of Italian descent but born in London and an architecture graduate of Manchester University, Paoletti had worked with the celebrated Italian engineer Pier Luigi Nervi before taking a post in Hong Kong in the mid 1970s. There, his engineering experience, coupled with an architectural background, commended him to the directors of the Hong Kong Mass Transit project and over 12 years he rose to the position of chief architect. A convinced modernist, at the time of his arrival in London he was amazed by the extent to which English architecture seemed afflicted by a reactionary classical revivalism. Paoletti's choice of architects for the new JLE stations, though drawn from a catholic range of reputations, ages and experience, in effect, countered this trend. He eschewed all historicism in favour of a

Paoletti deplored the competitive fee bid, comparing it to trying to find the cheapest chart to help you sail the Pacific.

QA Photos/JLE

THE TEAM

1. **Green Park**, JLEP Team (existing station)
2. **Westminster**, Michael Hopkins & Partners
3. **Waterloo**, JLEP Team
4. **Southwark**, MacCormac Jamieson Pritchard
5. **London Bridge**, JLEP Team, Weston Williamson (concept)
6. **Bermondsey**, Ian Ritchie Architects
7. **Canada Water**, JLEP Team
8. **Canary Wharf**, Foster and Partners
9. **North Greenwich**, Alsop & Störmer
10. **Canning Town**, Troughton McAslan
11. **West Ham**, Van Heyningen & Haward
12. **Stratford**, Chris Wilkinson Architects

COMPLETION DATES

Phase 1:
At the time of going to press the JLE was confident that the first phase, from Stratford to North Greenwich would be opened in late spring.
Phase 2:
North Greenwich to Waterloo by late summer.
Phase 3:
Waterloo to Green Park by the autumn.

COST

The total cost of the entire JLE project is quoted at approximately US$5 billion.

At the end of the line Chris Wilkinson Architects, another unknown at the time of selection, has designed Stratford Station, with its curvilinear roof, transparent spaces and tilted glass facade, and the remarkable Startford Market Depot, which houses the trains. The roof of the station thrusts forward over the vast expanse of the uninterrupted concourse, running parallel with the main line railway, and overhangs the tilted facade. This form maximises natural lighting and provides an uplifting environment more akin to sea ports than underground stations. It also provides solar energy-assisted ventilation via the void in the double-skin roof, through which air is drawn by the "stack effect" and expelled at the highest point.

Paoletti's original brief was that the JLE should be "tideless"; that there should be no noticeable difference between the old and the new. What he inherited was "the attitude of London as a sacred ruin" and the tube as a shrine to original designers such as Charles Holden. "The more I heard this, the more I realised it was impossible. I had to take myself out of it, disobey the rules, so that there can be no comparison. The justification is the end result, which is all to do with the quality of the whole – which is even greater than the sum of its parts."

Paoletti draws parallels with the Italian saying about the "Egg of Columbus". When asked to perform the seemingly impossible task of standing an egg on its end, the great explorer simply cut off the bottom and stood it on the table before him. In breaking the rules Paoletti and his inspired team of architects has taken British architecture on a new voyage of discovery. That it has been via the tube is nothing short of a miracle. WA

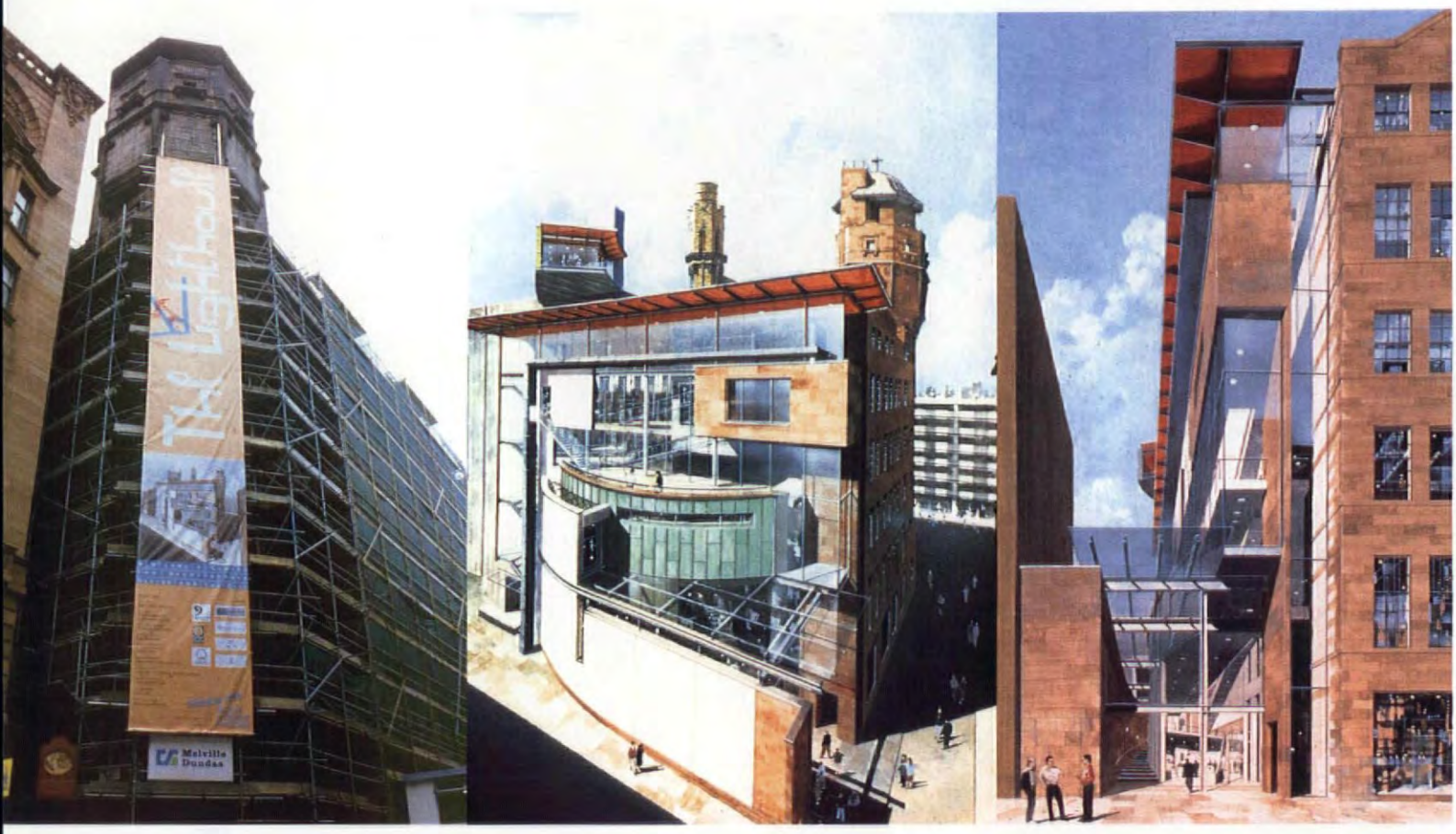
kind of pragmatic enlightenment.

Unlike the spartan stations of the DLR, with their metal steps and one-size-fits-all platforms, the Jubilee Line stations were all to be spacious and elegant and lit naturally wherever possible. Insisting on banks of three escalators everywhere (to allow for breakdowns), and appointing a different architect for each station guaranteed that the experience of the new line would be different to that of any other part of the network. With no time to lose commissioning began almost immediately, each architect being selected after interviews, discussions and a competitive fee bid – the last a practice Paoletti deplored but could not avoid; he has compared it to trying to find the cheapest chart to help you sail the Pacific.

Despite the critical acclaim the stations have already received, Paoletti feels a certain incongruity in a city chronically short of civic pride. He believes morale has a tremendous effect on the role architecture can play in public works. "When a city is full of pride and self-respect, architecture is always seen as an adornment, and the influence of architects on public works projects is at its highest," he says. "It was just such an attitude that brought about the underground systems of Washington and San Francisco."

As for the new stations, he is by turns proud and defensive. "Under the circumstances, what we have achieved is a miracle," he says. "But you can't expect underground stations to be detailed to the level of buildings. These are civil engineering structures. We have got wonderful underground spaces but all the finishes are very basic. The cost of the stations was infinitesimal compared to the cost of engineering the line. People should judge these spacious stations against the tortuous tunnels, underpasses and walkways that were the work of our predecessors."

And, he might add, compare them with the stations of the DLR. WA



Glasgow heralds 1999

Glaswegians were not happy when they were told that an Englishman was to head the team for Glasgow 1999, the year-long celebration of architecture and design in Scotland's former industrial heartland. Nicola Turner congratulates Deyan Sudjic, former editor of Blueprint, on confounding the critics.

Despite of the quality and quantity of the 300 exhibitions on show throughout Glasgow during 1999 – with famous names of Glasgow architecture, Charles Rennie Mackintosh and Alexander "Greek" Thompson, alongside international designers Philippe Starck, Ettore Sottsass and historical stalwarts, Frank Lloyd Wright and Mies van der Rohe – what will remain with Glasgow well into the next century are the results of an ambitious building programme which attempts to inject the city with a renewed vigour, both architecturally, but to some extent financially and spiritually as well.

The accolade of UK City of Architecture and Design has provided the city with a second bite of the cherry, the first being the hugely successful year as European City of Culture in 1990, which laid the foundations for the city's reinvention – at least in the eyes of the visiting public. At US$56 million, the event has been described as the most ambitious festival of architecture and design ever attempted – certainly in Europe.

The flagship project is the conversion of the former offices of the *Glasgow Herald*, designed by Mackintosh, into Scotland's Centre for Architecture, Design and the City, by local architects Page & Park. From the front the building remains much the same, at the back the architects have added a "battery pack", providing services and entry and circulation space for the original building. A series of internal bridges link the new with the old. The architects describe the addition as a "play of geometries which will be almost completely experienced internally". An additional small tower, the viewing gallery, is entirely self-sufficient and acts as a test-bed for energy consumption.

Away from the centre of town, in the city's East End, a US$16.5 million housing development will open in July, on a small parcel of land between St Andrew's Square and Glasgow Green. The 100 apartments have been designed by leading local and international architects (see model). Rick Mather's rhythmic balcony cantilevers are linked with Elder and Cannon's glass-fronted scheme by a high-level sky-walk of dwellings. Between this pair and Ian Ritchie's steel-framed housing association block, stands the elegant curved form of Ushida Findlay's building, which backs into the courtyard with a series of cascading planted terraces.

As well as architectural innovation, the scheme is unusual in its partnership between private developers, architects and the public sector, resulting in housing association homes as well as top-of-the-range apartments (most of which have already been sold), alongside each other. The aim of the scheme has been to stimulate the return of some of Glasgow's lost population from the suburbs, by offering a valid alternative with a choice of residences. WA

Phil Sayer

Omega models

ARCHITECTS/DEVELOPERS OF THE HOMES FOR THE FUTURE SITE

1 Ushida Findlay Partnership/The Burrell Company
2 Ian Ritchie Architects/Thenew Housing Association
3 Wren + Rutherford/Mactaggart and Mickel
4 RMJM/Logan Construction Management
5 RMJM/Logan Construction Management
6 McKeown Alexander/The Burrell Company
7 McKeown Alexander/The Burrell Company
8 Elder and Cannon/John Dickie Developments
9 Elder and Cannon/John Dickie Developments
10 Rick Mather Architects/John Dickie Developments

Original masterplan by Arup Associates/Page & Park

Facing page, from far left: The original Glasgow Herald building under scaffolding earlier this year, in preparation for the extension by Page & Park Architects; perspective showing the viewing gallery tower which has received funding for an initiative to transform it into a zero-energy space; perspective of Mitchell Lane entrance **Left, from top:** Homes for the Future under construction in March this year – completion date is July; roadside perspective; model

GLASGOW AT A GLANCE

JUNE

The Mackintosh Interpretation Centre
at The Lighthouse
From 10 June
Permanent exhibition of the city's most famous architect in his context
Tel: +44 (0)141 221 6362

Alexander Thompson: The Unknown Genius
at The Lighthouse
11 June - 22 August
Glasgow's "other" architect
Tel: +44 (0)141 287 1999

Future Systems
at Scotland Street School Museum
25 June - 31 October
Work by London-based architects of the new media stand at the Lord's cricket ground
Tel: +44 (0)141 429 1202

Home
at Glasgow Green, London Road
14 June - 31 October
Looking at the transformation in house design
Tel: +44 (0)141 287 1999

Mies van der Rohe – Architecture and Design in Stuttgart, Barcelona, Brno
at The Burrell Collection
Until 29 August
Tel: +44 (0)141 287 1999

The Architecture of Democracy
at McLellan Galleries
Until 25 July
All about parliament buildings
Tel: +44 (0)141 287 1999

JULY

Ettore Sottsass and Associati
at Glasgow School of Art
20 July - 25 September
Tel: +44 (0)141 353 4525

Vanity Cases by Starck
at The Lighthouse
23 July - 31 October
Tel: +44 (0)141 221 6362

Alvar Aalto in Seven Buildings
at Gallery of Modern Art
30 July - 10 October
Tel: +44 (0)141 287 1999

Homes for the Future Expo
at Glasgow Green/Greendyke Street
July-October
Tel: +44 (0)141 287 1999

All photographs by Morley von Sternberg

Ringing the changes

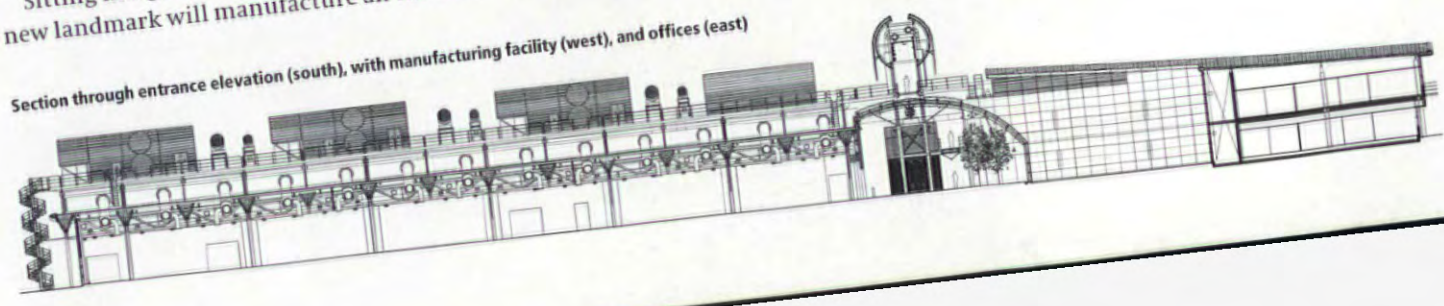
The UK's larger, more "commercial" practices are waking up to the need for a more overtly design-orientated approach to their work. High-tech specialist Sheppard Robson began its transformation with the Helicon building in the City of London in 1996. Last year it moved up another gear with the Motorola headquarters in Swindon, Wiltshire. Nicola Turner reports.

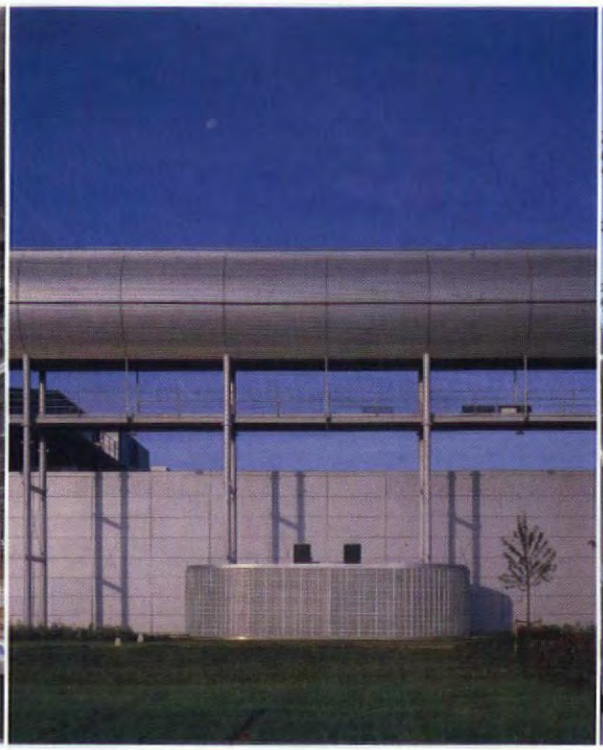
There was a time when high-tech architecture invoked suspicion among the conservative British public, which recoiled in horror at the unveiling of the Richard Rogers Partnership's Lloyds building in the City of London in 1986. But now, with the benefit of hindsight – and the recognition that Rogers, Foster, Grimshaw et al have spawned an internationally-acclaimed style – the country's clients can't get enough of it. Hence the enthusiastic reaction of the cab driver who drove us to the hill-top site of Motorola's impressive manufacturing facility and offices in Swindon, an hour south-west the capital.

Sitting in a greenfield site north of Swindon, the town's shiny new landmark will manufacture all the GSM radio transmission equipment that Motorola sells across the world. At a cost of US$64 million the first phase accommodates 1,300 staff in 28,017 square metres of manufacturing space and 4,486 metres of offices.

The highly-serviced requirements for the facility dictated the form. Above the cavernous operations space sails an aluminium-clad tube, 5.5 metres in diameter and 300 metres long. It is the main artery through which the primary services run and the dominant architectural feature. The internal street (less common parlance five years ago, during the design phase) will eventually run the length of the services tube to incorporate phase two: extra manufacturing bays, offices and a permanent restaurant drum to replace the impressive

Section through entrance elevation (south), with manufacturing facility (west), and offices (east)





Facing page: South-facing entrance showing the dramatic gestures of the single-storey manufacturing facility on the left and the more pedestrian two-storey office/laboratory areas on the right **Above, from far left:** The manufacturing facility runs off the internal street to the west; a temporary glass-block washroom pod for use before the completion of phase two; the internal street accommodates meeting and vending facilities **Left:** Spiralling escape staircases form central vertical features on both the offices and manufacturing elevation

temporary eatery at the north end of the factory. Brightly coloured service pods and meeting areas are accommodated along the length of the street. Colour coding continues along the floor, to denote routes through the building. The street provides the main circulation route at ground- and first-floor level. At roof level an open deck runs under the service tube. Colour is also incorporated in the manufacturing facility, with locker banks in hot pink, turquoise and tangerine, contrasting with yellow robot arms and blinking warning lights. Even the cranes are painted.

The manufacturing area – the length of three football pitches – is an uninterrupted space with 4.5 metres clear height. Four bays, each comprising a central A-frame structure, support a elevated plant deck with triangular-tapering gull-wing steel trusses spanning 32 metres each, on either side.

Motorola is remarkable not only for its expansive gestures and creative expression. Sheppard Robson was involved in the detail throughout the building, from specifying furniture, to choosing cutlery for the staff restaurant. On completion of the second phase, the full extent of Sheppard Robson's transformation will be revealed. WA

Client
Motorola
Project managers
GVA Grimley
Structural engineers
Mott Macdonald
M&E engineers
Oscar Faber
Landscape architects
Gillespies
Contractor
Tilbury Douglas Construction Ltd

Flying the flag

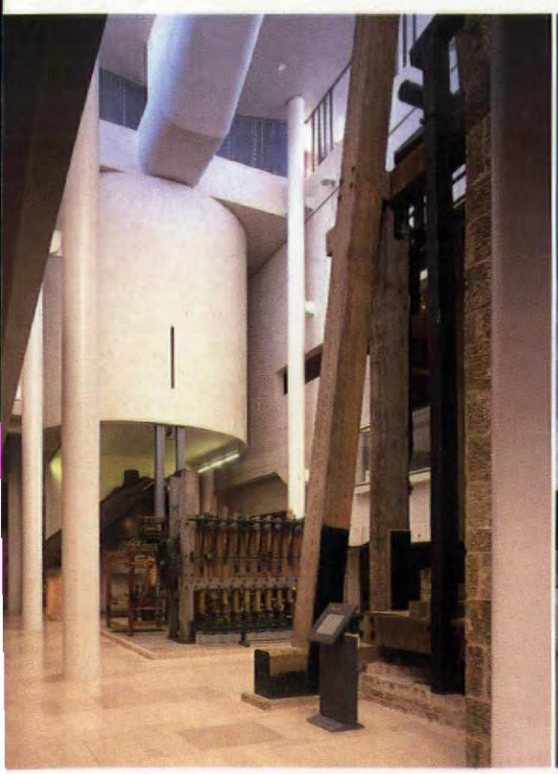
Penny Lewis commends Benson + Forsyth's sensitive, yet daring, Museum of Scotland which recently opened, heralding the new face of Scottish independence. Photographs: Richard Bryant/Arcaid

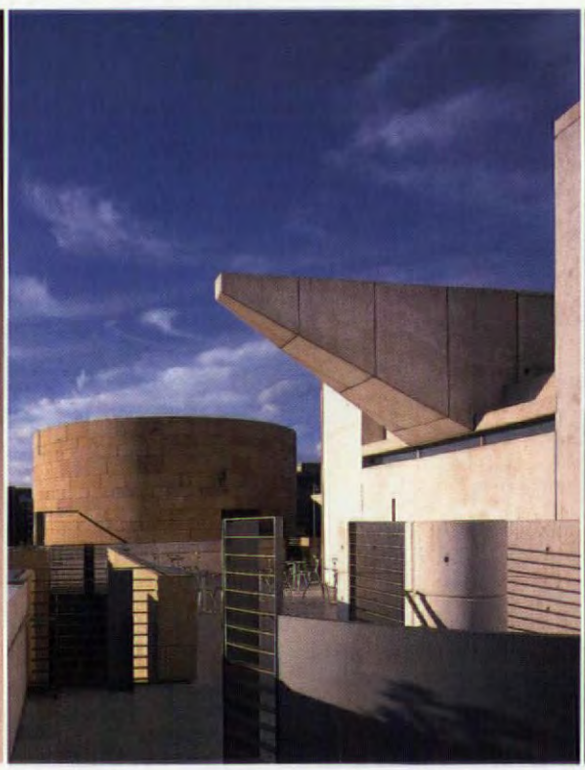
A new Museum of Scotland was first conceived long before devolution looked viable, but it has been completed just in time for the creation of the new Scottish Parliament. The purpose of the new Museum of Scotland is to complement Edinburgh's Royal Museum, its handsome Victorian neighbour, to tell Scotland's story to the world. London and Edinburgh-based Benson + Forsyth won the competition to design the museum in 1991. Despite objections from the Prince of Wales, they managed to hold onto the commission, and in November last year, the Queen opened the building.

The museum, a unique blend of Scottishness and modernism, has delighted the public and the pundits. It is a very brave and dramatic intervention into a city which is famous for its restrained elegance. From the south the building follows the existing street line and massing but as it turns the corner it becomes a collection of simple clearly articulated forms. On the corner a circular tower, linked to the rest of the building by bridges, marks the entrance to the new building.

The organising principle behind the building is simple. The core of the building is devoted to permanent exhibitions. It forms a seven storey block at the centre of the building which is lit from above and topped by an arc-shaped roof garden. Wrapped around the core is a three-storey building which follows the surrounding roof lines. Between the core and external skin roof lights allow indirect light into the heart of the building. The central core contains some of the largest exhibits, including a water pump and a locomotive engine. This is not a hands-on, interactive museum, the curators expect the visitor to use their imagination and the architects have provided the perfect setting. Views through the building, between floors and out to the Edinburgh cityscape, and the light filtering into the building from above, create a sense of discovery and adventure. The exhibitions start in the basement with Beginnings and Early People and work their way chronologically up the building to the 20th century at the top. Benson + Forsyth is responsible for the design of exhibitions on the middle floors, the Kingdom of the Scots and Industry and Empire, the rest were contracted to other design teams.

The materials follow the structure of the buildings. The

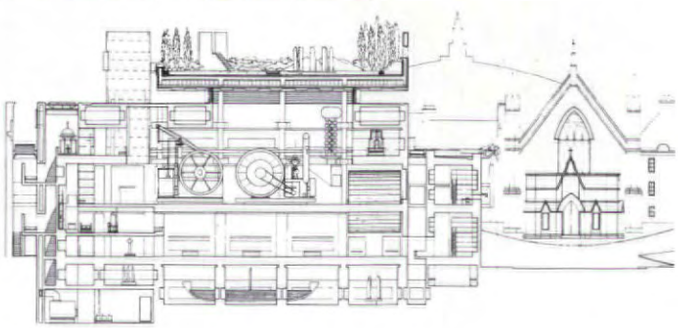




Cross section looking west (competition drawing)

SECTION B.B

Cross section looking south (competition drawing)



Above: The museum's drum, which includes the entrance, at the junction of George IV Bridge and Chambers Street **Facing page, from far left:** Round and square solids containing small enclosed galleries project into the central space; the concrete core with its arc-shaped roof garden, rises from the stone shell; toplit triangular Hawthornden Court is primarily an orientation space – stairs lead to the floors above behind a stone-clad screen (left)

external walls onto the street are clad in richly patterned clashach stone cut to a variety of course heights and stone sizes. An open rain screen system means the stone work has an almost surreal crispness. The main core of the building, including the arc, are white concrete, the rear of the building is finished in a white sand and cement render.

After Frank Gehry's Bilbao Guggenheim it is easy to believe that it is architecture that makes a museum not its contents. But some critics say that the "total architecture" of the Museum of Scotland is passé and tomorrow's museums will not be architectural treasures but flexible spaces. If the Museum of Scotland building tells us as much, or more, about contemporary Scotland as its contents, the failing is with the curators not the architects. WA

Penny Lewis is architecture correspondent for The Scotsman newspaper.

Services engineer
Waterman Gore
Structural engineer
Anthony Hunt Associates
Lighting
Kevin Shaw Lighting Design; Butler and Young

Masters of reinvention

One of only two publicly listed architects in the UK, Whinney Mackay-Lewis is at a crossroads in its formidable history. In May the firm acquired CHKM, broadening its portfolio to include airports, hotels... and sheds. *WA* finds out why.

Some architectural practices die with their founders. For the majority of others, becoming a second-generation business is a painful – often critical – process. Principals brought together as lieutenants, under the direction of dominant entrepreneurs, can find themselves working with partners with whom they have little personal or professional empathy, sharing only the baggage of their practice's track record, and the obligation to fund their predecessors' comfortable retirement. The pitfalls of succession are not insuperable, however, and London-based Whinney Mackay-Lewis demonstrates that, with the right combination of personal commitment and corporate culture, an architectural practice can not only survive the process, but also improve its professional standing. The stewardship of the practice has recently passed to the fifth generation of principals, continuing a success story which goes back to 1884.

"It was the end of a big era," admits Chris Cotton, the successor to Jeremy Mackay-Lewis as the firm's managing director. "The business is becoming more forward-looking, with a better design profile – not before time." Having served the practice for 25 years, ever since leaving full-time studies, Cotton's perseverance, and personal commitment to client service, has been rewarded.

Although corporate interiors have accounted for a great part of Whinney Mackay-Lewis's workload throughout the last couple of decades, Cotton recognises the competition for a finite number of new and exciting commissions in the office sector, acknowledging the competition from the London offices of established US firms, but defending British architects' standing in the field. "In the US it tends to be 110 per cent marketing and 40 per cent product. Here it's the reverse – 40 per cent marketing and 110 per cent product," the result being that WML must find a way to up its profile without diminishing the quality of their product.

The firm has no desire to relinquish its good standing in the interiors sector. But Cotton, and his younger generation ▶

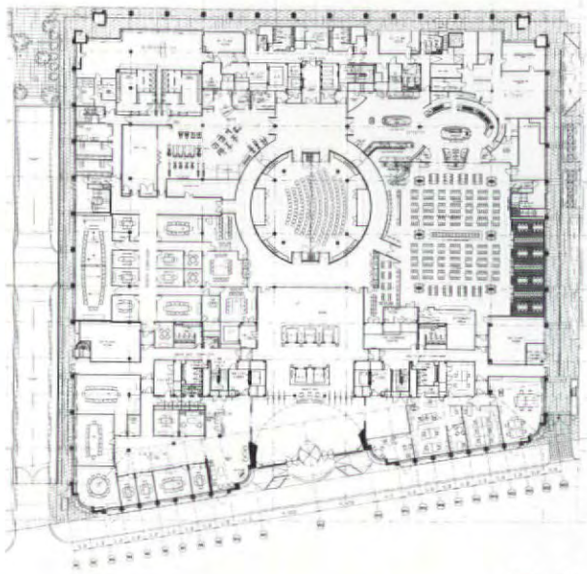
Right: Directors of WML; 1-7, David Mun; Neil Hartland; Graeme Rapley; Zsolt Moldán; Anton Jansz; Chris Cotton; John Cox. Joining the board of directors from CHKM in May were Robert Kimble, Richard Chapman and Victor Hadman **Facing page:** Main entrance portico of Banque Paribas headquarters in London (1997) rises above the standard expected of commercial architecture and marks a watershed in WML's work

COMPANY DATA

- Number of staff **66**
- Number of architects (before and with CHKM) **27 + 5**
- Average age of staff **33**
- Company benefits **Private health, pension, profit related pay**
- Other disciplines within WML London office **Masterplanning, interiors, space planning, project management**
- Key sectors to date **Offices, financial services, data centres, hotels, space planning, residential**
- Future prospects **Airports, hotels, entertainment, leisure, retail, high security projects**
- Recent high-profile jobs won **Media offices (London); American Bank (European HQ); Hampshire constabulary (Command Control Centre); Air Canada (UK HQ and cargo terminal)**
- Major clients **Paribas, ABN Amro, Chase Manhattan, Crown Estate, Grosvenor Estates, Delancey Estates, St Martins Property Corporation, British Airways, Air Canada, Hampshire Constabulary, Metropolitan Police Property Services, Newcastle International Airport, Sultanate of Oman**
- Countries worked in **UK, Portugal, Luxembourg, France, Germany**
- Regions to pursue **Africa, South-East Asia, Middle East, North America**
- IT/CAD system used **Microstation (PC), Archicad (PC)**

Right from top: Kinetic sculpture, "Winging", by artist Adam Craig for the Banque Paribas staff restaurant; lift core sandwiched between the triple-height entrance hall and central atrium, with maximally transparent cars and specially developed running gear

James Morris



Ground floor plan of Banque Paribas, London

of co-directors, have more varied aspirations. "The firm has established a premier reputation working for international companies and finance houses, ever since our founders collaborated with Lutyens. We want to build on this reputation and broaden skills to develop more projects outside London."

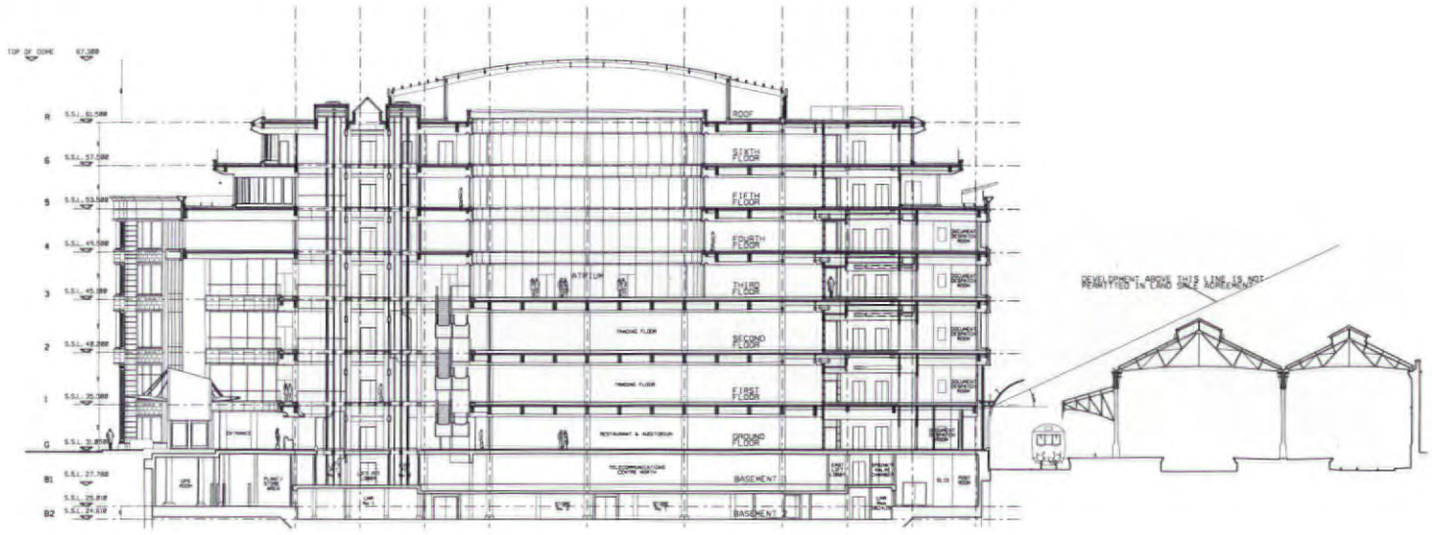
But where growth at Whinney Mackay-Lewis really lies is within the newer high-security sectors, such as airports and sheds. With the acquisition of the small UK-based but internationally-operating firm, CHKM, Cotton has recognised the need to stay one step ahead of the game, moving into less conventionally attractive sectors which promise greater long term potential. The future for architects in shed design (as presented in this month's Sector analysis, page 74-87), is bright.

With the increased business comes an expanded workforce, bringing the total to 63. While Cotton is the first to agree that success should not necessarily be measured by numbers of staff, he nevertheless hopes that "the wider portfolio of work will help to attract a greater number and talent of architects to Whinney Mackay-Lewis".

Few business leaders speak of "bringing the best out of people" with the understated sincerity of Chris Cotton. Content to share responsibility for design direction with others – notably Graeme Rapley – Cotton manages, but in no sense owns the practice. Whinney Mackay-Lewis is a subsidiary of a publicly quoted corporation, the WML Group Plc, whose other interests are all related to building services engineering and real estate management. Many of the parent company's shares are owned by employees, with Rotch holding a 42 per cent stake.

"There have been some misconceptions in the past regarding our Plc (Public Limited Company) structure," Cotton acknowledges. "We are architects, wishing to be architects, but part of a larger group. Our shareholders will allow us to carry on our vocation as architects so long as we continue making money. We spend 99 per cent of our time looking after our clients. We look after our shareholders by looking after our clients."

The commercial rewards of this philosophy are beyond doubt,



Section through Banque Paribas atrium north elevation

the firm returning a profit in all but two of the last 25 years.

The recent changes in the firm's management were clearly easier to handle due to the widely distributed ownership. A more specific benefit, however, lies in Rotch's interest. "Rotch is one of the major PFI (Private Finance Initiative) funders in the country," Cotton explains. As such, Whinney Mackay-Lewis stands to be directly employed by its own shareholders, working on privately financed public projects. The firm's first Rotch-funded project is now complete, with several others at various stages of the tortuous procurement process.

Architectural owner-drivers

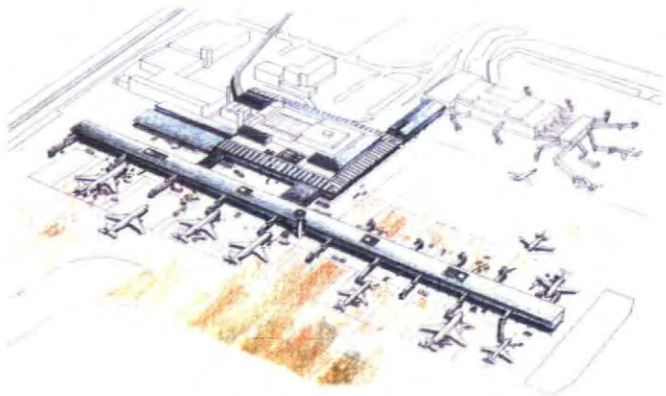
"Giving people ownership of projects," Graeme Rapley explains, "is part of the continuous battle to improve design quality". Rapley evidently has a strategy for this crusade, addressing clients and colleagues alike. In order to progress as designers, Whinney Mackay-Lewis has courted a new generation of more progressive developers. Challenging the notion that commercial projects are distinguished principally by virtue of the opulence of their materials, Rapley believes that "people's perception of property has changed". The virtues of space, light and compositional elegance have been rediscovered.

The "new approach" is most apparent in projects which have yet to be completed, such as the root-and-branch recladding, remodelling and extension of an office building at 1 New Fetter Lane in London (see page 70). Freehold Portfolios Estates, a client falling into Rapley's "progressive" category, acquired a site for which Norman Foster had previously produced a redevelopment proposal. Whinney Mackay-Lewis was commissioned to produce an emphatically contemporary building reusing much of the existing structural frame. The end result promises to be elegant and disciplined, appropriately saving its sole flamboyant architectural gesture for the corner entrance.

Acknowledging his firm's occasional indulgence in formalism, Cotton asserts that "Graeme's approach is much more analytical". The design process is becoming more inclusive, both of external determinants, and with respect to wider staff participation. Not so long ago, only a quarter of Whinney Mackay Lewis's employees were architects. Today, about half of the 55 staff are qualified, and therefore better able to join in the process of "brainstorming... and developing lots of ideas," which Rapley advocates.

Paribas pragmatism

"Here as elsewhere, elevations used to be glued onto plans," Rapley concedes, decrying the superficial facade-making of the kind of 1980s commercial architecture with which his firm was only recently associated. The 45,100-square-metre London headquarters of Paribas, completed in 1997, is a notable example of the practice's expertise in creating modern interiors, but is compromised by facades designed primarily to avoid delays in obtaining the necessary approvals. The building marks something of a watershed in the firm's development, and many of its shortcomings are excused by the constraints imposed by the client. Whinney Mackay-Lewis was commissioned by the French bank to deliver a building within a short, and absolutely fixed, period of time, giving them little option but to adopt the ▶



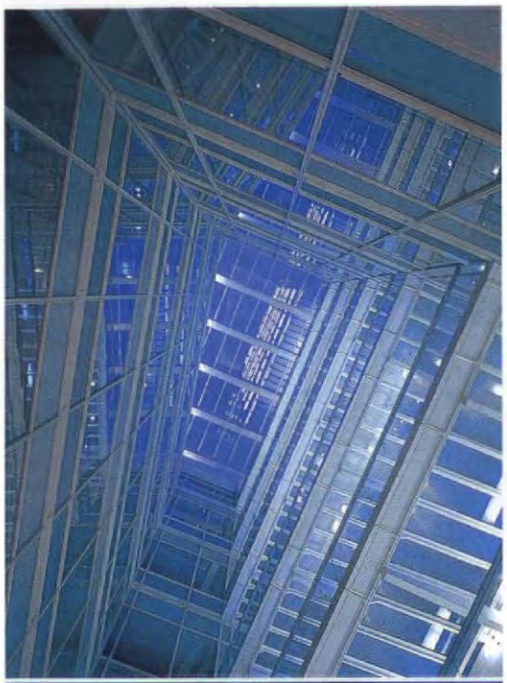
Left: Birmingham International Airport plc, main terminal, aerial view, one of CHKM's recent projects and typical of what WML will soon be taking on

▸planning strategy with which Michael Hopkins and Partners had previously obtained a Planning Consent for the same site. No doubt Paribas appointed Whinney Mackay-Lewis in preference to Hopkins on the basis of the former's dependable service and unrivalled track record of service to financial institutions in London and Paris, fearing the inevitable risks associated with the latter's more innovative design approach. Yet, despite the conservatism which their appointment dictated, Whinney Mackay-Lewis has produced a building which not only satisfies their client's brief, but includes some very thoughtful and sometimes beautiful details, rising well above the standard expected of British commercial architecture.

Anton Jansz, the director in charge of the Paribas project, is justifiably proud of the deceptively simple integration of ceilings and lighting above the vast trading floors, having developed a specially profiled metal ceiling panel (manufactured by SAS) incorporating a luminaire delivering both indirect and (predominantly) direct lighting, for which the project received the International Philips Lighting award for innovation. The lighting of the suites of meeting rooms on the building's top floor, combining pelmet lights, and compact fluorescent and fibre optic downlighters, also makes a key contribution to the success of the interiors. In other areas too the architects have worked hard with manufacturers to achieve details consistent with their conceptual design. The Otis lifts, sandwiched between the triple-height entrance hall and the central atrium, have not only maximally transparent cars, but specially developed running gear, all of which is exposed to view.

If the facades of Paribas represent the end of one era, the interiors fit more comfortably with the image which the firm is now keen to project. "We're very much an image-obsessed profession," Rapley concedes. Greater discipline – through self-imposed rigour, as well as peer review, is now the order of the day. Is Rapley a "design policeman"? "Not entirely," Chris Cotton believes, "but we need to move more towards reviewing projects, to ensure a consistency of quality – though we would never tie ourselves to a house style." If they were forced to adopt any label, it might be "contextual". "Addressing the client brief, and looking at the environment," Rapley says, "have been consistent objectives."

The firm's design for a speculative office building in Berkeley

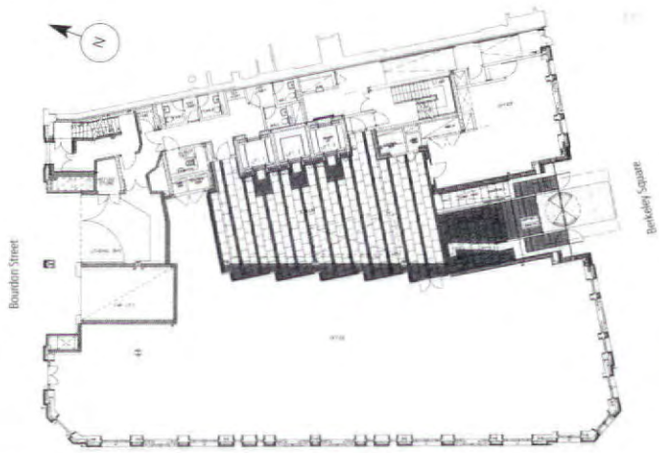


Facing page: Computer image of remodelling and extension of an office building at 1 New Fetter Lane, London **Left, from top to bottom:** Looking up the atrium of 30 Berkeley Square, London; the lift landings and glass walkways; entrance facade of 30 Berkeley Square

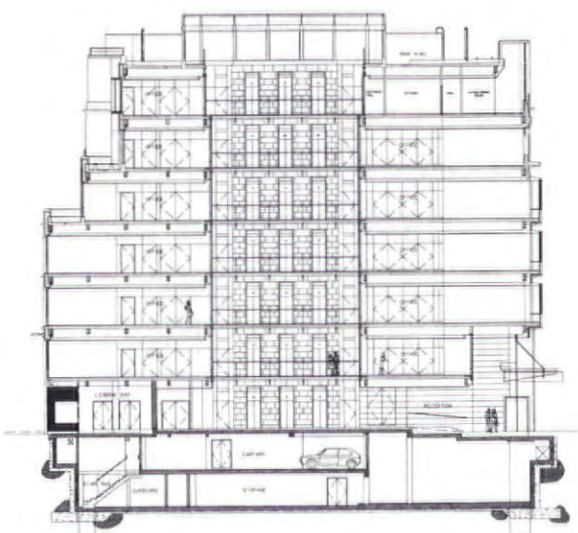
Square, at the heart of London's Mayfair Conservation Area, shows how, gradually, the historicism of Whinney Mackay-Lewis's previous work is giving way to a design approach which looks below the surface of precedents for its *raison d'etre*. The architects refer to Palladian and later permutations of classical architecture when describing the compositional principles of the building's elevations. The massing of the building is also historically informed, making good the destruction of wartime bombing by restoring the northern enclosure of the Square. At a conceptual level, the building is very much a hybrid, the formal symmetry of its principal elevation concealing an asymmetrical internal organisation; the classically derived details of its exterior married to an entirely modern atrium, complete with glass bridges and bespoke lighting. Completed in 1997, this 7,000-square metre building marks the end of Jeremy Mackay-Lewis's reign, and should be seen as a stepping stone towards the more analytical design approach which the practice is aiming for in future.

Size doesn't matter

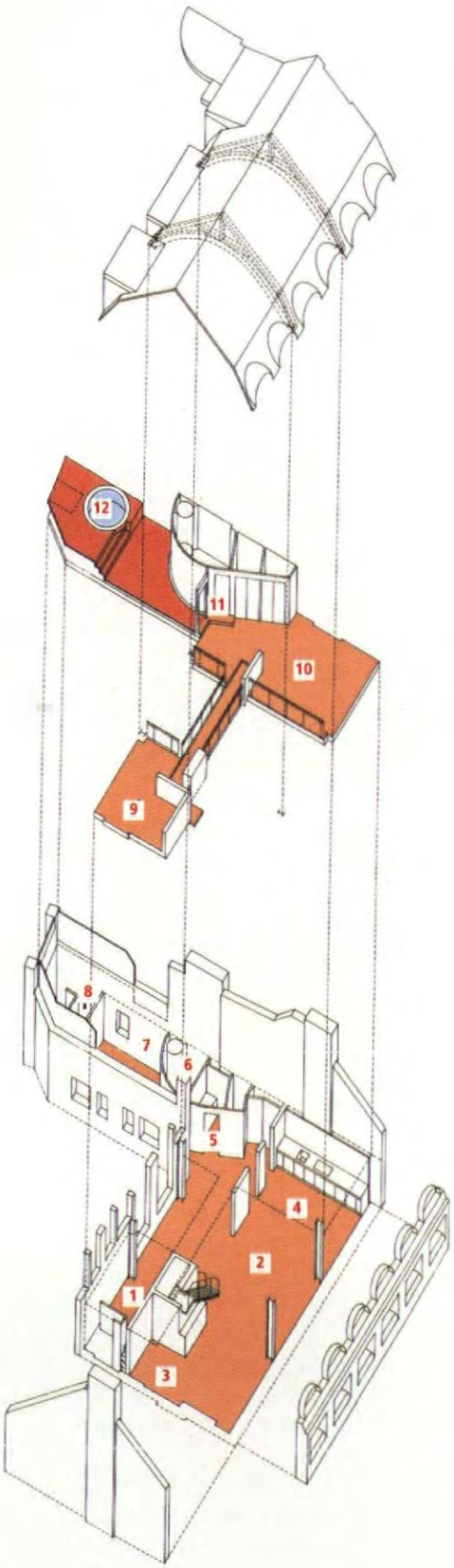
"Analysis doesn't preclude flair," Cotton asserts. "Individuals should develop their own strengths." To encourage this, ▶



Ground floor plan of 30, Berkeley Square



Section of 30 Berkeley Square



Penthouse flat, William IV Street

1 Entrance
2 Main living space
3 Snug
4 Kitchen
5 Utility room
6 Shower room
7 Spare bedroom
8 Fire staircase
9 Library
10 Sleeping space
11 Barhroom
12 Outdoor jacuzzi

Right Working model of ABN AMRO at 250 Bishopsgate **Facing page, left to right:** Exterior building restoration for Reuters, London; restaurant of Credit Suisse offices, Canary Wharf; staff delicatessen at ING Barings, London

James Morris

▶ Whinney Mackay-Lewis has been willing to accept commissions for small domestic projects, of a scale which many of their rivals would reject as trivial and uneconomic. If an architect has a particular aptitude for designing houses, he or she should be encouraged to apply their skills, alongside more lucrative work. The extensive remodelling of a 19th-century warehouse near Trafalgar Square, in central London, to form a penthouse for film director Tarsam Dhandwar, is a good example. To work on such a project has clearly been stimulating for those directly involved, and the fact that the job was won in competition against Rick Mather, a designer more typically associated with such commissions, has also boosted Whinney Mackay-Lewis's design credentials. "The opportunities were always there," Rapley recalls, but the present directors are less inclined to dictate design solutions than their recently retired predecessor.

Rapley emphasises the importance of working with good consultants. "Building up relationships with innovative engineers makes our work more holistic. Engineering should not be an add-on." Whinney Mackay-Lewis is currently collaborating with Battle McCarthy on a development in London's Soho, funded by an institutional client willing to put ecological issues above the conventions of the market, and commission a major London office which uses natural ventilation.

The design developed by Whinney Mackay-Lewis and Battle McCarthy (still under wraps to the public, and therefore not illustrated here) removes an existing service core, thus opening up a new atrium which provides both an architectural focus and a key element of the environmental strategy. New architectural elements are lightweight, contrasting with the massive brickwork of the existing buildings, with a cacophony of raking and curving steelwork and glazing. There's nothing conservative or

James Morris

tentative about Whinney Mackay-Lewis's design sketches for this building. Within obvious practical constraints, this is the fashionable architecture to which every student aspires, but few graduates get to build.

Mark Limbrick, who recently returned to Whinney Mackay-Lewis after receiving a double first at De Montfort University, is typical of the kind of professional which the practice is keen to foster. Having worked on Marylebone Gate during an earlier spell with the firm, Limbrick was attracted back by a "good working atmosphere" and the prospect of further experience of major projects. For many students and recent graduates, commercial practice and academic study appear totally unrelated. Limbrick, however, has found that the techniques of environmentally friendly design which are one of his university's research strengths have been directly applicable to the Soho project.

"Of the larger British architectural practices it is those which have managed to revitalise their design profile which are going on to reap the commercial rewards."

Design to succeed

In a competitive environment, professionalism and service quality have to take precedence over idealistic management and design innovation. Chris Cotton is proud of the fact that Whinney Mackay-Lewis has never had to make a claim on its professional indemnity insurance. "Not many firms can say that." Cotton appreciates, however, that all clients are becoming more design conscious – and that of the larger British architectural practices, it is those, like Aukett Associates and Sheppard Robson, which have managed to revitalise their design profile, which are going on to reap the commercial rewards.

Cotton stresses the need to continue the diversification of the firm's client base, which now includes such household names as Bodyshop, Railtrack, British Energy, various airport authorities and airlines, hotels and police forces, alongside the likes of ABN Amro and Reuters – blue chip businesses which have employed Whinney Mackay-Lewis since the days of Lutyens' collaboration.

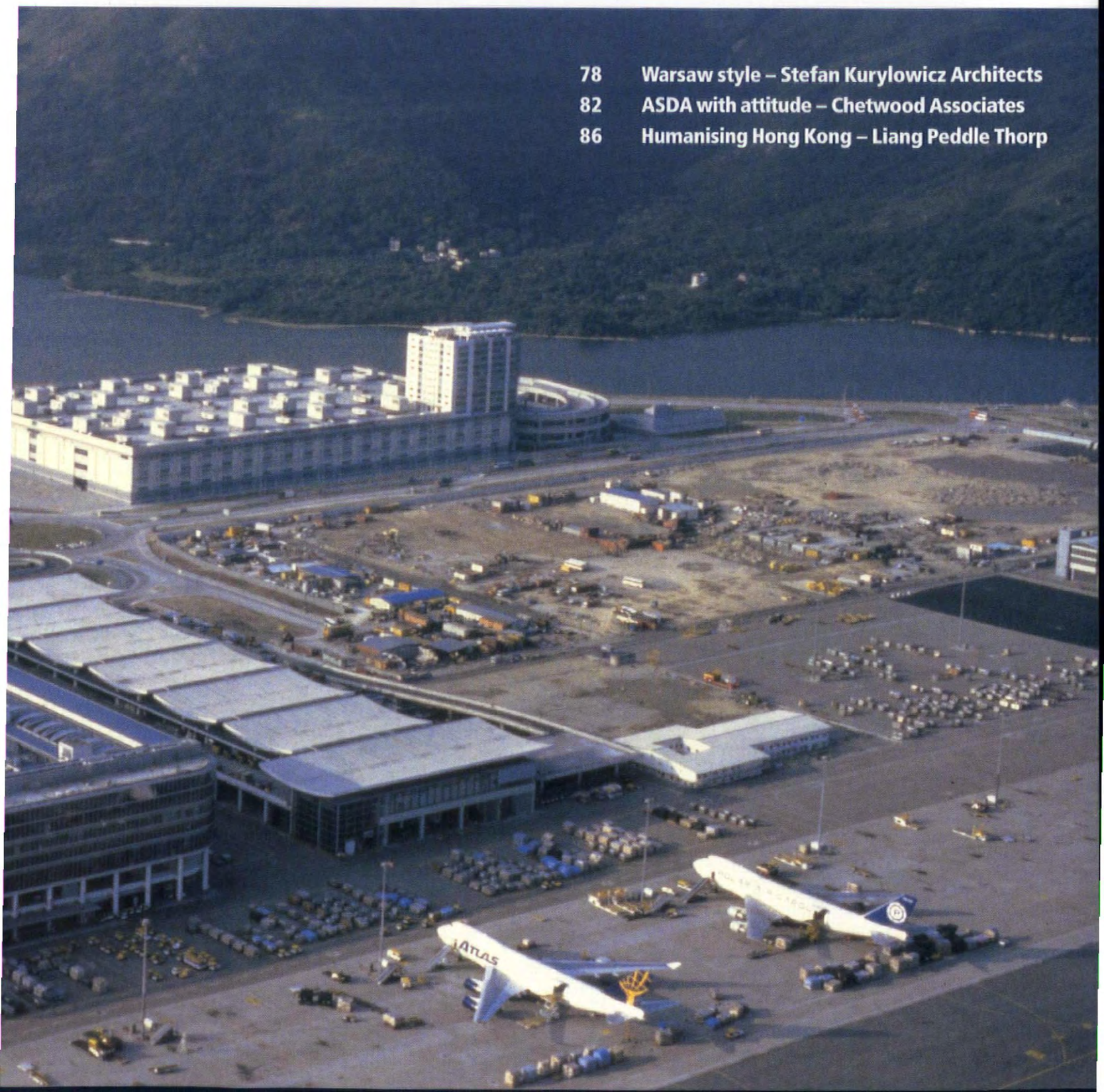
Competing for work with the biggest American firms has proved challenging, Cotton concedes, due in no small measure to the parallel globalisation of multinational clients and international design firms – HOK, Gensler and similar practices capitalise on their American head office connections irrespective of their sphere of operations. Looking eastwards, by contrast, Europe appears to offer better opportunities. Looking beyond their traditional London market, Whinney Mackay-Lewis has recently been commissioned to design a very substantial headquarter building in western Europe, (also still confidential). Preliminary sketches for this embargoed project confirm, however, that the firm's commitment to progressive design is now well established. The future, it would seem, lies in diversification of building types and a nose for the emerging markets closest to home. With CHKM on board, everything is possible. WA

Sector analysis – Supersheds

Shed your prejudice

Below: HACTL Superterminal, Hong Kong, designed by Foster and Partners is the largest single automated air cargo terminal in the world
Photograph: Dennis Gilbert

Now is the time for architects to cash in on "supersheds". With the contraction of the manufacturing industry import penetration has increased sharply, bringing with it the demand for storage and distribution facilities. Contrary to popular belief, developers in the sector are welcoming architects. Katherine MacInnes reports.



HACTL photographs by Dennis Gilbert

Above: View along the facade of HACTL Superterminal 1
Facing page: Container storage system inside HACTL

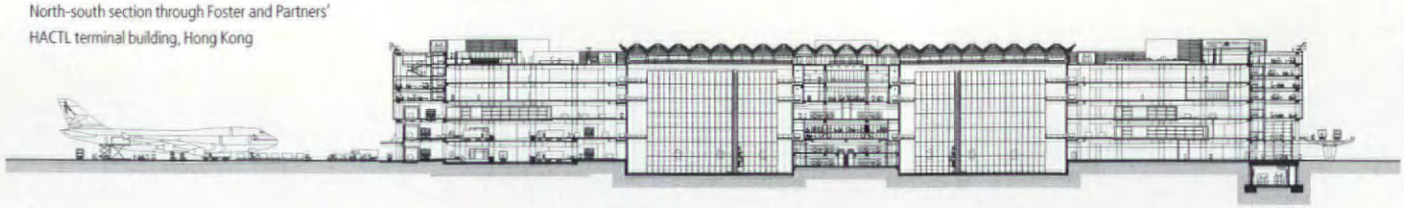
Are architects necessary in a sector apparently concerned with little more than the bottom line? There is some difference of opinion among developer-clients about whether architects are relevant to these functional distribution "supersheds" whose emphasis is on cost efficiency rather than enticing the customer, which is the responsibility of superstore "sheds". Have they become a product of computer generation and prefabrication where planners and architects play only a minor role? The difference in approach to the type of shed and the individual developer is evident even within the Central European Industrial Development Company (CEIDCO) formed by TKG International and Heitman Financial.

"When you say architects – well I mean you are just building boxes," says Heitman's Christopher Merrill. John Kontrabecki, president of TKG International, concedes that "distribution facilities do not seem to have enough 'sex appeal', and it's therefore hard to get an architect excited about designing a warehouse". But Polish architect Stefan Kurylowicz, who has worked with CEIDCO, disagrees and points to his own work as an example: "Critics have described my latest warehouse for EMI as the most sexy warehouse that there is. Look at it." (See page 80).

Hong Kong success story

On the other side of the world Foster and Partners set about dispelling the myth of an architect-free zone by completing a 33-month programme to build the HACTL Superterminal 1 at Chek Lap Kok Hong Kong International Airport. Like most big distribution sheds, the building has been designed to function in 24-hour working shifts, 365 days a year and incorporates catering facilities. HACTL consists of the terminal and the express centre which together have the capacity to handle 2.5 million tonnes of cargo per annum, more than two and a half times the capacity of its nearest rival at ▶

North-south section through Foster and Partners' HACTL terminal building, Hong Kong



West section through Foster and Partners' HACTL express centre and terminal building, Hong Kong

▸ London's Heathrow. The terminal building provides 260,000 square metres of operational, office and ancillary space – the express centre, which provides express cargo and courier operators with their own sorting offices, covers an area of 50,000 square metres.

Operationally the seven-storey terminal has been developed in onion-like layers with the central storage system at its core. On the east and west facades, 290-metre-long container storage systems made of steel-framed racking structures, accessible on two sides, pigeonhole the cargo ready for processing. The whole system is controlled by a central computing system (COSAC) developed and marketed by HACTL. The unprecedented scale of this building is evident in the fact that one of its key design features is the unusual length of its air-side terminal interface which extends over two kilometres, since the better the access the greater the volume of cargo that can be processed simultaneously.

Cold calling developers

But despite Foster and Partner's very visible success, few architects are enthusiastic about entering such a commercial market. "I mean if the architects were really excited about sheds, they would be knocking on the doors of developers. Do you know how many architects have cold-called me? One. HOK. I consider that to be amazing!" exclaims Kontrabecki.

Although HOK has designed some large sheds and has an office in Poland, Kontrabecki – whose firm is making inroads into the distribution business in Central Europe – was looking for a Polish firm (see box opposite). "In my view, whether architects become more involved in distribution facility 'shed' design is going to be up to the architectural community rather than developers," he says. "As a developer I know from experience that good looking buildings sell well." Kontrabecki, who has developed extensive distribution facilities in Silicon Valley, California, where TKG are based,

Ahead of the game

Warsaw Distribution Centre, Poland, by Stefan Kurylowicz Architects

"In Central Europe , a lot of developers announce projects but only 10 per cent come to fruition", explains Christopher Merrill of Heitman Financial. This is not a reflection on the demand for distribution centres. The architect of the Warsaw centre, Stefan Kurylowicz, explains: "There is a trend towards having an HQ and a warehouse together. Increasingly that seems to be what people want. Whether it is two separate entities or the same building."

John Kontrabecki, President of TGK claims: "I try to use local suppliers, materials and sub contractors necessary to create a real estate product that is economical to build and of good quality. To do that you need to have the guidance of an architect who understands both worlds. Stefan Kurylowicz is one of the few who does." Although TKG uses prefabrication to keep prices down in the US, they haven't used prefabricated components in Poland. "We've looked into it and we are researching, Central Europe does have a precast business but the real issue is can we get precast elements of good enough quality and economical price?"

Interior showing semi-automatic high rack stacking truck with five level storage racks and laser levelled concrete floor

The changing nature of distribution *provided by Hanscomb*

Warehouses are not just storage buildings anymore. In the last two decades major changes occurred in the distribution chain, partially responding to changes in the retail marketplace. A convergence of inter-related events and changes reshaped the face of logistics. The result is the "just-in-time' (JIT) philosophy prevalent in today's business world with:

- Faster inventory turns
- Smaller order sizes
- Smaller inventories in retail stores
- Strategic partnerships between manufacturer and retailer
- Some retailers becoming part of distribution chain
- Growth of express delivery systems

Greater efficiency in the supply chain

JIT is supported by technology such as point-of-sale equipment and automated storage and retrieval systems that use bar coding, and scanning devices. Point-of-sale equipment allows constant monitoring of inventory levels for effective shipment of replacement stock.

Warehouses are replaced by distribution centres

With this shift, increased areas for distribution and order fulfilment were required in warehouses. Alan Nager of Operations Associates, Greenville, SC notes that a warehouse may now house numerous activities, some of which were part of the manufacturing facility. For example, sometimes assembly is done in distribution warehouses. There is still storage, but this may not be a major area. Unlike traditional warehouses, the areas required for unloading, processing, packing, loading and offices in distribution warehouses can be significant, sometimes equal to the actual storage area. Warehousing moved from a little thought of part of the business to a hub in the business strategy. Accompanying this shift is the distinction and growth of the distribution centre, a warehouse for finished goods. In the distribution centre through-put capacity is more important than size of storage area. They are simply in-out boxes where users receive goods from many suppliers, break down the supplier's packages, repackage goods from various suppliers for specific needs and load for shipment. They are high velocity warehouses.

One of five warehouses located in the Warsaw Distribution Centre the industrial south of Warsaw, Poland

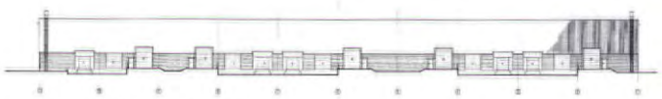
Cross section showing two- columned 29, 749- square-metre flexible interior

TGK is working with Heitmann in Central Europe. Kontrabecki investigated the situation in Poland in 1990. "I arrived in Berlin, rented a car and drove through East Germany, Poland, the Czech Republic and Hungary. I predicted that when the communist governments began to fall the western governments would reach out with a aid programme, just as the US reached out to west after World War Two. World Bank and the Bank for Redevelopment offered assistance but not on the scale I expected. Today, private rather than public investment is powering the region.

"We had to be innovative to attract funding for the Warsaw Distribution Centre," Kontrabecki explains. "We put together an international syndicate of venture capitalists rather than traditional real estate investors comprising two Japanese, one North American and one Brit. We took a loan from the European Bank for Reconstruction and Development and with that capital built a four-building complex. It was hugely successful. With that success we were able to attract real estate capital from the US in large amounts. We now have our feet firmly planted and have a successful plant in Central Europe because we need to prove to the investment community that it was a good investment."

Comparing prices with the US Merrill continues: "We charge US$11 per square metre for the warehouse space and US$25 per square metre for the office space. This is more expensive than the US where a warehouse would be US$3-4 per square metre. If you look at the rents they are paying for old inefficient space it's cost effective for them to pay more for a modern facility."

TKG's clients are "the Fortune 1000" in Central Europe. It is looking for a distribution solution and wants a similar solution to that which it has enjoyed in the US or Europe. "Same quality, a telecommunication system that is the same or better than in the US," Kontrabecki explains. "They don't want to have to be concerned about whether the lights will work. Everything is there and they can focus their attention on business – conditions in Central Europe are still very primitive.



Dock elevation showing lorry loading docks

Front elevation showing office windows which constitute 20 per cent of the area with optional additional windows above existing ones. Warehouse interiors are adapted by tenants

Client: **CEIDCO (formed by TKG International and Heitman Financial)**
Structural design: **MOSTOSTAL Engineering Office Co Ltd**

scoured Poland for an architect for his first "business park" in Warsaw.

Distribution sheds in Central Europe

"There is a critical shortage of architects in Central Europe who have been exposed to modern trends in architecture," explains John Kontrabecki. "In Poland I searched to see if I could find an architect who knew how to use AutoCad 14 and knew what a western-standard business park was all about." There were plenty of architects, but none who were technically at the cutting edge except for one – Kurylowicz, who worked in Canada for Rusoka Architects in the mid-1980s, and describes Toronto as 'basically just one big warehouse'. Through his experience there he was able to design a distribution facility to a western standard that would attract global clients.

Constructing and letting warehouses is one of the most profitable businesses in Poland. There is a shortage of warehouses, and those that exist usually do not conform to Western standards. Two US firms, American International Group (AIG) and Lincoln Property, have laid the foundation stone of the Diamond Business Park in Lodz. Last year the alliance began a similar but much larger complex near Warsaw. It is predicted that the Americans will be overtaken by Europa Distribution Centre (EDC), a developer belonging to the English group Woodsford Consulting Ltd, currently building Europa Park, the largest industrial complex in Poland. Jan Chudzynski of EDC believes that the shed boom will spread across Poland with the construction of a planned network of highways, as warehouses are erected further from the cities.

Marketing possibilities

SITE is an almost unique example of a US-based practice which has made its name designing sheds for retailer BEST – such as the "Indeterminate Facade" in Sacramento, California with its dramatic cascading brick construction. SITE managing director James Wines says that "the only reason that the BEST sheds were architect-designed was because the owner, Sydney Lewis, was a big art collector and he was using his own facilities to add to his art collection. He thought of it as large public art".

Although the US has a distinguished history of commercially- ▶

"Critics have described my latest warehouse for EMI as the most sexy warehouse that there is. Look at it." Stefan Kurylowicz

▶ sponsored architecture, characters like Lewis in the shed sector were, and are, unusual in the US. Encouraged by BEST's marketing success, has SITE continued to design sheds?

"No, we've done one project in the US in a decade. Developer mentality here is inclined towards cost. In Japan, France and Canada however they realised that there were profits to be gained by developing a recognisable image."

What about the profit margins?

Perhaps the emphasis on cost efficiency means that the profit margin doesn't make it worth the architects' while. "You mean, 'Can they make money?' Absolutely!" confirms Kontrabecki. "For a bunch of reasons. Once you assemble a product team they become educated. Your initial capital investment in design is almost a one-off, because you can repeat the formula over and over again. Sheds are not absolutely identical but the basic geometry is the same. Architectural firms that choose to make it a speciality will develop a core business that will provide a substantial income year after year in a steady stream."

Production line architecture

One of the main criticisms of the architecture profession is the disproportionate amount of time spent on design per individual building. Australian architect Michael Trudgeon (*WA*35 page 78) has commented on the enormous disparity between the number of hours invested in the development of a complex industrial product like a new motor car, and the number of design hours invested in new buildings. If one way of redressing the balance is by repeating a successful formula, then the high-tech prefabricated sheds which have to store products in highly controlled environments are surely the buildings we have been waiting for. The largest sheds have reduced the proportion of clients' distribution costs by almost 10 per cent since the 1980s.

The disparity in the quality of materials and method of construction used for sheds around the world plays a crucial part in the perceived worth to developers. In the US, concrete is cast on site and metal clad buildings are seen as cheap, and generally fail to attract investors. Concrete slabs in the US are 150 millimetres thick and laid straight on to a damp-proof membrane without a sub-base. In the UK the preference is for 200-millimetre slabs on a 300-millimetre granular sub-base. Interior office walls are plasterboard in the US but in the UK clients demand solid brickwork. Columns in the US are generally on a restricted grid, whereas in the UK where the emphasis is on flexibility there is a tendency towards longer clear spans.

Big business potential

The lack of interest by architects in sheds to date seems particularly strange considering that this sector is a manifestation of relatively recession-proof global trade which translates into a solid client base.

This is true firstly because distribution centres tend to be found in developed countries, storing and distributing goods manufactured from developing countries with lower pay structures. Similarly, the demand for warehouse space appears to be more closely related to consumer expenditure, ▶

Top: Magna Park, UK standard Distribution Centre building adapted for Honda and P&O
Above: Magna Park, UK standard Distribution Centre building adapted for Toyota
Facing page: EMI distribution warehouse and headquarters by Stefan Kurylowicz, Warsaw, Poland

Distribution trends and design considerations

provided by Hanscomb

Trend toward large warehouses/sheds

Warehouse size is increasing due to consolidation, which has been aided by improved productivity through automation systems, better transportation management and strategic partnerships – which allow suppliers to know sales data so they can ship more quickly and efficiently. If you save time in the operations, you can increase travel distances allowing consolidation.

Raw materials versus finished goods

Warehouses for raw materials do not move goods as quickly as warehouses or distribution centres for finished goods. Raw material warehouses will have higher densities, more bulk, fewer SKUs (stock keeping units/tracking numbers) and less automated equipment than finished goods warehouses, which are characterised by higher velocity, more SKUs and possibly greater automation to aid in order picking.

Staffing considerations

Since warehouses are doing more than in the past, there are more people, with higher skill levels, inside the building now. The architecture is on the inside of the box, not the outside. Owners are concerned with attracting and retaining skilled people. Designs have skylights and windows, better finishes and lighting, and sometimes air conditioning. Outside, warehouses are still primarily a big box.

Heart of gold

ASDA, Sunderland, UK, by Chetwood Associates

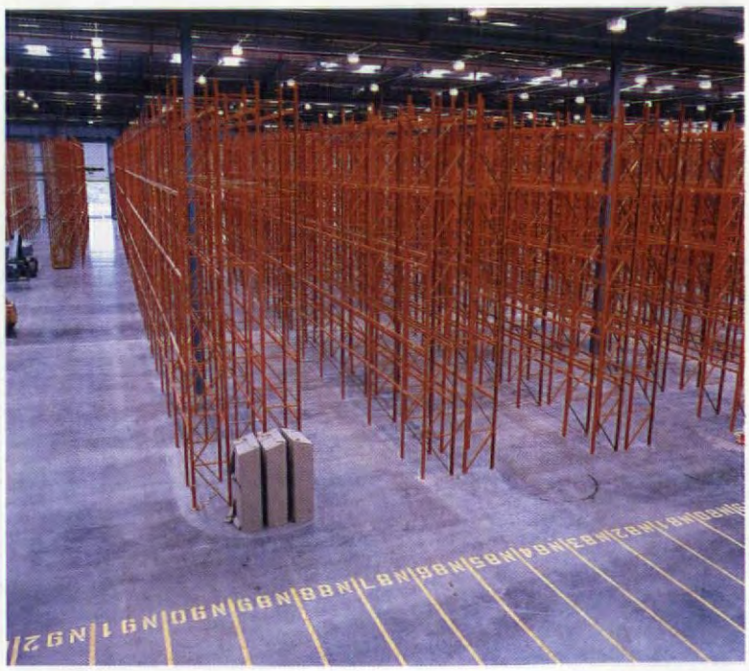
Distribution centres are defined by their location. Like the haulage that serves them, they can be found at major junctions such as the Golden Triangle which is bounded by the M1, M6 and the A1-M1 Link where Magna Park, one of Europe's largest distribution warehouse parks is located. This is where Chetwood Associates' was first commissioned by ASDA's property arm, Gazeley Properties, to build their first B8 Supershed. Andy Scott was Chetwood Associates project architect for their latest 26,941-square-metre distribution facility built for ASDA with Gazeley Properties in Washington, Sunderland.

Patrick McGillycuddy, director of construction at Gazeley, explains: "ASDA warehouses are two next to each other with perishable goods in one and non-perishable in the other... We basically wanted a function composite flow-through distribution facility. One of the innovations that we have implemented in this project is that the flow through suppliers deliver to the goods in section in the same order that they have to be dispatched. This reduces holding time and picking time. Distribution centres have lots of dock levellers. Normally these walls are cast in situ which would take about six weeks. We have introduced a precast system by Dyna Seal from Holland. They make the doors and shelters – they provide the whole dock suite. It is a composite unit that they understand. We have also refined the cladding system. We use special flat panelled Luxalon panels – a highly engineered sandwiched panel that can be clipped on to the steel frame – for the office area. The rest of the building is clad in Wards profile metal.

"The Washington Asda took 32 weeks to build. Six weeks was working on the site itself which was like porridge." Gazeley focuses on employee comfort. The new building includes a nursery which can serve children of staff at both the perishable and non-perishable distribution facilities.

Client: **ASDA**
Property agent: **Gazeley Properties**
Cost: **US$27.2 million**

Clockwise from top left: Prefabricated docking bays are one of the ways Gazeley and Chetwoods have saved time and money; the nursery serves both the perishable and nonperishable ASDA distribution centres; five-storey racking system with laser-levelled concrete floor; the greenfield site near a main road; office area for ASDA staff



▸ which historically remains buoyant during recession, than to manufacturing investment and output which falls sharply during these periods. In other words, the contraction of the manufacturing industry has been accompanied by a substantial increase in import penetration which has in turn created a large demand for new storage and distribution facilities of foreign-produced goods.

But there are a few architects in Europe, as well as the US, who appear to be perfecting the art of shed design. Chetwood Associates, now a well respected practice in the UK, began by building distribution warehouses with Gazeley Properties, the development arm of ASDA supermarkets, at Magna Park, in Leicestershire.

"Chetwood Associates started working with us in 1989," says Patrick McGillycuddy, director of construction at Gazeley. "We chose to work with them because they start with customer needs. In terms of architects, we go for medium-sized practices and companies. At the early design stage of a project we have Laurie Chetwood's input but with bigger practices that couldn't happen."

Andy Scott at Chetwood Associates explains: "When we are dealing with Gazeley we do try to standardise as much as possible – prefabricating increases the speed of construction and reduces time on site saving between 30 and 40 per cent of the overall development cost. Up to now we have taken the sleek box idea and tried to rationalise the building components and simplify the detailing as much as possible, maximising flexibility."

Innovative team management

Like any product production service Gazeley and Chetwood Associates are aiming for zero-defect distribution centres. The Apex near Milton Keynes in the UK, a Gazeley speculative distribution warehouse by architect Simons Design (part of Simon construction), comes with a three-year total care package equating to the 30,000 mile warranty enjoyed by motor industry customers.

Recently they have been getting closer to achieving "zero-defect" through partnership with the contractors, engineers and other members of the project team. "We are only as good as the support we get from the contractors and the rest of the professional team," explains McGillycuddy. "Now there is a total change in all our mindsets and the only way to deliver these projects efficiently is through partnership."

Sheds of the future

"At Chetwood Associates we are looking at a shed for the Millennium – a completely new template design for the future," says Scott. "We have set up a design forum, the 'High Store Group', a group of people who have got together from racking to forklift truck operators, engineers of all kind, land agents, planners, to experiment with plan configuration. The functional space would stay rectangular but loading bays have been repositioned." There are also plans to put docks on only one side of the building, rather than two. It facilitates cross-docking where the goods are off loaded, moved across the dock and loaded up again. "And the roof scape has been redesigned. The internal roof valleys are a problem long term with maintenance – where you are storing high valued goods, a leak would ▸

Friendly relations

Jupiter Distribution Centre, Tennessee, US, by Allen & Hoshall

Flexibility you expect among the program requirements for a major distribution facility. But friendliness? "As much as it can be, it's very people-oriented," says Barry Alan Yoakum, vice-president with Allen & Hoshall, the Memphis-based A&E firm that designed the new North American distribution centre for Brother International in nearby Bartlett, Tennessee.

Yoakum says Brother wanted a pleasant environment not only for visitors but for workers at the facility, the first phase of Brother's 176,510-square-metre, US$60 million "Project Jupiter". Even the workers arrive at the front door, a drum-like, two-storey, glazed atrium fronted by a "water feature", reminiscent of a Japanese pond. Offices account for about 8,360 square metres of the facility.

On the other facades, however, the building is all business. Shipping and receiving take place on three sides, whose 17 x 13 metre modules derive from multiples of four metre truck bays. Concrete tilt-up panels clad the three working facades of the facility, which will house the electronic giant's industrial sewing machines, faxes, typewriters and other products.

Memphis is known as a trans-shipment centre because FedEx is based in the city, but Ken Kohl, Brother's manager for Project Jupiter, says few shipments will leave by air. Memphis is also a major rail head. Steamship containers can reach the facility from Long Beach, California in 72 hours. Then the steel-framed distribution centre's highly automated systems move products onto trucks that will take Interstate 40 to points across North America.

"In the Americas, anyway, it's state of the art," says Yoakum. The three working facades can be easily altered to meet demand for more truck bays. Eventually the building may double in size, he says.

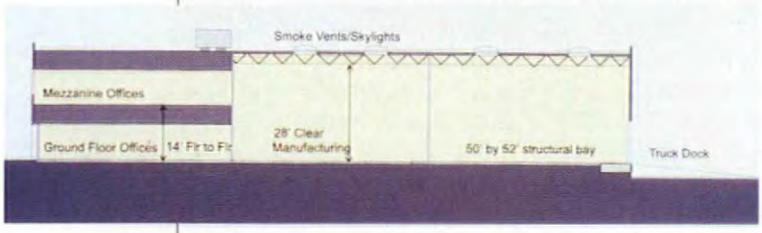
The centre was designed to withstand the major earthquake experts expect to hit the area sometime. A six-inch-wide seismic expansion joint will take the load. "This has to operate even when the big one comes."

Chuck Twardy

Client: **Brother International**
Engineers: **Allen & Hoshall**
Contractor: **Linkous Construction**
Cost: **Phase one: US$35 million (total cost: US$60 million)**

Above: Elevation showing curved concrete features in the glazed facade

Left: Elevation of finished section of the building with the strip window solution
Below left: Building section of two-storey office area
Below right: Site plan showing position of Harte-Hanks centre in Valencia Commerce Centre



Flexible fashion

Harte-Hanks Building, California, US, by Hill Pinckert Architects

The Harte-Hanks Building in the new town of Valencia, California, 30 miles north of Los Angeles, is a concrete tilt-up warehouse and distribution facility. Developed by The Newhall Land and Farming Company, the 12,561-square-metre building features the latest trends in warehouse and distribution construction and design.

"Because we started this building as a speculative development, before Harte-Hanks signed a long-term lease," says Thomas L Lee, chairman and CEO of Newhall Land, "we wanted a highly flexible site plan and building layout to accommodate the broadest range of tenants now, as well as changes in tenants and uses in the future".

A warehouse user, for example, wouldn't need much parking. But this same building could also accommodate a manufacturing facility, and that would require a good deal more parking for workers. Thus, Newhall Land allocated two parking places per 90 square metres of building space, a total of 273 surface parking spaces.

Interior flexibility was created by using structural bay columns which are large enough to reduce their number, and to avoid interference with future reconfiguration of the space and uses. Other design features also added flexibility to this state-of-the-art warehouse and distribution facility. The Harte-Hanks building has 8.5-metre minimum clearance heights. Of course, a lofty clear-height isn't important to many manufacturers. But it does provide the flexibility to lease or sell the facility to different users, particularly warehouse users. The Harte-Hanks facility has 1,200 amps of 480/277-volt three-phase, four-wire power to accommodate both warehouse and manufacturing functions.

Because Harte-Hanks leased this building early in Newhall Land's speculative development process, it was able to influence the design. "Harte-Hanks asked us to add a 1,858-square-metre mezzanine for their offices, a training room, and a telemarketing call centre," says architect Byron Pinckert. "We also moved the mechanical systems for the office area into the core of the building to serve their future expansion needs."
Charles Lockwood

Developer: **The Newhall Land and Farming Company, Valencia, California**
Development Consultant: **Hewson Company, Sylmar, California**
Contractor: **Oltmans Construction, Westlake Village, California**

Left: Tibbet & Britten's new Axial hand-over centre at Chipping Warden, UK shows that distribution contractors can demand good design
Bottom: Fukuoka Cargo Terminal by HOK Fukuoka International Airport, Japan

►be expensive."

And the future of the distribution business? "Well our conclusion is that the way things are going distribution is going to be slightly less HGV-led and more air-freight led. This will mean that distribution centres will get much larger – perhaps one to two million square feet – and more local to air terminals."

There are already signs that this is happening. HOK is involved with several new projects in Asia and the US since the JFK warehouse in New York in 1985, and Foster and Partners' supershed in Hong Kong focuses on air-freight systems.

Location, location, location

Distribution centres are located not just at airports, but at all major transport routes the world over, including motorway interchanges and train stations. Their high profile, "billboard" locations are what makes their function as a marketing tool, or as an ambassador for the client, a reality. But apart from a readymade site for an outsized logo, location is also relevant for more practical reasons. Mike Sprague, president of the North American division of the international distribution contractors Tibbet & Britten, compares operations in the US and Canada.

"Location is the secret of developing an efficient distribution strategy everywhere, but particularly in Canada. In Yellow Knife in the Northwest Territories for example, the lorries use an ice road over the Great Slave Lake, for eight months of the year. For two we drive around the lake, and for the remaining two it is inaccessible because of flooding. In New Foundland, where we distribute for WalMart, we have to allow for a four to five day transit time because of icebergs. WalMart in Canada is on average three times further from its distribution facility that its US equivalents."

One-stop-shop

Zoning issues around North American cities are already set up for industrial development. "There is a general developer who provides a 'one-stop-shop' service for setting up a distribution centre", explains Mike Sprague. Increasingly retailers are contracting out their entire distribution which means the lorry companies rather than the global retailers are the clients. "When we commission a shed at Tibbet & Britten, we might use our own consulting engineer to keep the general 'one-stop-shop' developer honest, but then we just let them run the project."

Facility "architects"

Facility designers rather than architects are the designers of most North American sheds. "There are two or three large facility designers in the US that global distribution agencies would use: The Facility Group in Georgia, Food Plant Engineering on the West Coast and Epstein in Chicago," continues Sprague. "They control the architectural element mostly by making recommendations for the internal layout, but sometimes they get the contract to build as well."

Design and build or "build to suit"

In the US simple construction and tight schedules for distribution facilities often lead to the use of design and build ►

Left: Exterior shot showing facade design
Below: Cargo cranes unloading for storage in the distribution centre
Bottom: Ground floor plan of single storey warehouse areas divided into three grid storage sections

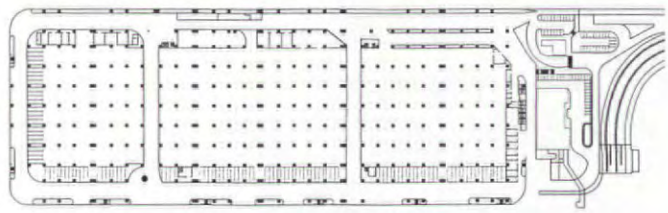
Intensive care

Hong Kong International Distribution Centre, by Liang Peddle Thorp Architects & Planners

Everything seems more intense in Hong Kong. The Hong Kong International Distribution Centre is conceptually simple; a 507,000-square-metre shed offering simple storage space to around 50 tenants, on seven levels. It is, however intensively used, open 24 hours and handling 6,000 trucks per day at peak periods. "This building is all about vehicle movement," says estate manager Johnnie Lee.

The double height ground floor is given over to container stacking for the adjacent HIT wharf, so vehicles enter the building at mezzanine level and drive up a 3.5 kilometre internal ramp to a rooftop waiting area for 400 trucks. Drivers wait until they are notified that a loading bay is available and can make use of the 800-seat restaurant. The other half of the roof is rented out for car parking. The lower floors are of two types. Levels two and three have twin side aisles with natural ventilation and natural lighting. Levels four to six have a single, central aisle which are more efficient in terms of net to gross but where working conditions are less attractive and the competition for vehicle space more intense.

At the east end of the building a slender zone of offices provides 21,500 square metres for related businesses, on ten levels. Architect Liang Peddle



Thorp has considerable experience of designing distribution buildings in Hong Kong. With variations of open strip and punched-hole openings, tile cladding in warm blue, pale grey and white, radiussed corners and a variety of low relief portal features, the architect has developed a system of articulation which seeks to humanise this vast enclosure.
Ralph Thomas

Client: **Hutchinson Whampoa Property Group**
Lead consultant: **Maunsell**
Total cost: **US$230 million**

Costing issues *provided by Hanscomb*

First cost or whole life costs

The economics of warehouse/shed construction depends on one's perspective. There are competing concerns of first cost and ownership or whole life costs. Flexibility and whole life costs are typically greater concerns in an owner-built facility than in a speculative built facility. Depending on the activities in the warehouse, equipment can be a major cost. In this instance the building cost alone will be considered.

Some factors that will contribute to determining the magnitude of warehouse costs are: configuration, bay sizes, clear interior height, single versus multi-storey, etcetera. Sometimes the cost impacts are not always obvious. For example, in the US warehouses above 12.2 metres high require in-rack sprinkler systems. Requirements for heating or cooling – often dictated by location and/or goods. The most basic consideration is building height. In a pallet system a multiple of pallet height (1.8 metres high) sets the building height with the minimum typically being three pallets.

Table 1: Warehouse/shed cost comparison (All Costs in US$ per square metre)

Less Than US$400	US$400 to US$600	US$600 to US$800	Greater Than US$800
Mexico	Australia	Belgium	Denmark
Spain	Canada	France	Finland
	Netherlands	Germany	Japan
	New Zealand	Greece	Norway
	Portugal	Ireland	Sweden
	United States	Italy	
		United Kingdom	

All costs converted using October 1998 exchange rates.

Table 2: Typical elemental cost percentages

Substructure	8 - 16%	Interior Construction	6 - 12%
Superstructure	15 - 22%	Mechanical	13 - 22%
External Enclosure	13 - 21%	Electrical	8 - 13%
Roofing	8 - 16%	Equipment (Dock)	1 - 3%

Chinese trailblazer

Distribution centre in southern China, by Richards Basmajian

China opens up on its own terms. Information control, it seems, is absolute. The client for this project refuses to be named. Even when foreign goods are allowed access, the central government controls distribution, although the parameters are not codified. The distribution centre in China by Richards Basmajian Limited, architects and interior designers based in Hong Kong, is an exploration of what is possible.

"It's a joint venture with the local government," reveals director David Richards. "They're very much involved with this. It was an interesting project to work on. The scale of it is enormous...When we first started to talk to them, the brief was very open-ended. We were talking about housing, a conference centre, a hotel."

By early 1994 the current scheme for 100,000 square metres in 631 warehouse units was finalised and the first phase of 172 units started on site in 1995 and completed in 1998. Measuring 12 metres wide, 45 metres deep and with eight-metre interior clearance, unit size was decided by the dimensions of racking for pallets with forklift access. Each unit has a loading bay at one end, and a two storey area at the other, suitable for offices above a showroom. Roads consequently alternate between public access and goods access.

Profiled metal cladding with steel trusses on concrete columns is unconventional in China. "There's been a lot of thought put into the construction and the cladding. It's been very well built. I'd say in China there isn't another to match it in terms of quality. There are isolated buildings which perform the same function but in a different way".

Support facilities including freight and finance companies, restaurants and complex administration are provided in a two storey building near the entrance to the site.

In China, this is a trailblazer.

Ralph Thomas

Credits unavailable at time of publication.

Below: Section through model of warehouse showing the distribution of offices and storage systems

Right: Model of the proposed development site with distribution centres arranged in a grid pattern

Below right: Elevation showing docking bays and separate flagged car entrance for staff

► contracts rather than hiring architects. Clients feel that there is little reason to create problems by doing something a local code official has not seen before. Design and build is also used in most cases in Europe. The end-user dictates the type of building. These supersheds are designed to respond to the workforce but not to customers – the client is aware of this. Their priorities are a guaranteed maximum price contract. Gazeley's McGillycuddy offers the term "build-to-suit" in place of design and build.

Asia's sleeping

Although a rash of sheds is spreading across southern China since the handover of Hong Kong to take advantage of the lower land prices, many are cautious about the rate of development in this sector in Asia.

Ian Reynolds of Jakarta-based surveyors Davis Langdon & Seah Indonesia says this: "Davis Langdon was involved with the Unilever facility in Surabaya, Java in 1980. They have an in-house design team for such projects. In Asia, it seems that most of our global manufacturing clients such as Sara Lee want facilities which are one third raw material storage, one third production and one third finished goods storage and contract out their distribution." But Reynolds claims that "at the moment the Asian economy has gone to sleep. It will be another year or so before the demand for distribution centres picks up again".

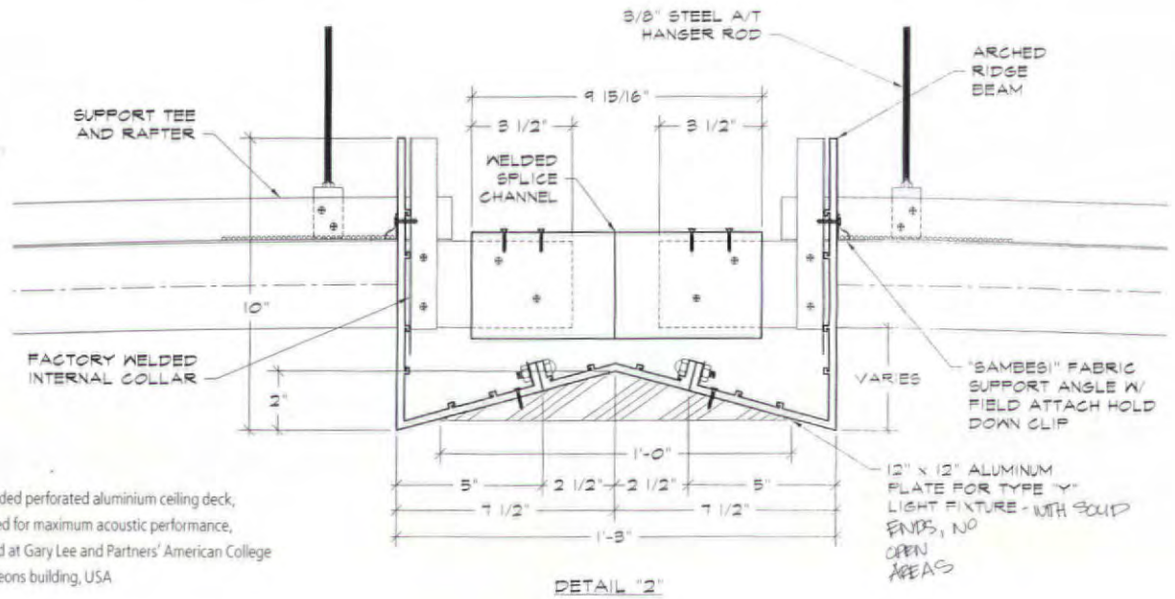
Ticky tacky boxes or shrewd investment?

Like stockbrokers, developers make their living out of change, by deducing ahead of time which areas are going to present them with opportunities. And like brokers, in attempting to predict the changes they accentuate what they have detected. The growth in "out-of-town" distribution centres is a logical extension of this traditional pattern, although whether the popularity of "out-of-town" sites will be seen retrospectively as an unequalled model for urbanism in the late 20th-century, remains to be seen. The era of the supershed is at hand. WA

TECHNICAL

Standard issues

There is no textbook way to maximise the value of floors and ceilings. Components, standards and guidelines around the world differ greatly, and ISO regulations on insulation and plant storage are proving difficult to implement. So, as Dan Fox reports, to get the best, architects are coming up with their own ideas...



Suspended perforated aluminium ceiling deck, designed for maximum acoustic performance, installed at Gary Lee and Partners' American College of Surgeons building, USA

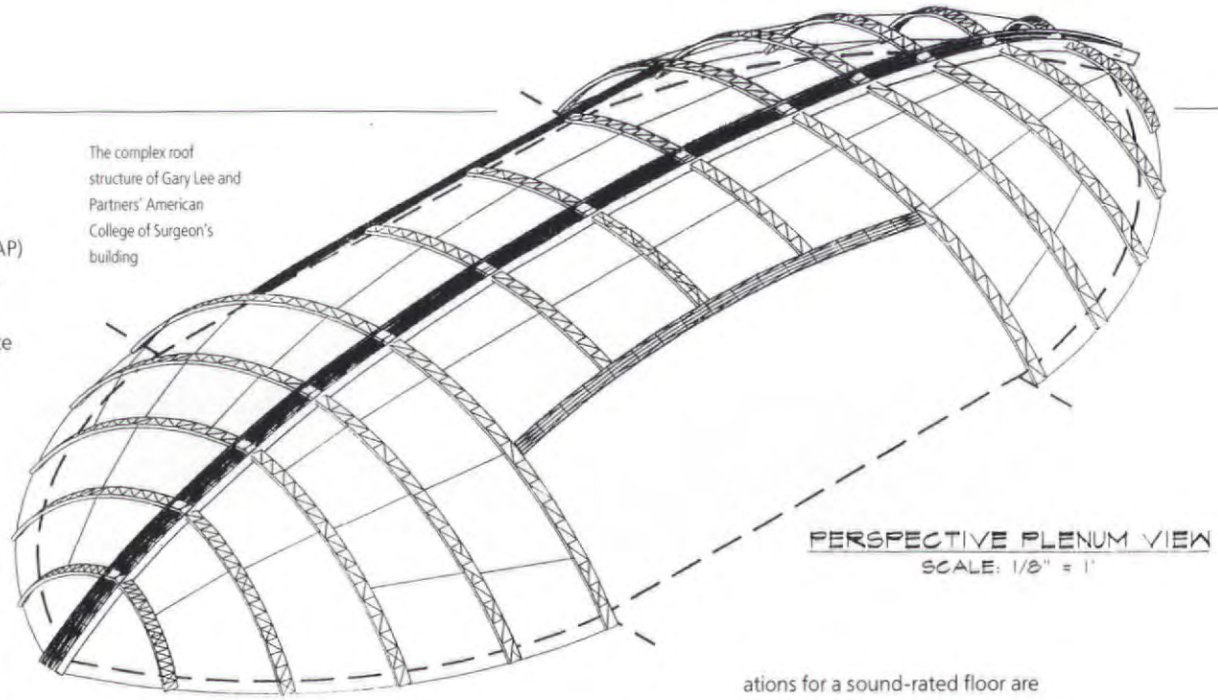
The International Standardisation Organisation (ISO) (see *WA*70 pages 34 to 37) has recently introduced a programme of standards relating to acoustic insulation to accompany its more established codes for thermal insulation and placement of wiring. Architects involved in the design of floors and ceilings internationally will know that the expectations of clients and building standards bodies differ enormously around the world, and the resulting lack of definition in the market for floor and ceiling components makes specifying the products a potential minefield, where manufacturers and architects are left guessing over what production values and standards to adhere to. So could an international textbook ever makes things simpler? Or should architects resign themselves to relying on their own ingenuity to get the best out of floors and ceilings?

ISO standards are not mandatory, but the organisation has raised its profile considerably in the past year – largely due to its catch-all ISO 9000 and ISO 14000 quality-management certificates, and has over 250,000 subscribers in 129 countries). But even with its undisputed muscle, ISO's building codes have failed to make any real impact on architecture yet, and ISO compliance seems to be more of an advertising strategy than a valuable global standard. Building codes are historically created to ensure the safety of a building's occupants – and so are embedded deep in national legislation. With enormous sums of money at stake for even a small design modification, voluntary codes relating to occupant or client comfort rarely reach the construction industry.

David Wilson, of UK ceiling manufacturer Luxalon (a Hunter Douglas subsidiary), thinks ceiling components alone are too diverse to allow any global code to be applicable. "Manufacturers don't even work with local standards in mind – it all comes down to what the client is prepared to pay for, what the manufacturer sees as saleable advantage."

Decoding the codes

Those looking closer to home for guidelines invariably find a bewildering web of requirements, code numbers and acronyms from co-existing standards bodies. For example, in the US the Building Standards and Guidelines Programme (BSGP) reports that New Hampshire has adopted a new energy standard based on the 1995 Model Energy Code (MEC). It was initiated by the



The complex roof structure of Gary Lee and Partners' American College of Surgeon's building

Department of Energy (DOE) after research by the Public Utility Commission (PUC) and Building Codes and Assistance Project (BCAP) to give new relevance to obsolete 1970s standards.

US building codes vary from state to state, so the problem of the main regulatory bodies is similar to that of ISO on a world scale. Currently, the use of a hotchpotch of documents in the conception of new products and design of buildings is creating a need for numerous local and state amendments and interpretations.

However the wholehearted backing on the part of the Building Owners and Managers Association (BOMA) of current tentative moves to unify US codes (see *Who are the codemasters*, page 91) suggests that the clients, who really call the shots, see commercial advantage in straightening up the regulations.

Russia's SNIP, a system of public health and safety codes, is federally enforced and extends to most of the former Soviet states. SNIP is aiming to widen its scope to cover best practice in the interest of attracting foreign developers. Sweden has recently tightened its acoustics regulations to a degree over and above the European norm, and this will have a knock-on effect on European Union building guidelines, which work on a "highest common denominator" basis.

It is fair to assume that if this global pattern continues, progress in the US, and the world at large, will be made sooner rather than later. David Eisenberg, giving a paper at a recent BETEC (Building Environment and Thermal Envelope Council) symposium, said: "Most encouraging is the international development of model energy codes. These represent the first step toward a basis for codes not strictly limited to the health and safety of the occupants of buildings." This may well be a crucial development in perception of building codes.

Floors in the system

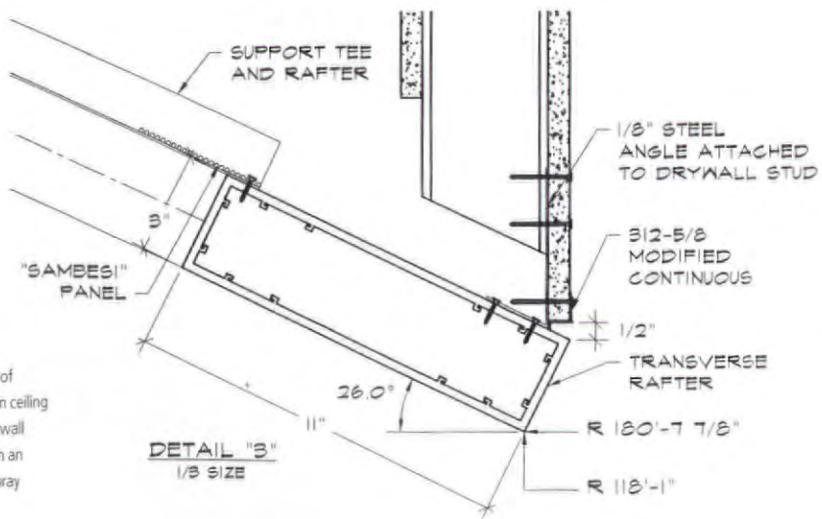
There are few specific quality guidelines in place for the manufacture of flooring products, and the amount of concern given to acoustic transmission, reflection and absorption is entirely at the manufacturer's discretion. UK floorcoverings manufacturer and consultant Ian Larkin believes that manufacturers do not see any commercial advantage in producing coverings with anything other than "standard" acoustic insulation. The prevailing industry wisdom is that architects will specify on aesthetic merit, durability and price, so these are the production values that are given attention.

Architects are more likely to be able to obtain helpful practical consultancy how floors will work in terms of acoustics from underlayment manufacturers, who sell a product based purely on performance. In the US the code considerations for a sound-rated floor are Impact Insulation Class (IIC) and Impact Transmission Class (ITC). Most local codes have a minimum sound rating limit of about 50 for both. These should be rated by an accredited acoustic laboratory and manufacturers who have tested their products in this way are usually happy to show off the test results.

False ceilings

Ceiling manufacturers appear to take acoustics more seriously, and the "acoustical ceiling panel" is widely available and widely applicable. However, acoustician Courtenay Nicholas of the UK's Sound Design feels that acoustical ceilings are "the most widely mis-sold architectural product" and that the lack of training and experience architects gain in acoustics leaves a gap that salespeople in the ceiling industry frequently exploit. Too often the result is a building that includes a variety of mismatched acoustical products designed to solve disparate problems, but with very little sum value.

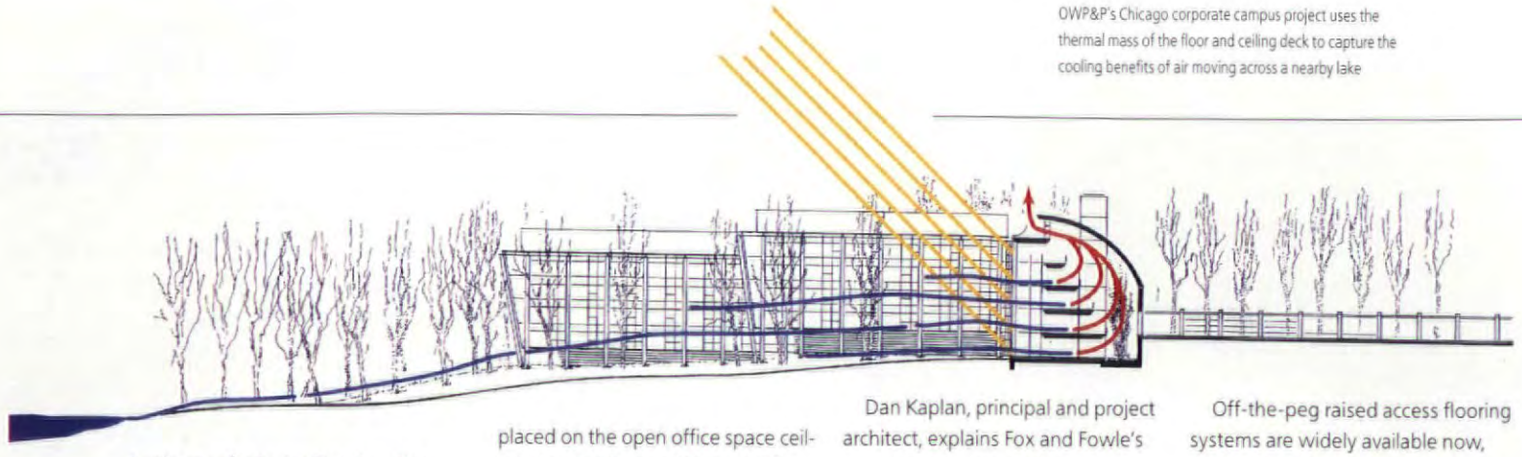
Consideration of acoustics at the design development stage generally adds only three per cent to the capital building cost – and in today's "owner versus tenant scenario", acoustics can be a large enough part of the lease potential of a building to make that cost negligible.



The American College of Surgeons building main ceiling underside, fixed to drywall soffits and coated with an absorbant acoustic spray

Sound architecture

Gary Lee and Partners' American College of Surgeons project, a recent ▶



OWP&P's Chicago corporate campus project uses the thermal mass of the floor and ceiling deck to capture the cooling benefits of air moving across a nearby lake

▶ winner of *Interior Construction* magazine's construction excellence awards, is a building whose ceiling was developed with acoustic performance in mind from its inception. The main sculptural ceiling is the *pièce de resistance*, a stainless steel mesh panel construction resembling a boat hull, which launches itself from a drywall soffit supported on stainless steel columns.

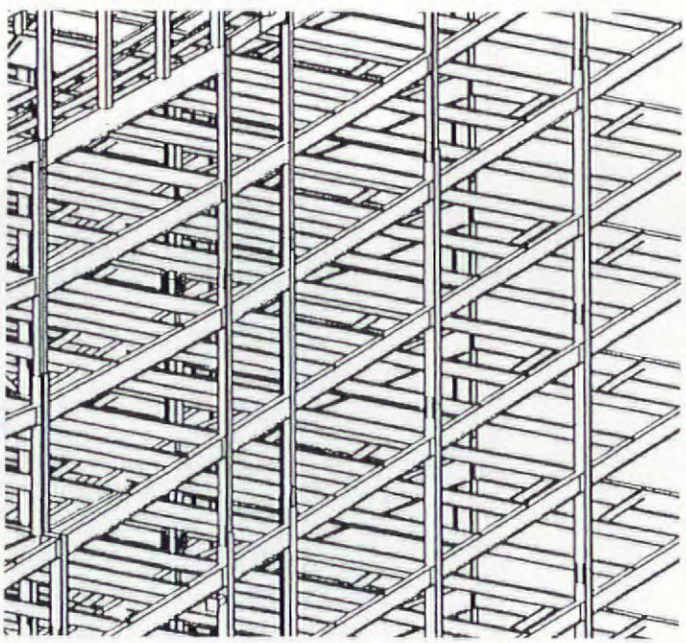
The prime objective of the project was a visually spectacular space, so the building's excellent acoustic insulation had to be built around a structure-led design. Architect Kathleen Both says: "The requirements for a public space this complex meant acoustical tile was out of the question. We used permeable aluminium mesh which absorbs some of the sound, and then above the mesh on the underside of the ceiling we applied an acoustical spray. This is an ugly solution but the surface was concealed by the mesh." Elsewhere, perforated panels were strategically placed on the open office space ceilings to absorb sound that would have otherwise been deflected back towards occupants.

The result, a highly specialised custom design utilising bespoke components, came in on budget and exemplifies the achievements possible when acoustics are considered early, and in terms of the entire structure, rather than as an add-on.

Wire ceiling heights crucial?

Fox and Fowle architects has developed what could be the blueprint for storing wiring and technological hardware with the Reuters Building, a part-speculative office tower under construction in Manhattan.

Reuters, a 24-hour international news agency, uses the most up-to-date, often experimental, technology, and avoiding even a few seconds of systems downtime is imperative. But the sheer pace of change is making the design of long-term cabling solutions for such modern businesses increasingly difficult.



Fox and Fowle's Reuters building in Manhattan, New York, is of traditional steel construction, but uses extra floor-to-ceiling height and a flat, non-cellular deck to give the client extra flexibility over accomodation of wiring and plant

Dan Kaplan, principal and project architect, explains Fox and Fowle's concept: "The key design concern was infrastructure – the client had very advanced needs. The Reuters Building is a steel-structure, metal-deck, concrete-floor building. Traditionally, we would use a cellular deck, with wiring built into the slab. The key to this building's flexibility and much of its energy-saving properties is in the floor-to-ceiling height." With 4.3 metres in the main part of the building and 4.9 metres in the trading rooms, there is an extra 15 centimetres for a raised floor even after installation of a generous suspended ceiling. The advantage of floor storage is increased flexibility, and, according to one study, the payback time for a company with a high turnover rate of personnel and systems can be as little as a couple of years.

There are other advantages to Kaplan's high-ceiling approach – the increased window area allows more natural light, and the potential extra space in the ceiling means there is enough room to install indirect lighting – two energy-savers that can amount to much in a working multi-tenant building such as Reuters. Kaplan thinks this design style will become ubiquitous in New York as corporate owners switch from traditional overhead ductwork to underfloor air delivery systems, which use the thermal mass of the floor, a method that less space-intensive European office designs already feature. These systems are becoming more flexible and viable over smaller floorspaces (costing from US$2-US$4.50 per square metre). Kaplan says that as value-engineering becomes a major element of the saleabiltiy of a speculative project, the raised floor will become a crucial part of its value.

Off-the-peg raised access flooring systems are widely available now, notably from specialists who often produce underfloor air delivery gear.

Heat and heatability

During the energy crisis in the 1970s, building codes were imposed to thermally "seal up" buildings, and, for the first time, coverings manufacturers began to take environmental issues more seriously out of fear of litigation. This coincided with the height of the use of chemicals in the makeup of components. Thermal insulation as a composite part of covering components was researched and, to some extent, introduced. However, when the crisis was over, the pace of development slowed to a standstill.

The received wisdom among architects now seems to be that original, impressive thermal results will usually only be achieved by innovative structural solutions. Bjorn Hallsson, principle of Chicago-based commercial firm OWP&P, and firm advocate of energy-efficient design, is very much of this opinion. He says: "Insulation of floors and ceilings is affected by latitude, climate, economics and energy considerations. In northern latitudes two approaches are applicable – one develops an active solution (conventional conditioning), the other incorporates a passive solution, which works with the active, reducing its and the building's operating cost." With the former, Hallsson feels that the most important insulating measure either way is the introduction of a thermal break between floors, between the floor and ceiling edges and the exterior envelope (ground floor included).

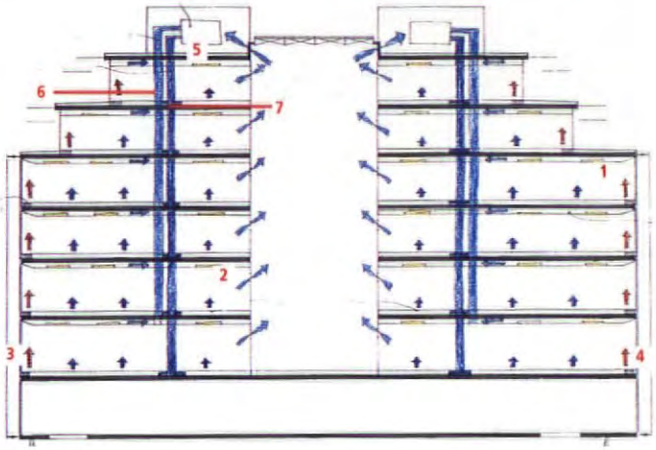
Get in early

Hallsson thinks architects need to think about floor and ceiling insulation early to achieve the best result.

Diagram showing the part played by advanced flooring and ceiling designs in Sheppard Robson's Helicon building – a benchmark in integrated thermal solutions

Key to Helicon building

1 Chilled ceiling
2 Underfloor air
3 Convection heat removal
4 Vents
5 Air handling system
6 Return air
7 Supply air



"The second approach incorporates the original solution, but its application is taken a step further in energy-saving measures. This is achieved through natural ventilation at night, providing cooling of major internal surfaces, such as ceilings, and benefits operations of buildings considerably in reducing the need for active systems, and lowering operating energy costs. For this approach, the construction of upper floors and ceilings needs to be of heavy materials, generally of reinforced concrete cast in place or precast." The use of a suspended ceiling can dilute the thermal benefits of the ceiling structure, but research shows that perforated tiles, although susceptible to pattern-staining when not sealed, do allow enough air movement to capitalise.

"The need is for the floor to provide a sufficient mass, at an appropriately chilled temperature, to be able to absorb the anticipated heat generated by people, artificial lighting and equipment through the better part of a working day, reducing the need for active conditioning systems," says Hallsson. "With this approach, the underside of the floor construction makes an exposed ceiling. The floor surface may be lightly insulated under the floor finish, depending on criteria for thermal comfort and cost."

There are a dozen or so different types of insulating materials on the market which can be applied in this configuration with varying levels of performance. The US Environmental Resource Guide grades them on environment, health and welfare, energy and building operation qualities. The materials performing best are those relatively new on the market – cellulose (made from recycled paper) and cotton-based material made from post-industrial textile fibres (75% cotton and 25% polyester). Close behind are magnesium silicate, perlite, mineral wool, fibreglass and vermiculite. At the bottom of the scale are materials such as extruded and expanded polystyrene, polyurethane and phenolic foam – all similar to one another in performance. "In this approach, the floor and ceiling construction become a participating element in the combined system solution for the building as a whole," says Hallson.

OWP&P's 45,720-square-metre corporate campus under construction in Chicago exemplifies this ▶

Who are the codemasters?

To acheive true global standardisation of building codes, the support, investment and agreement of all of the organisations below would be necessary – and that would be the very tip of the logistical iceberg...

Brazil
Associaçao Brasileria de Normas Technicas – Non-profit organisation working towards standardisation of construction technology. Brazilian representative of ISO.

Germany
Deutches Institute fur Normung ev – Voluntary standard that applies to all construction products and materials. It is not legally binding but regarded as best practice. Federal and state construction laws also exist.

International
International Organisation for Standardisation – Umbrella organisation for national standards institutes from any country, industrialised or developing. ISO standards represent international consensus on the "state of the art" in the technology concerned.

PRC
Central Government Codes – There are over 200 design codes which cover all aspects of architecture and construction and apply nationally. However, decentralisation of government is set to lead to establishment of local codes of construction principles.

Russia
State Committee for Housing and Construction Policy of the Russian Federation – Provider of SNIP, the uniform system of public health and safety codes used throughout the Russian Federation. Organisation and classification differs substantially from those of the USA.

South Africa
South Africa Standards Bureau – Maintains the National Building Standards, which are very similar to those of the UK.

UK
British Standards Institution – Independent national body which produces and maintains standards via a committee process and public debate.
British Standard Specifications – Standard for building products and materials.

USA
Building Officials and Code Administrators; International Conference of Building Officials; Southern Building Code Congress International – Three bodies which have traditionally created and developed the building codes adhered to by most US states. They have been working together since 1994 to unify their systems to form and "International code" applicable across the 51 states by the year 2000.
Building Owners and Managers Association – Large trade body which predictably wields some influence in the construction sector.
American Society of Testing and Materials – Major provider of material standards.

► approach, as cool air is compartmentalised through the building after passing over a nearby body of water, and utilises the thermal mass of the floor/ceiling deck as an energy store. In London, Sheppard Robson's Helicon Building was a benchmark for the more futuristic approach. Along with generous underfloor wiring cavities, the building's chilled ceilings and underfloor air delivery systems work as part of an integrated low-energy temperature conditioning system – the first time in the UK that a large-scale speculative commercial space has incorporated such high-spec floors and ceilings.

Change on the horizon

When specifying furniture, the architect of the future may be able to buy truly off-the-peg – any concerns will be simple and easily resolved. Conversely, choosing services and cladding is an involved process and requires painstaking research and a degree of consultancy and design testing.

Floors and ceilings seem to fall into the middle ground – with no clear right or wrong. What is clear, however, is that clients and legislators are waking up to this seeing the benefits of effective design and manufacturers will have to make develop the market to make ore advanced solutiions available off-the-shelf. A components market with a wider selection of technically-advanced and relevant products would go some way to making truly effective floor and ceiling design ubiquitous, and raising standards worldwide. WA

Showing the way in floors and ceilings

REVIEW

Coverings 99 – USA

The "big one" for the flooring industry took place in Orlando, Florida from 23-26 March. Coverings is the largest flooring and decorative surfaces exposition in the western hemisphere. There were 16,500 verified trade visitors and a total attendance of 24,000. Although a large part of the show caters for the manufacturers themselves – the "Solution Source ", a high-profile sub-conference, provided debate on how to get ahead in flooring industry – architects and specifiers will have found plenty of interest in the huge variety of new and established products on show. Over 1,100 international floorcoverings suppliers were on hand to do business face-to-face, and visitors had the opportunity to take a first hand look at the latest designs, application ideas and industry trends. As a one-stop shopping and research centre, Coverings certainly holds its own.

For information on Coverings 2000 contact TSI Inc, 900 East Indiatown Road, Suite 207, Jupiter, Florida 33477.
Tel: +1 561 747 9400
Fax: +1 561 747 9466

REVIEW

FM Expo – UK

FM Expo is a facilities management show which ran in London on 13, 14 and 15 April and was attended by around 250 exhibitors, including a good sprinkling of floorings manufacturers and acoustic and thermal insulation technicians. An intimate affair with a relaxed pace and comfortable spaces in which to do business, FM proved that construction shows can work without the hustle and bustle and the hard sell. Although attendees from western Europe abounded, there were few from further afield. There were a good many architects among the delegates – attracted by the well-designed show floor and an interesting mix of stands, as well as the adjoining ConstructIT which profiled a range of electronic design tools. A seminar programme ran throughout and addressed industry issues which, although topical, were generally of questionable interest to architects. *For information on FM Expo 2000 contact Miller Freeman, Blenheim House, 630 Chiswick High Road, London W4 5BG.*
Tel: +44 181 742 2828
Fax: +44 181 747 3856

PREVIEW

NeoCon 99 – USA

NeoCon, the catch-all show for the interior design industry, kicks off in Chicago on June 7 and runs for three days. On top of the phenomenal number of visitors (approaching 1,000) NeoCon's breadth is its principle asset. Five other shows fall under its umbrella; Buildings Show (commercial building products and services), Decorex USA; (interior design products); Office Expo BPIA (mid-market office furniture); New Hospitality (products and services for restaurants, hotels, motels, resorts and clubs); and TechnoCon (IT for use by architects). Commercial architects interested in floorings and ceilings would do well to check out some of NeoCon's "Office Design" and "Retail Design" seminars as well as the Buildings Show's comprehensive FM discussion programme. There is also a variety of keynote lectures, networking events, meet-and-greet evenings and award ceremonies scheduled for the evenings.
For information contact NeoCon99, PO Box 543405,Chicago IL 670654.
Tel: +1 800 527 6468
Fax: +1 800 527 6469
Web: http://www.neoconwtf.com

PREVIEW

Intel – Italy

This is the 20th year of the International Electrotechnical and Electronics Show, and it looks likely to be the largest yet. The products on display will include electrical systems and lighting, but the backing of the Italian National Association of Building Managers means that the theme of integrating electronics into a building will be one of the principal themes, something of prime interest to those specifying or designing innovative floor and ceiling systems. Perhaps the area most worth watching is the developments in fibre-optics – as cabling mass is reduced due to technical developments in the sector, the implications for raised flooring and suspended ceiling space requirements will be massive. Intel shares a floor with DOMUS Italia, a convention which deals with building management issues.
For information contact Associazione Intel, Via Gattamelata, 34 – 201 49 Milano.
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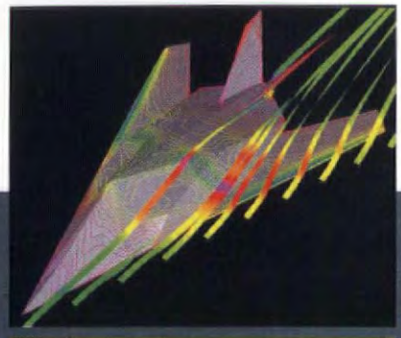

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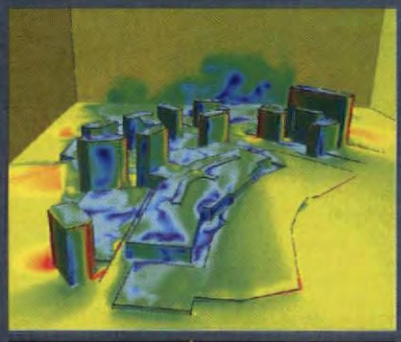

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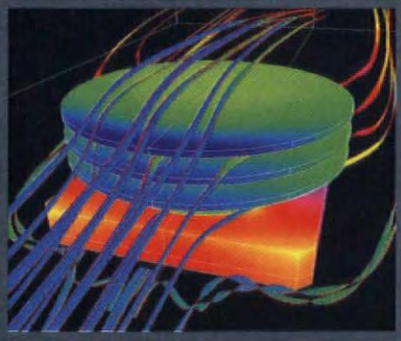

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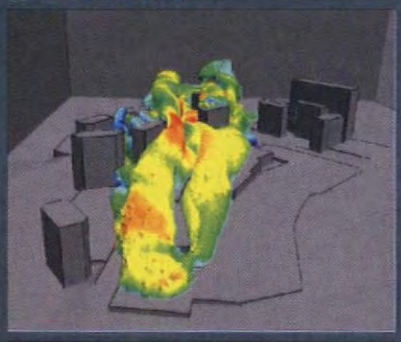

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CAD IN FLOORS AND CEILINGS
From aerospace to office space...

The developers of the world's most advanced fighter planes have used it for years, millions of dollars are spent every year around the world researching it, and now architects are discovering it can help them predict the performance of their building with unprecedented accuracy. Computational fluid dynamics is a sophisticated computer modelling technique which determines the flow of fluids (typically air) on or around surfaces. It is used to predict and then graphically represent the distribution of air flow (direction and speed), temperature, relative humidity, pressure and trace species (smoke or pollutant movement and concentration). The software is extremely complex in nature, you can't buy it off the shelf and it is usually operated by trained technicians.

Precise knowledge of factors such as heatflow, mass transfer, mechanical movement etcetera at an early stage is particularly useful for designers of floors and ceilings. The complexity of designing thermal performance into a building's structure, and integrating the performance of coverings products, thermal breaks and building services into the equation is greatly reduced with access to detailed information about what part each factor will play in the solution. The need for risk-taking is eliminated and the design parameters of each part of the job can be reduced, enabling a more precise design.

First used in the 1960s, the CFD service industry really took off in the 1980s, when it began to be widely used by in the aeronautical industry. Today's advanced programmes create working models of jet engines and entire planes, showing the dispersal of heat and the aerodynamic performance. The American F1-11 fighter plane and the Stealth bomber were designed this way. In chemical engineering CFD can help maximise yields from reactors and processing equipment, and risk-hazard analysts use it to predict what damage bomb blasts or fires will do to buildings or equipment. On the horizon is software which will chart the flow of fluids inside the human body, enabling surgeons to predict the outcome of operations.

CFD can be procured in a number of ways, but more often than not, a practice will hire a building or IT consultant to use the software for them. Australian consulting engineers Norman Disney and Young are leaders in this field – they use a programme called "Air", developed at the University of Sydney, in the design of Rice Daubney Group's George Street offices in Sydney (see *WA*75, page 90) a project which demanded precise prediction of the thermal performance in order to maintain extensive indoor gardens. Buro Happold, in the UK, has used the the CFX programme in collaboration with IT provider AWA Technology in the design of the Greenwich Millennium Dome (see page 50), the British Museum Great Court and the Lowry Centre in Manchester (see page 53). Buro Happold manager Padraic Kelly says: "CFD is becoming an essential part of engineering design". Budding users can rent or purchase their own programme, but learning to operate CFD does take time – it is far less user friendly than the majority of commercially-available CAD solutions. "Remote computing power" – access to CFD expertise through the internet – is being developed and may well be the way to make the technology more widely available.

1. Aerodynamic model of the American F1-11 fighter plane

2. Transfer of heat caused by traffic in an urban centre

3. Distribution of heat on a passenger jet in flight

4. Air flow in and through a chemical reactor

5. The dispersal of pollutant through buildings

6. Slipstream model of the space shuttle during take-off

CERAMIC TILES FROM SPAIN

Ceramic floor tiles for high traffic areas

The Spanish ceramic floor tile has become one of the most important in the range of ceramic products within a very short space of time. Owing to new technology introduced in Spain in the 1970s, the floor tile has now matched the ceramic wall tile in sales and production. As with the wall tile, the use of the floor tile has extended all over the world thanks to its special properties and technological evolution.

The single firing system has allowed Spanish manufacturers to produce floor tiles with improved technical characteristics, as required by tiles exposed to a high level of wear and tear.

Today, there is a great variety of glazed and unglazed tiles extruded as well as dust-pressed; among them, the variety called porcelain tile. Vitrified tiles are able to perform under heavy traffic, allowing for the design of creative interiors, using imaginative combinations of colours and formats

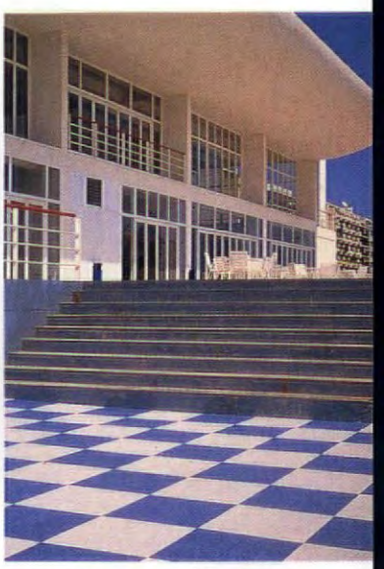
Alcalagrés, S.A. Decorative mural in the "Campo de las Naciones" tube station in Madrid, using porcelain tiles in 40x40 cm

Roca. PG1N series

Venis, S.A. Project: Technological Ceramic Tile Institute (Spain). Himalayas series

Azteca Cerámica S.L. - Hercules series

Cedonosa - Ferrogres Natural series



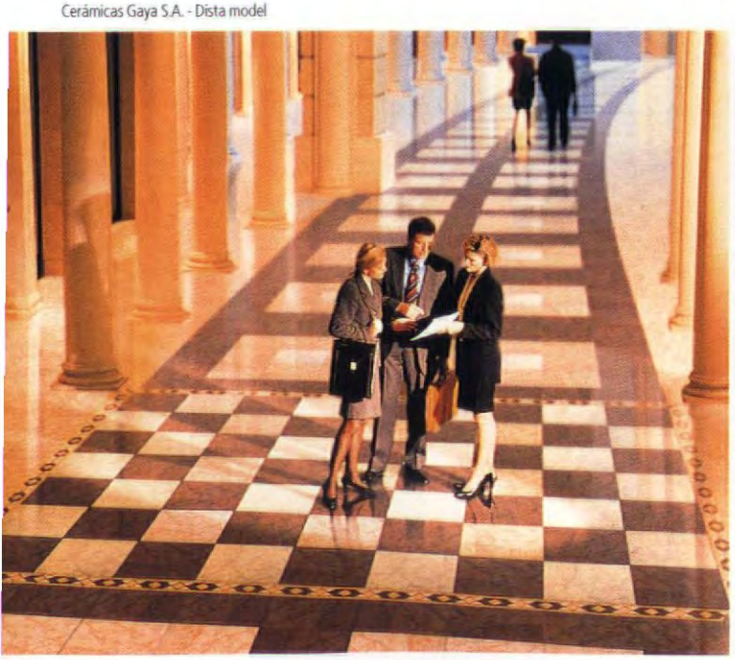
Gres de Nules - Project: Sailing School (Spain). Atica series

Industrial and commercial buildings

There is an enormous range of buildings categorised as industrial and commercial, depending on their intended use, such as sports complexes, large commercial areas, airport terminals, train stations, hospitals and laboratories, educational centres, etc.

The common denominator of all these buildings is heavy traffic, and a high level of exposure to mechanical, physical and chemical agents where, in particular, integral mechanical actions of high or very high intensity should be expected. Also, on large and continuous surfaces, there is likely to be exposure to strong static loads, the wheeling of heavy loads, and impact. Therefore, depending on the case, it will be necessary to select tiles, which are thicker than the average used for other environments. These actions are caused not only by heavy traffic, but also by the industrial cleaning methods used in these areas.

Cerámicas Gaya S.A. - Dista model



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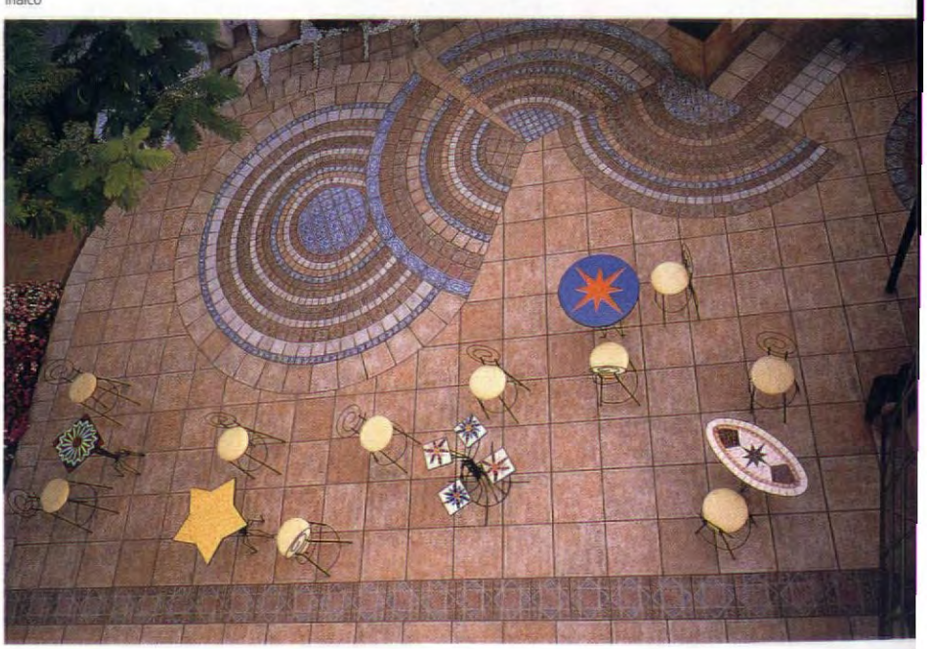


Cerámicas Diago S.A. - Omega series

Cristal Cerámicas S.A. - Titan series

Navarti Cerámica S.L. - Omega model

Non-residential construction. Interior spaces

Halfway between residential and industrial construction there are a variety of public spaces where the use of ceramic tiles has become common based on the factors of functionality, ease of cleaning and health requirements.

Since the last decades of the XIX century, ceramic tiles have been used in restaurants, bars, dairies, meat and fish markets, as well as in medical and pharmaceutical buildings and public restrooms. Their use has also been extended to places where decoration precedes function; this evolution reached its climax during the period of Modern architecture.

In projects for the interior decoration of retail shops and other places of average traffic, where the decorative aspect has to be considered

Tau Cerámica

Azuliber S.A. - Segovia-Alcázar series

Ceramica Saloni S.A. - Titanio series

carefully, it is important to know beforehand all the mechanical actions that are likely to be exerted on the face of the flooring. In areas where there is heavy traffic and greater exposure to abrasion (e.g. access and spaces across from counters and cash registers in stores) tiles of the highest resistance to abrasion have to be selected.

Ceracasa - Palacio series

CERAMIC FLOOR TILE TRENDS

1998 concludes with the continual evolution of floor tile trends:

- Due to the quality of clays used and applied technology, ceramic floor tiles are available in large formats. The 50x50cm and 60x40cm formats stand out especially, giving a feeling of spaciousness. Today we can also find in the market 120x60 cm format. The Spanish sector is a pioneer in the production of these formats within the world industry.

- Floor tiles demand extremely high technical qualities. At the present time their use in public areas is becoming more and more popular due to the qualities of the product. More technical collections, suitable for high traffic areas are appearing with high mechanical resistance, minimum water absorption levels, slip resistance and abrasion resistance. They are used in commercial centres, train stations, airports etc.

- Imitations of painted material, silks and embroidery effects are starting to emerge in floor tiles. Marble, rustic and stone effects continue to be popular.

- As in wall tiles, polished floor tiles are being produced to imitate exotic marble almost perfectly. A glaze is applied to the biscuit base, which is then polished creating a shiny appearance. The four sides of the pieces then undergo a hydraulic process thus creating a perfect finished product.

- Modular systems are starting to be used in floor tiles. Creative designs for different surroundings can be achieved with very few pieces. Rosettes and borders are presented on mesh to ease fixing.

- Natural textures, which create a grain, are being used for floor tiles in high traffic areas, as they are usually slip resistant. They have a rough and natural appearance.

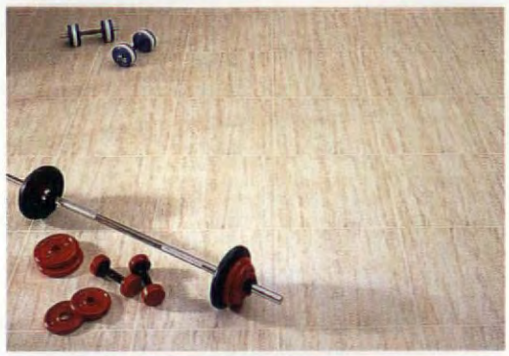
- Hydraulic cement can be imitated achieving the same designs and colours.

- The surface of porcelain earthenware floor tiles, a product which is noted for its resistance and limited water absorption, is glazed to achieve bright and glossy effects.

- Natural products such as wood, stone etc. continue to be imitated. Tiles are decorated with fossils, sea creatures, heraldic emblems. Warm colours, natural and time-worn white are those which stand out most.

- Both floor and wall tiles are designed to co-ordinate and produce effects and surroundings to suit the needs of the individual customer.

Gayafores -
Calzada series



Azulev S.A. -
Sahara series

Residential construction. Floor tiles

Ceramic tiles have always been, to a greater or lesser degree, an active component of the architecture of single-family homes.

On occasion, tiles have been used in skirtings, benches and ornamental elements of gardens. At other times, the role of tiles has been reduced to that of exterior pavers, generally using unglazed rustic tiles on terraces.

This panorama has been enriched by the availability of glazed and unglazed gressified tiles with many practical characteristics. For instance, these tiles are resistant to stains caused by efflorescence due to moisture, and to disintegration due to frost damage. In rainy areas or in spaces where there is potential presence of water, slip resistance must be taken into account and in areas that are exposed to low temperatures, it is fundamental to assure resistance to frost.

Novogres S.A. -
Piedra series

Natucer, SA - Project: El Dorado Boulevard (Miami, USA) Domus Avar series

Incea -
Stone series

CERAMIC TILES FROM SPAIN

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North America: Spanish Commercial Office (USA) • Tel: +305 446 4387 • Fax: +305 446 2602 • Email: buzon.oficial@miami.ofcomes.mxc.es

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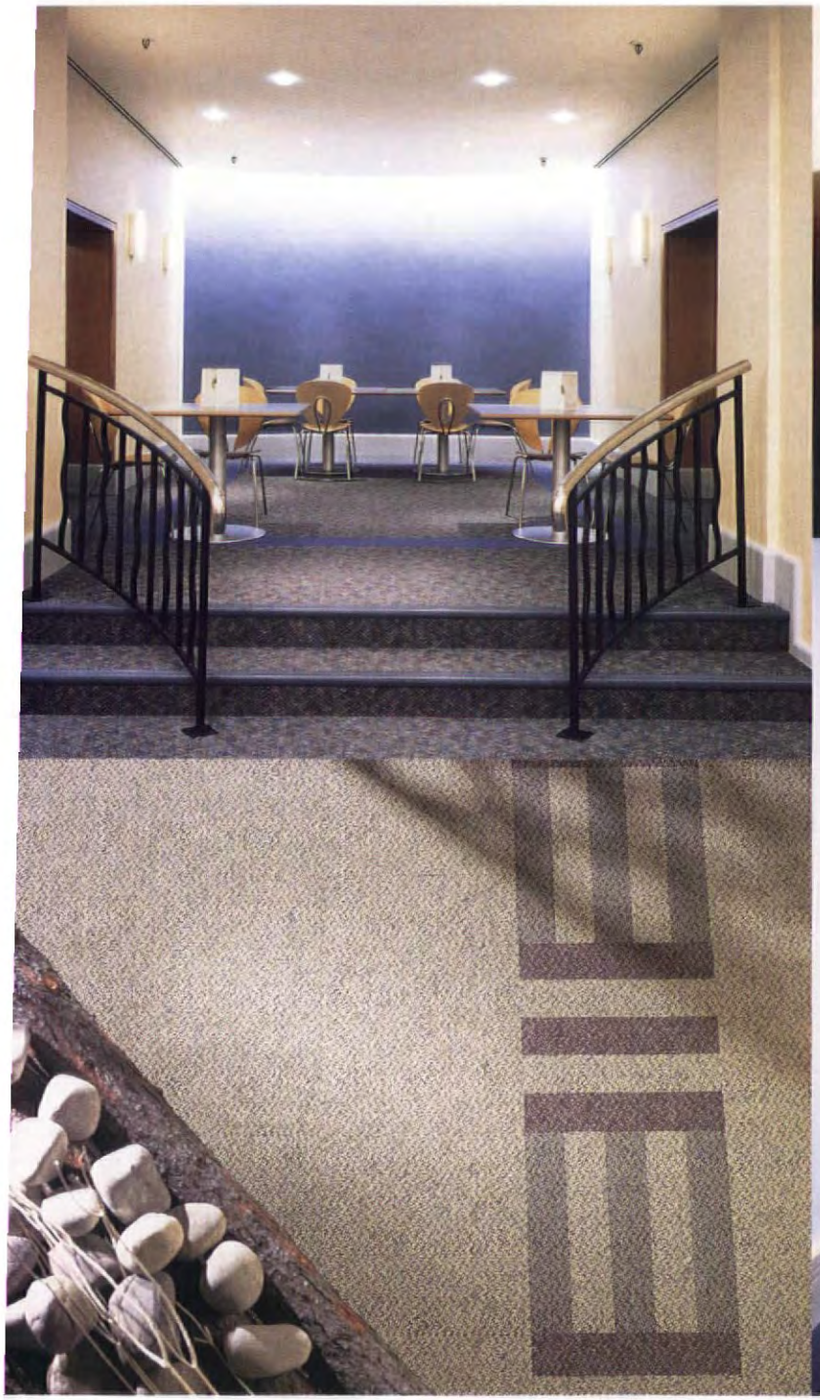

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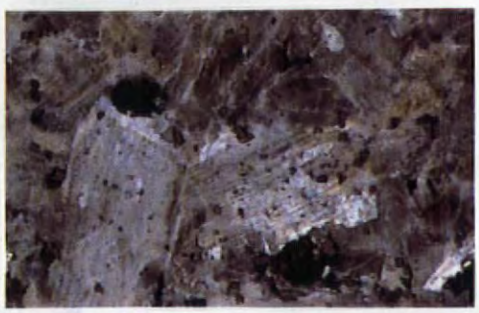

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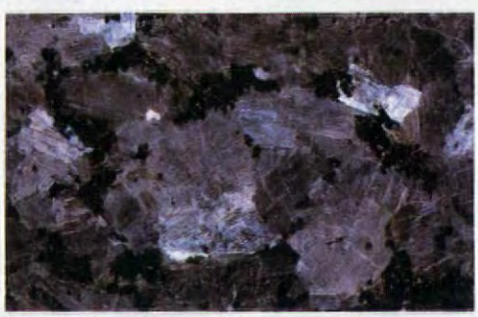

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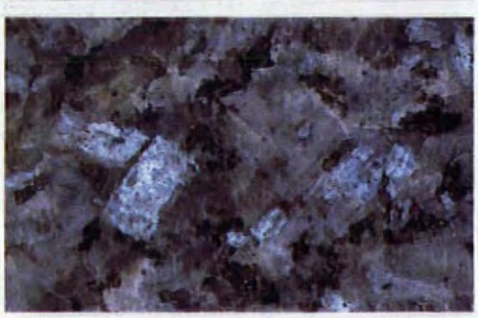

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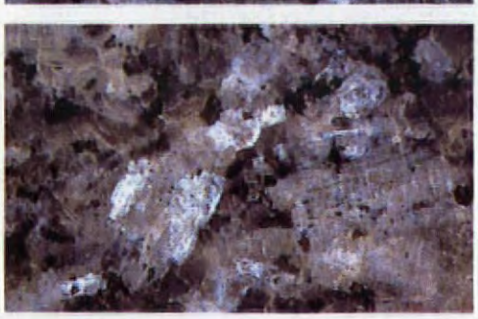

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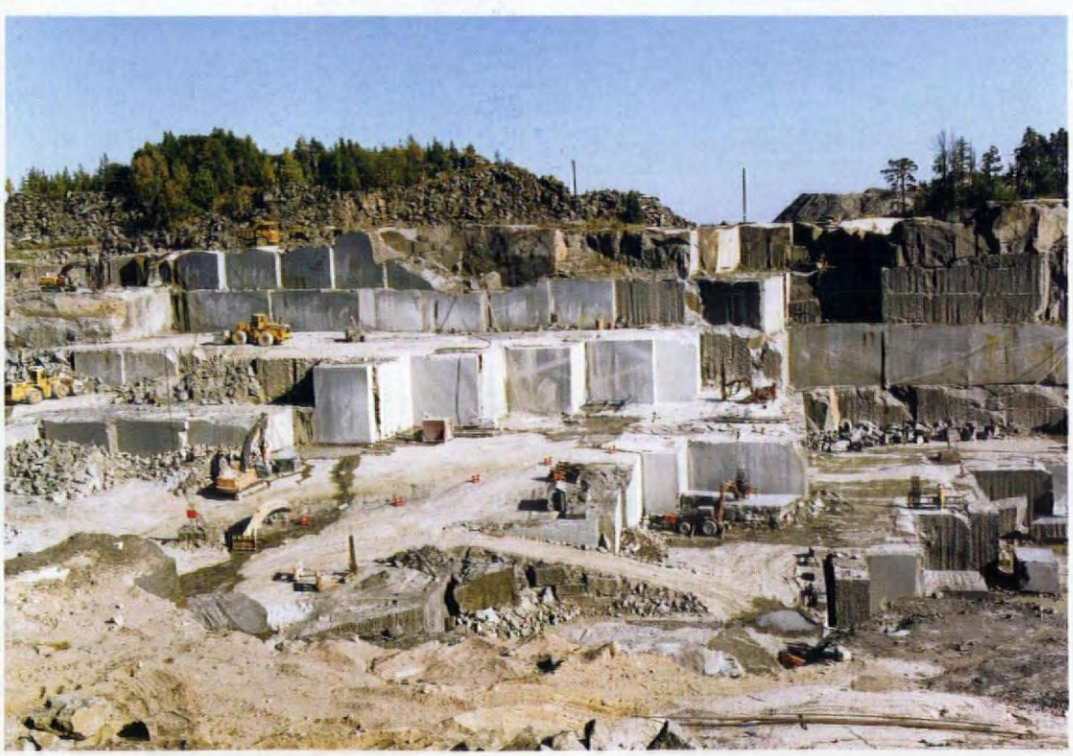
One Liberty Place Architect: **Murphy/Jahn** Material used: **Royal Blue TFM**

1. Emerald Pearl; 2. Blue Pearl Fjord- FJ; 3. Marina Pearl MP; 4. Blue Pearl LL; 5. Royal Blue TFV



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RIBA BRIEFING

Reviewing the new CD

A user group has been formed to compare notes on Product Selector *Plus* and the quality of information on various databases. Members are also encouraged to let the Institute know what it's getting right — and getting wrong. A feedback letter is accessible on the CD's home page; members can also write to: *RIBA Information Services at 1-3 Dufferin St, London EC1Y 8NA.*

Complaints so far have come mainly from members who feel that the RIBA is concentrating too much on IT-based innovation for practices, and from practices with Apple Mac systems. While most of the material on RIBADisc is accessible to Mac users, technical difficulties mean that the *Periodicals Index* and *Loan Library Catalogue* cannot be accessed by non-PC users.

John Edwards, head of communications services, said the development of RIBADisc had posed some tough questions: 'We had to ask ourselves whether we should build on existing PC-based technology to develop the CD cost-effectively, or spend £50,000 to adapt it for use by Apple Mac offices. As things stand, Mac users can access 480 Mb of the 650 Mb on RIBADisc; meanwhile, we are moving as quickly as possible to get Periodicals and the Catalogue up on the new riba.net website'.

RIBA AGM

The report of the Council of the RIBA will be presented for consideration at the annual general meeting, which will be held at 12.45 p.m. on Wednesday, 14th July, 1999 at 66 Portland Place, London, W1N 4AD.

RIBADisc — a new spin

More product, more archive material on latest version of practice CD

Architects can build their own practice library extension in moments with the new version of RIBADisc. The CD Rom contains updated information on a wide range of practical matters, and this year for the first time it's being distributed free to every registered practice.

RIBADisc is a unique collection of operational archives for the working architect. Whether you're looking for the right product, checking legal precedents for a land ownership dispute, wondering where to get advice on dealing with bats during renovation work, looking for an approved CPD provider or putting together a reading list to research a specific topic, you can find it on RIBADisc.

The latest version of RIBADisc contains:

RIBA Practice archive: all Practice pages from the RIBA Journal from 1984 onwards have now been collected. The archive is easy to navigate via a search engine, which will call up all relevant articles on a given subject.

Product Selector and Advisory Organisations: revised databases contain fully indexed information on around 7,000 manufacturers and suppliers, details of 1,100 advisory organisations, and 360 Agrement Certificates. Updated in line with the 1999 edition of The Green Book, databases include more technical data and NBS Plus,

Periodicals Index: An expanded archive of over 16,000 abstracts and references compiled by the British Architectural Library is searchable by key words.

CPD Providers: The complete list of all approved CPD service providers, and free CPD materials available, along with the latest RIBA guidance for members and practices.

Catalogues: Hugely expanded and updated catalogues from RIBA Bookshops and RIBA Publications, as well as the full Loan Library Catalogue.

Innovations for *RIBADisc 99* include: direct connections to the websites of manufacturers and organisations from databases... direct Internet connections to RIBA and RIBA Companies... company searches by words or strings... entire company entries copied and pasted in seconds. There are now full texts for over 350 BBA Certificates, and synopses leading to full texts for all BRECSU documents (including new items on care homes, office refurbishment, selection of windows, and passive solar estate layout). The What's New section includes a demo of CAFGEN version 1.2.

It's a cad, cad, cad world

Around 90% of job vacancies for architects now specify that candidates must be CAD-proficient; applicants with CAD skills almost invariably command figures at the upper end of salary ranges, according to the latest market overview from RIBA Appointments Bureau. Minicad, Autocad and Microstation are the most sought-after formats (currently in that order).

Those looking to join an architectural practice with a high reputation may have to take some of the prestige in lieu of salary, says bureau manager Tim Pritchard: 'Larger or more commercial practices will generally pay higher figures. Conversely smaller or "design name" firms will generally pay lower'.

The bureau deals with vacancies for all experienced members of the architectural profession (not just RIBA Members), although, says Pritchard, worldwide economic uncertainties have severely reduced the number of jobs we are handling abroad'.

Recruitment patterns this year in the UK suggest that economic nervousness may have subsided a little: 'Early in the year the market looked somewhat shaky again; there was talk of looming recession, and the element of uncertainty in many employers' minds meant not only that more strategic and senior hires were put on hold, we also began to see a redundancies. By mid-April the market had become hopeful but patchy, with optimism largely in the South East; dents to economic confidence can hit the market almost overnight'.

The Bureau provides some salary example guides on its RIBANet Conference site as well as its new website, www.riba-appointments.com.

What's on RIBANet...

In the Architectural Practice conference members have been sharing solutions to a contemporary problem - and this time it's not the Millennium Bug. With clients increasingly asking for drawings to be e-mailed, how can architects exploit new technology without themselves being exploited?

One way is to 'lock' drawings, so they can be seen but not copied. Members offer tips on using bitmap images and Acrobat readers. More routine advice is available in Practice Management, in response to the question 'how much is a graduate with no office experience worth?' A practice in the London area is paying 'a flat £600 for the first month, rising to the equivalent of £9K for the second month, £10K thereafter, for as long as it works out'.

In Planning & Urban Design, members discuss strategies for urban renewal, including the scope for converting large city houses into flats and the constraints of permitted development rights. There is discussion about rural conversions - specifically new uses for old chapels - in Conservation.

World of Architecture postings include news of a once-unbuildable, now-unaffordable Lloyd Wright bridge; the debate continues on how fair a deal RIBA overseas members get. In Architectural Markets, updates on new brownfield housing initiatives, community schools and walk-in health centres.

Strange messages from the *alt.architecture* newsgroup appear in Ask Ian Martin, and members' music recommendations range from trippy to drippy in Everything Else.

RIBANet is free to members - 2,100 are now online - fax +44 (0)171 307 3786 e-mail RIBANet@inst.riba.org

Members have their say

Service quality improves, but tackling shortcomings is the priority

Remote, unresponsive, rude and expensive. This is the RIBA at its worst, according to the latest annual survey of members.

A list of services targeted for improvement has been identified by the poll, which encouraged all members to offer criticisms of the way the Institute works.

Although more than two-thirds of all RIBA services were rated 'good' by members, decision makers at the Institute should now focus on areas of concern, says a report on the findings by the membership development department. Member complaints include:

- The RIBA is out of touch with the needs of members outside London; overseas members in particular feel there is not enough contact.
- Inaccessibility: members are frustrated by 'voice mail, multiple transfers and treatment by staff'.
- Membership is too expensive: there is widespread objection to paying additional fees for the Members Information Line and the directory of practices.
- Overseas subscription rates are too high.
- The RIBA is not doing enough to promote understanding of architects and architecture, and must do more 'to educate the public and generate increased awareness of the value of architecture'.

A total of 2,975 members took part in the annual Service Usage and Ratings survey, which showed that despite criticisms members are making more use of the Institute. More than 20% of respondents used 11 services; in the previous year's survey a similar percentage had used 7 services. Increased use was most significant for the RIBANet electronic conference service (up by 58%) and CPD courses and events (up by 25%). RIBA Bookshops, Product Selector and the RIBA directory of practices were among the most widely used services.

There are signs of steady improvement: 67% of all the ratings for services were 'good', a year-on-year increase of two percentage points. And a total of 22 services received good ratings higher than 60%. Head of membership development Jennifer Parker said: 'The overall picture is encouraging, however it would be a mistake simply to congratulate ourselves on our strengths. The survey plays a key role in identifying weaknesses as experienced by members and in setting strategies to address these'.

Designing futures

A major initiative to demonstrate the economic benefits of architectural design quality has been launched by RIBA's Future Studies committee.

The aim is to tackle the widespread belief in government and industry that good building design is a cost rather than a benefit to society. Committee chairman John Lyall said the project had been shaped by a stimulating workshop held at Portland Place, to which experts from non-architectural fields had been invited.

A pamphlet is to be produced by social researcher Ken Warpole, for publication in October, setting out the practical economic value of design in applications such as housing, brownfield developments and urban regeneration.

Several examples of how design can add value were discussed, including one from incoming RIBA President Marco Goldschmied. He recalled the pressure for the Pompidou Centre's famous external escalators to be kept within the building. The design team prevailed — the rest is regeneration history.

The workshop followed a showcase evening to preview the Future Studies programme. Speakers included Warpole and John Thackera of the Netherlands Design Institute, who described previous successful initiatives.

info@work

A weekly e-mail bulletin for RIBA members has been launched by the Practice department. The initiative has been welcomed by practices, who now receive regular updates on statutory, regulatory, legal and technical news.

Edited by journalist Neal Morris, the bulletin aims to include as much hard information on topical issues as possible. It is being mailed as an HTML document, which allows most practices with Internet access to click on hypertext links for a direct connection to source material.

To subscribe send your name, RIBA membership number and e-mail address to amanda.epstein@inst.riba.org.

Polemic

Architecture versus simplicity?

"Simplicity", the great modern architect Mies van der Rohe once said, "is not simple". This is an observation that some people find profound – on a par with such gems as "Keep it simple Stupid" or "If it ain't broke don't fix it" – but others dismiss, on grounds that the only statement about simplicity in architecture worth making nowadays is that we need more of it, and fast.

One of the greatest living authorities on simplicity is a religious writer named Richard Foster. His book on the subject – *Freedom of Simplicity* – has sold over a million copies. For Foster (contra Mies), simplicity is very simple indeed, even though he sees it as the key to all understanding. In his opinion the only thing worth knowing about complicated things is that they cannot be understood. Astrophysics, the media, city planning, architectural theory, are all complicated things, hunting grounds for misinformation, confusion and deception. Simplicity is the opposite. It clears things up. Foster advises that a simple declaration of ignorance is the only way to learn about any subject. He also urges his readers to divest themselves of all unnecessary possessions, to "de-accumulate", as he puts it, and thus make their lives altogether more comprehensible.

This digression on the subject of simplicity might seem remote from the problems faced by the tumultuous cities of the world, but it is not. Simplicity versus complexity in urban planning and design is now a hot issue. Not only across the European Community, where extravagance and muddle in the provision of new administrative buildings has triggered demands for drastic economies, but in the self-remodelling cities of South-East Asia where business is at last responding to growth hormones after two years of dire recession. In both these very different economic zones architects are finding themselves targeted as the authors of complexity and enemies of simplicity. Indeed some of them even speak of a conspiracy of politicians, bureaucrats, developers and industrialists, determined to cut them down to size.

Easier said than done we might think, but is it? Architects are victims of their numbers – there are over one million worldwide, all in competition with one another – and victims of their own independence. Shorten their training and their numbers could multiply uncontrollably. Degrade their status by forcing them to take payments from contractors instead of thinking up their own fees, and the result could be architects in name only, professionals who are no more than subcontractors to a "cultureless" design and build industry.

Some time ago I talked about this to the great Italian architect Renzo Piano, a man who understands simplicity as well as "de-accumulation".

"If you lose personal control of your life and your work," he said, "you progressively lose contact with reality". This is why Piano keeps a tight rein on the activities of his office. He believes fervidly in public participation, advanced technology, the 19th century engineering tradition, design as a tool to solve social and economic problems, traditional town planning and simplicity, all at the same time. What he doesn't believe in is a global conspiracy against architects.

The problem with the defence of the "cultural" role of the architect, wherein his or her life is a great creative mystery, almost impossible to understand, is that it is complicated, confusing, undemonstrable and simply not true. If the practice of architecture really were so demanding that it knocked brain surgery and biotechnology into a cocked hat, we would never have been able to train three times as many architects as the world really needs in the first place.

Martin Pawley

"If the practice of architecture were really so demanding that it knocked brain surgery into a cocked hat, we would never have been able to train three times as many architects as the world really needs in the first place."

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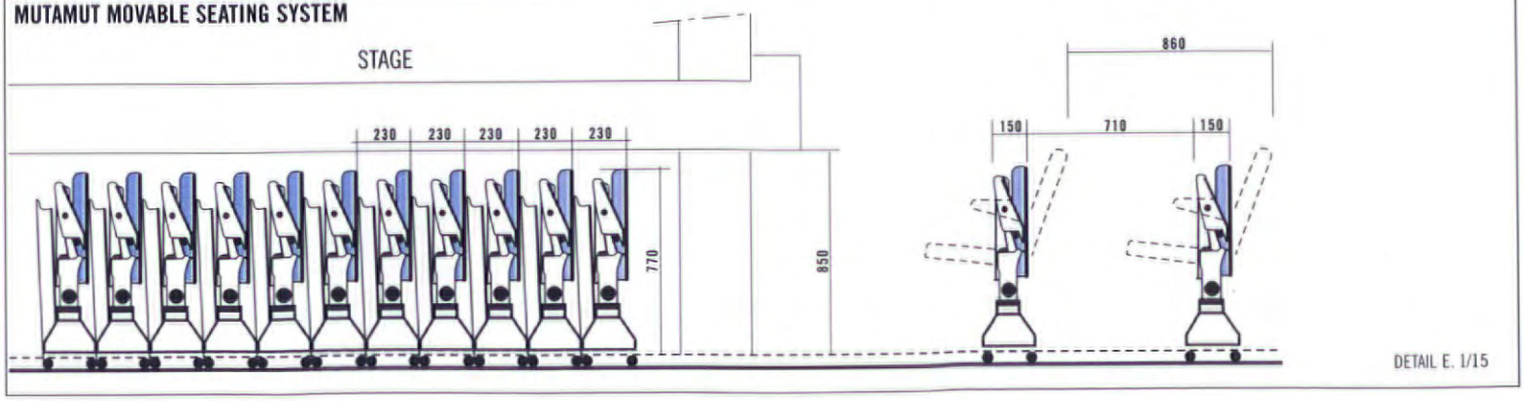

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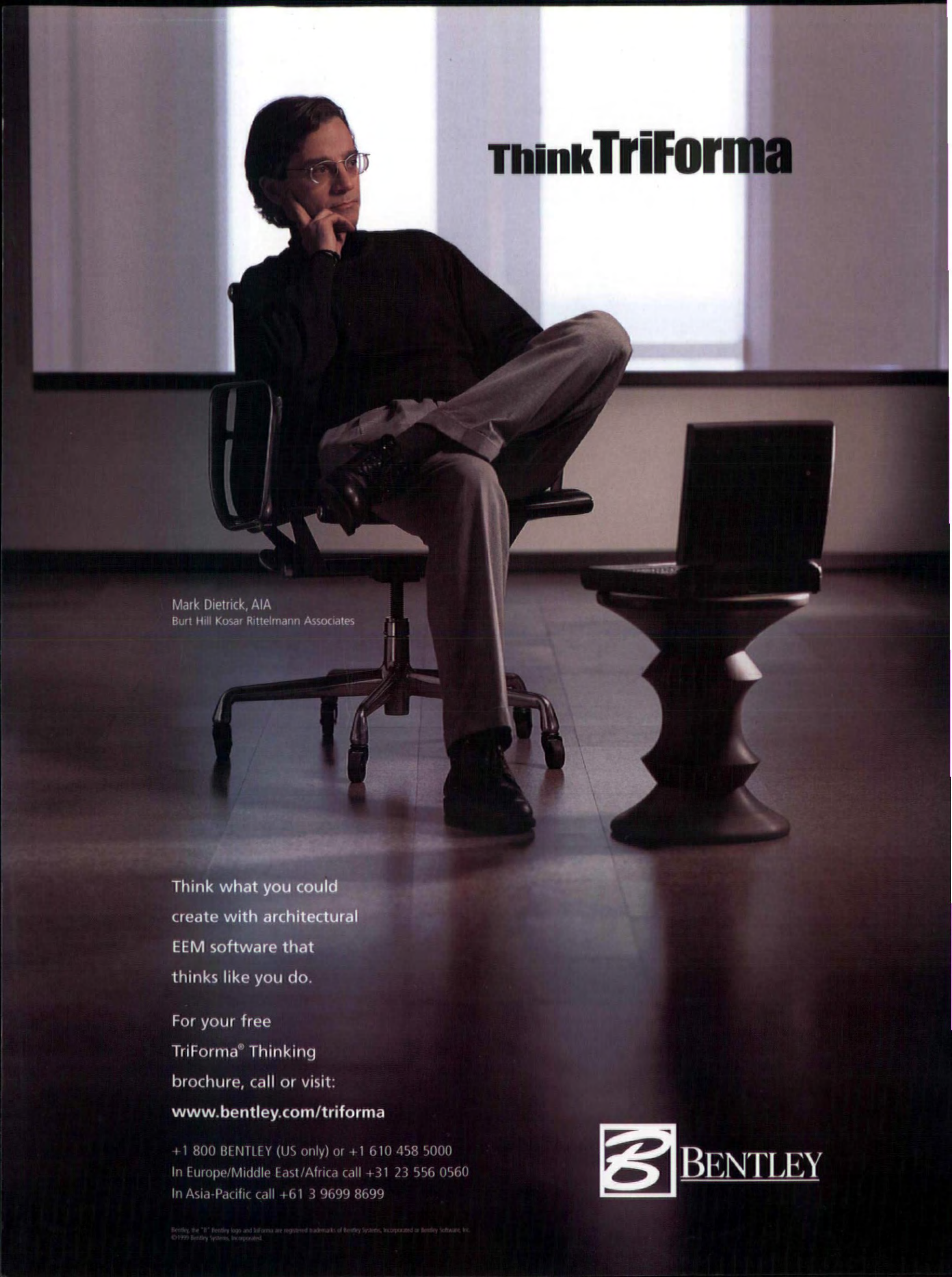

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