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Martin Charles

Duisburg in detail

Dennis Gilbert

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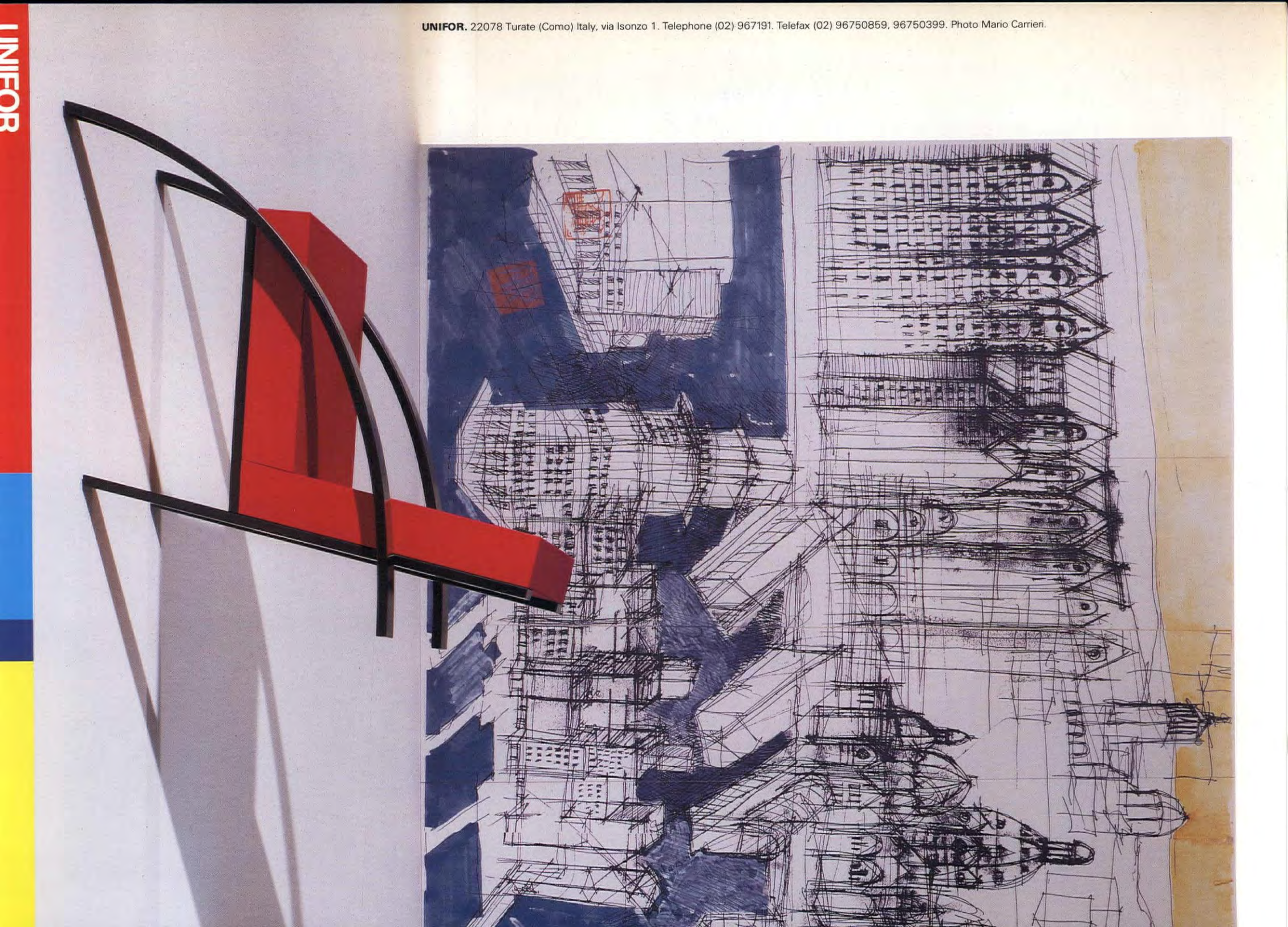

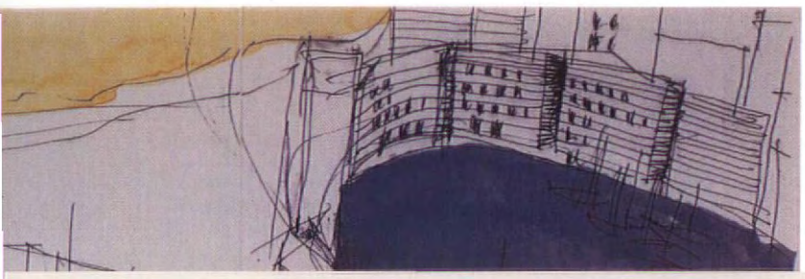

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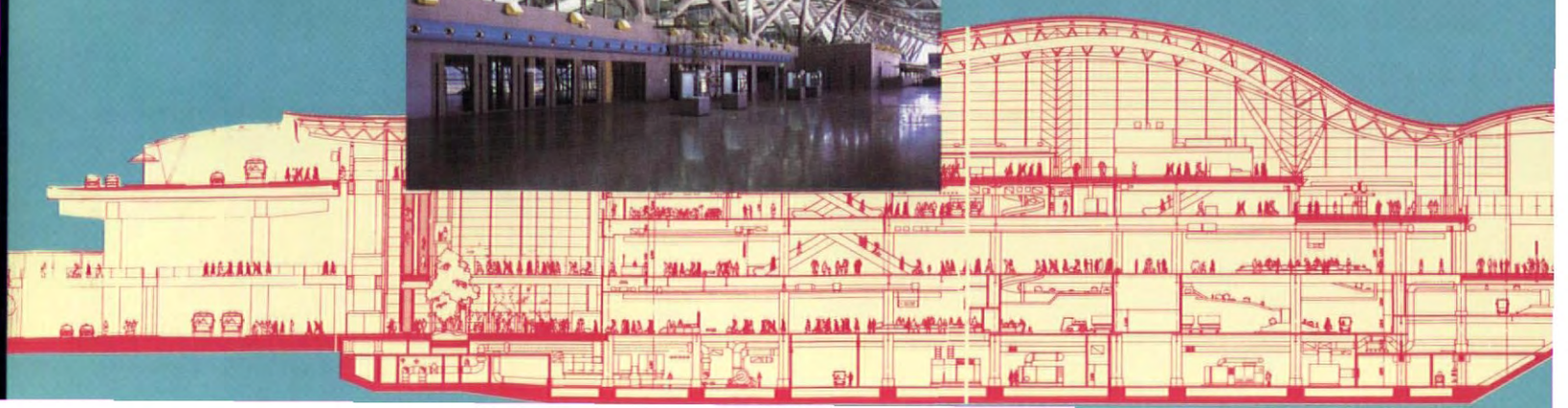

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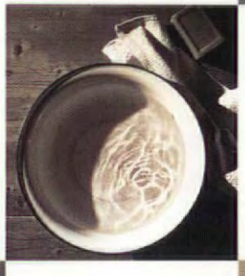

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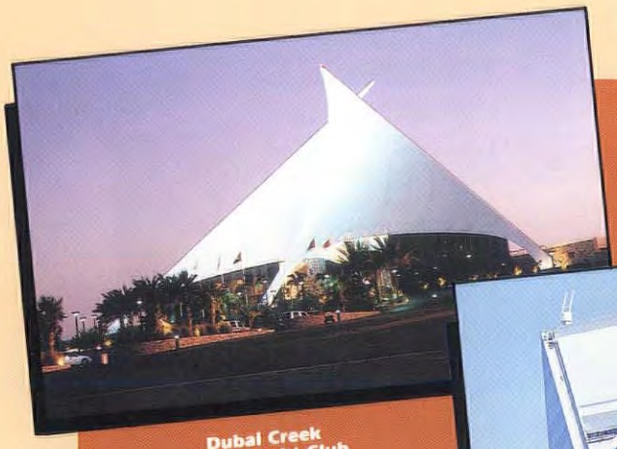

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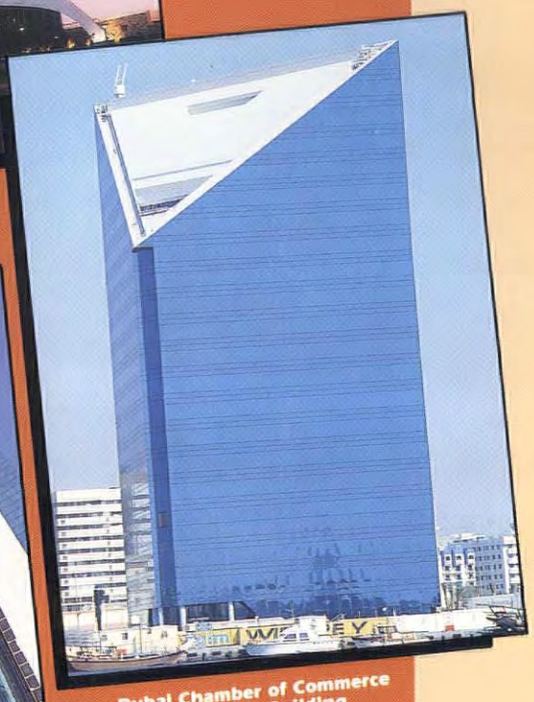

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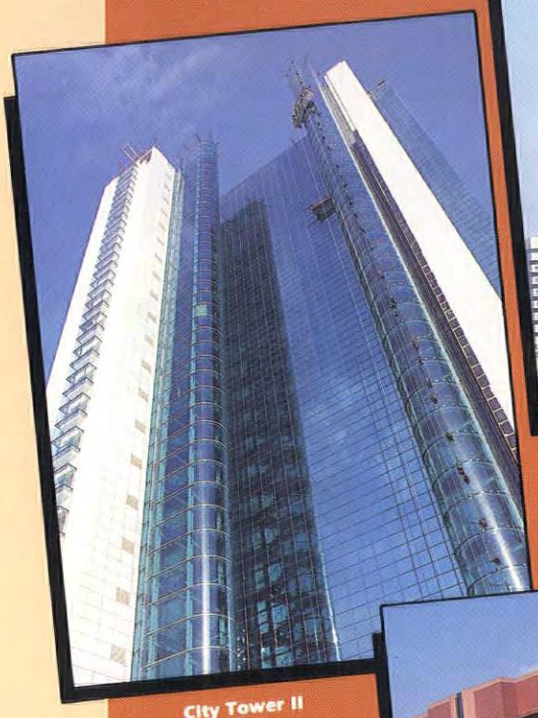

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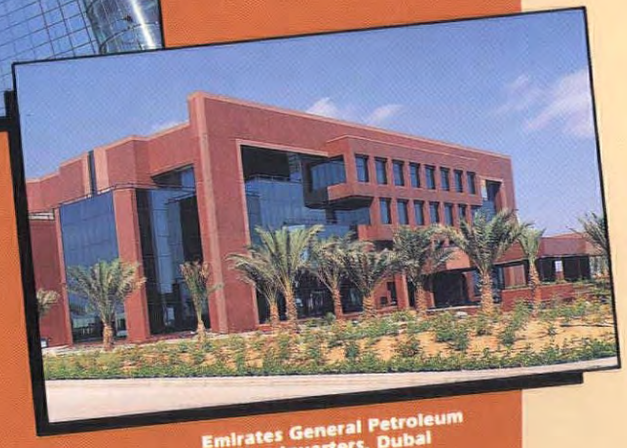

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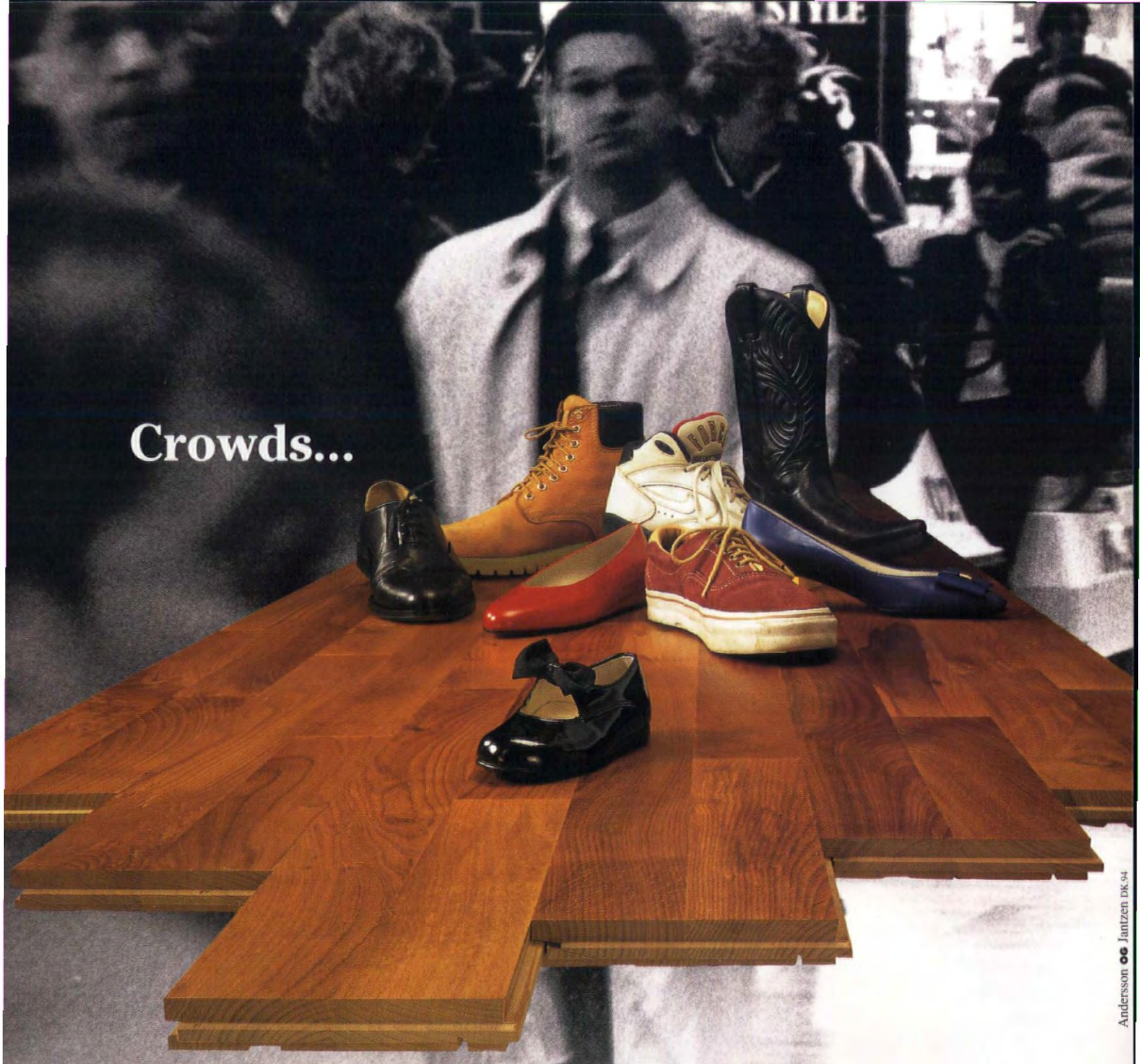

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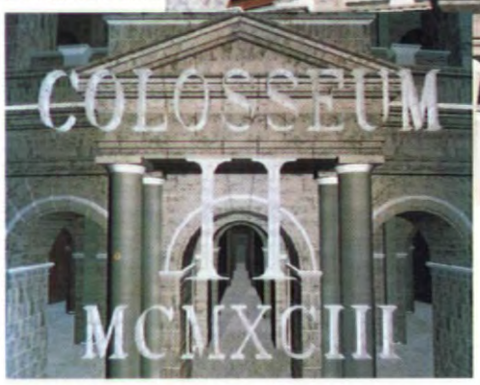

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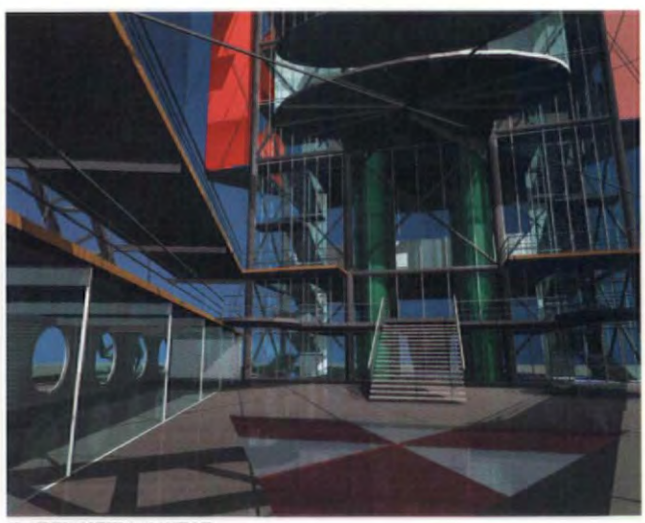

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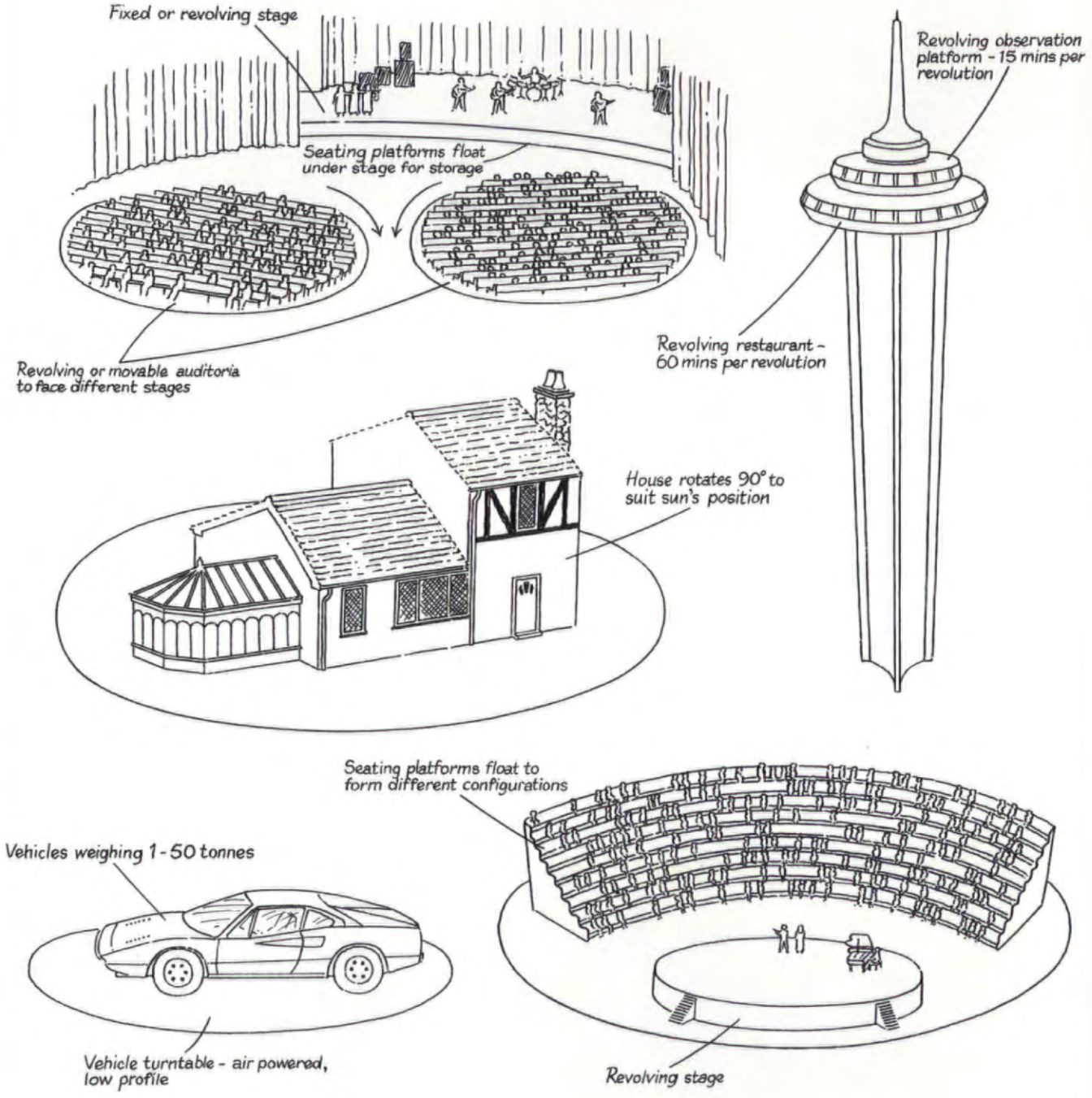

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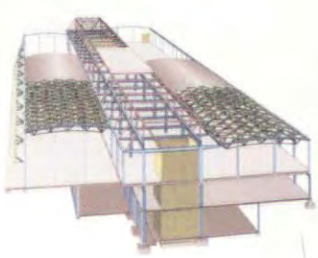

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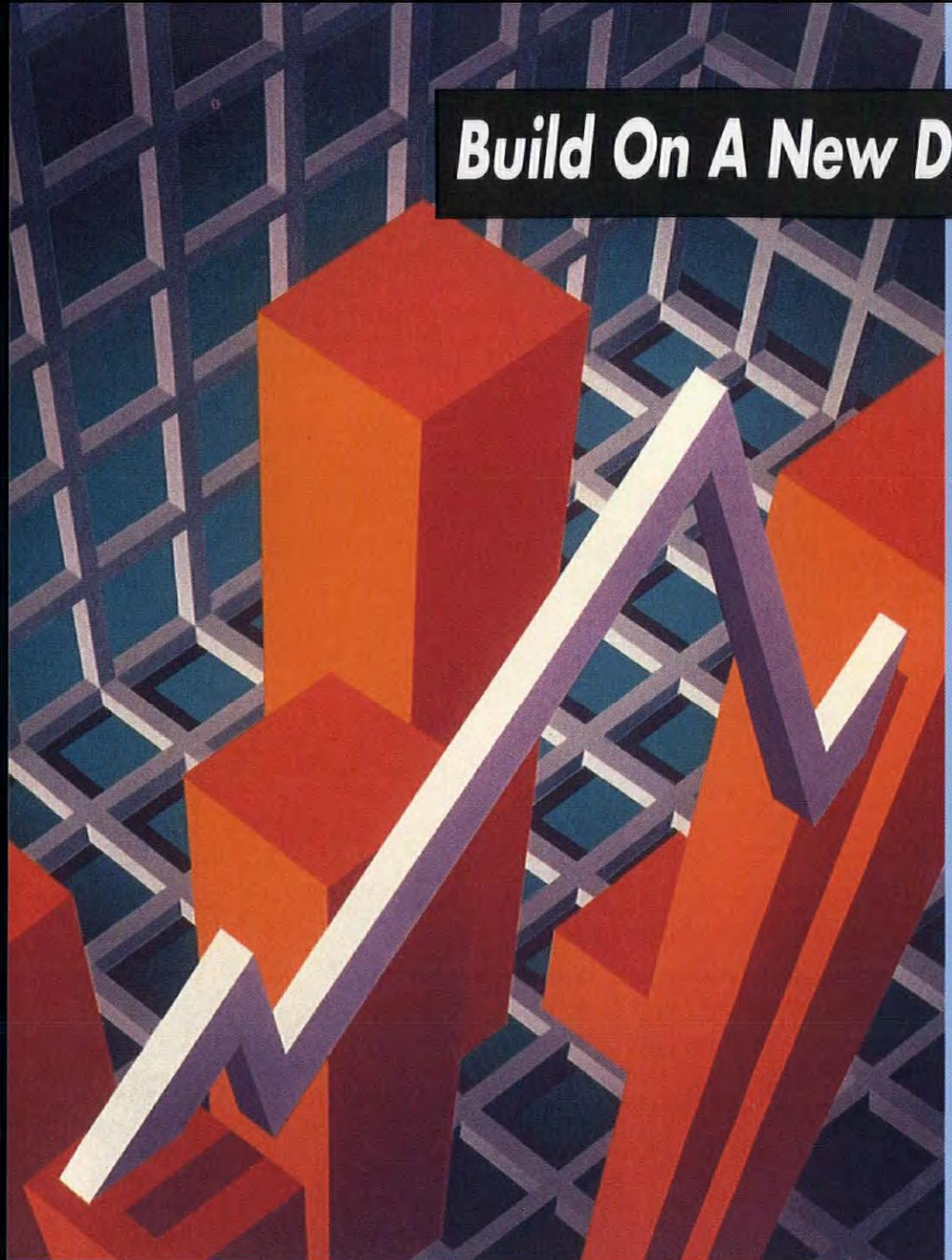

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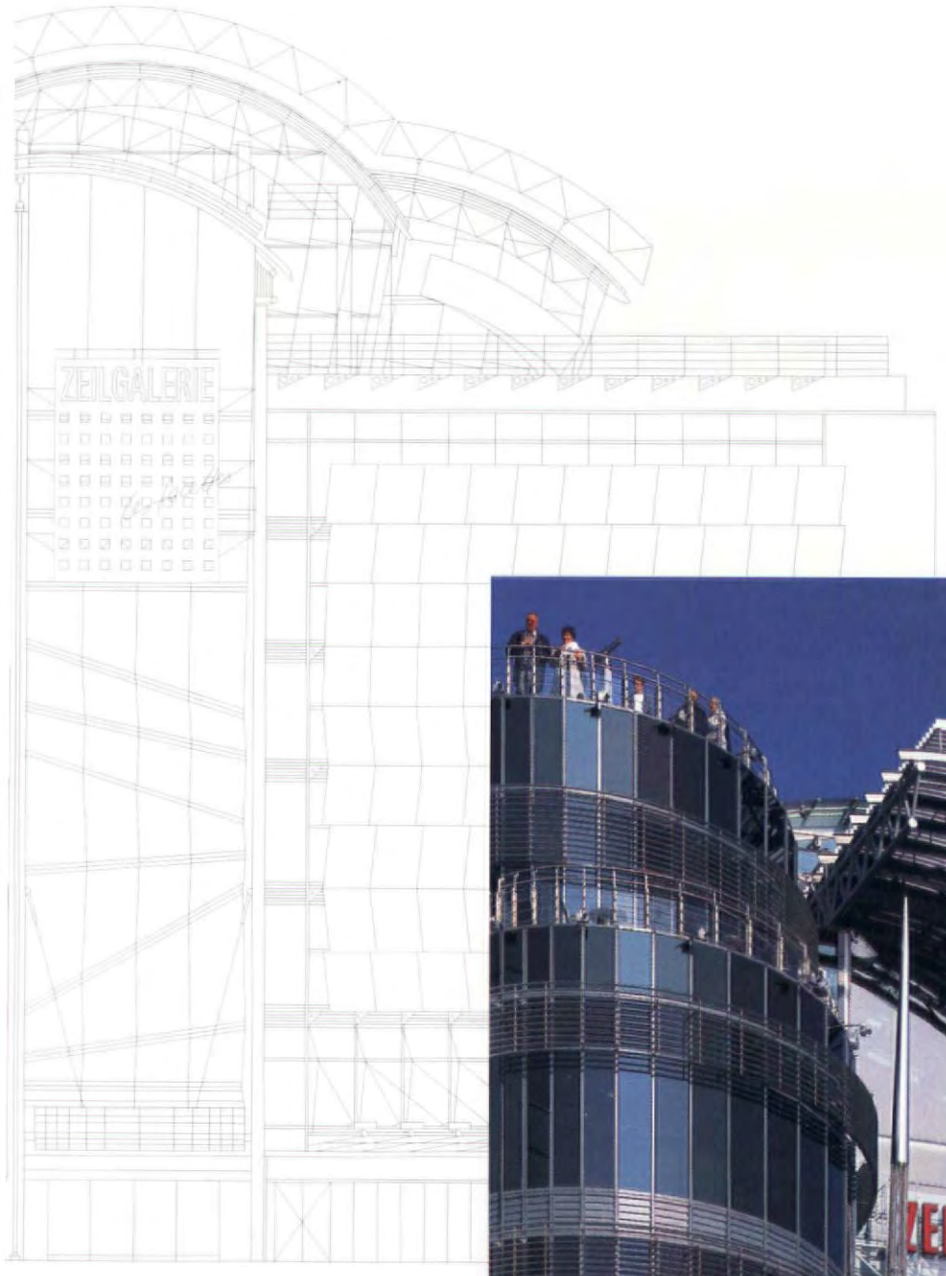
Constructions

Actually facade means nothing more than face. And a face can show different expressions. The one at the Zeil-galerie in Frankfurt changes its appearance according to the hour of the day and the season of the year. A thin skin of perforated metal sheets, with the aid of a computer, reacts to the changing surroundings. When dusk is falling and all during the night the front of the building reveals a veritable spectacle of lights and colours. The facade becomes an interactive medium.



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architekturbild**db**

In the same year Paul Wolff took the unaffectedly vivid photo of the leisure paradise in "Zickzackhausen" (Zigzag-village) – as Ernst May's newly completed estate in Frankfurt Niederrad was popularly called (picture above). Photo and quotation complement each other – as though Bruno Taut had written for Paul Wolff, or Paul Wolff photographed for Bruno Taut.

One could hardly illustrate better what is so often missing in architectural photography: the direct and – although self-evident – perceptible connection with people. For we build for human beings who will use the spaces and fill them with life.

This is the theme for architekturbild 1995, the European architectural photography prize sponsored by db.

The Editor, db

"It is immaterial how spaces appear without people; what's important is how people appear in them."

Bruno Taut, 1927

architekturbild (architectural picture) is the title of the European Architectural Photography Prize 1995

Co-operating as European partners are the following journals:
Photo Technik International *(D);* Arch & life *(B);* L'Architecture d'Aujourdhui *(F);* architecture in greece *(GR);* Ta Nea Tis Technis *(GR);* Tefchos *(I);* Professional Photographer *(GB);* domus *(I);* progresso fotografico *(I);* Zoom *(I);* Byggekunst *(N);* architektur aktuell *(A);* Arkitektur *(S);* Fotografi *(S);* A & V Arquitectura Viva *(E);* Fotóművészet *(H)*

architekturbild has for 1995 adopted the motto

People and Architecture

With the prize architekturbild 95 it is intended to include and continue the Tectonic Prize announced in 1990. The European Architectural Photography Prize architekturbild will be promoted – as previously with the Tectonic Prize – every two years.

The following prizes will be awarded:
A First Prize (12,000 DM) together with conferment of the title: "European Architectural Photographer of the Year 1995" and two highly commended awards (of 2500 DM each).

Prizewinning photographs and the 25 best placed competitors will be extensively covered in a special issue of db in June 1995.

Jury:
Wilfried Dechau, Dipl.-Ing., db, Editor-in-Chief
Dennis Gilbert, Photographer, London, Prizewinner of the Tectonic Prize, 1992
Hans Hansen, BFF, Photographer, Hamburg
Hans-Eberhard Hess, DGPh, Editor-in-Chief of the Journal Photo Technik International
Prof. Heinrich Klotz, D. Phil., Art and Media-Technology Centre, Karlsruhe

Last date of entry is 1st March 1995
Adjudication in March 1995
Prize award in June 1995

Application forms can be obtained from db, architekturbild, Postfach 10 60 12, D-70049 Stuttgart
Fax: (+49-711) 26 31-104

WICONA PRESENT AT BAU 95 AND SWISSBAU

One the occasion of the Bau 95, WICONA Bausysteme GmbH has conceived a new exhibition stand of two levels. The stand itself is a construction made of different profile series and offers in that way a clear presentation of the new product range and its use to the visitors. A wall made out of facade elements, representation of a project carried out in Berlin (KU-Damm-Karree) will be part of the exhibition stand.

The centre of it will serve to the presentation and training of the new WICTOP 3D-software, which will be the focal point of the BAU 95. This "home made" software is a personal creation of WICONA, totally independent of other CAD softwares. It is possible, thanks to WICTOP 3D to realise all kinds of construction systems proposed by WICONA, should it be windows, doors, facades and roofs, conservatories, pyramids, vaults or cupolas. Wicona is in charge of actualising the data.

Concerning the work planning and manufacturing, calculation lists, glazing and profile lists as well as fittings and accessories are made out with WICTOP 3D. Furthermore this software enables a cutting optimisation presenting all the data of angles and this for 3D-sections, notching etc. As for saws, WICTOP 3D may be directly controlled by WICTOP 3D. The edition of construction sections in DXF-size guarantees the reception of data in other CAD softwares.

The technical subject on security is the second crucial point. WICLINE 60 and WICSTYLE 60 burglar-proof windows and doors are two special series with reinforced profiles, which meet the growing requirements of the tests. The reinforcements are mainly on the front wall of the frame and on the sashes as well as on the inner transverse walls while the reinforcements on the doors are visible on the external walls. Moreover, WICLINE and WICSTYLE 60- windows and doors are now available as bullet-resistant. The method which consists in adding bullet-resistant profiles on the present series remains the same. The whole system for bullet-resistant elements will be combinable in the future.

From the beginning of 1995, a new regulation on thermic protection will require higher values. Thanks to the WICLINE 85 series, WICONA has found the answer to the Frame Material group 1. In order to increase thermal insulation, traditional window profiles will be equipped with a thermal break of 40mm. The constructor puts foam pieces between the thermal breaks which reduces the harmful effects of convections and radiations. Unfavourable bearings on the compound glass edges of the thermic protection glass are decreased by means of bigger glazing gaskets.

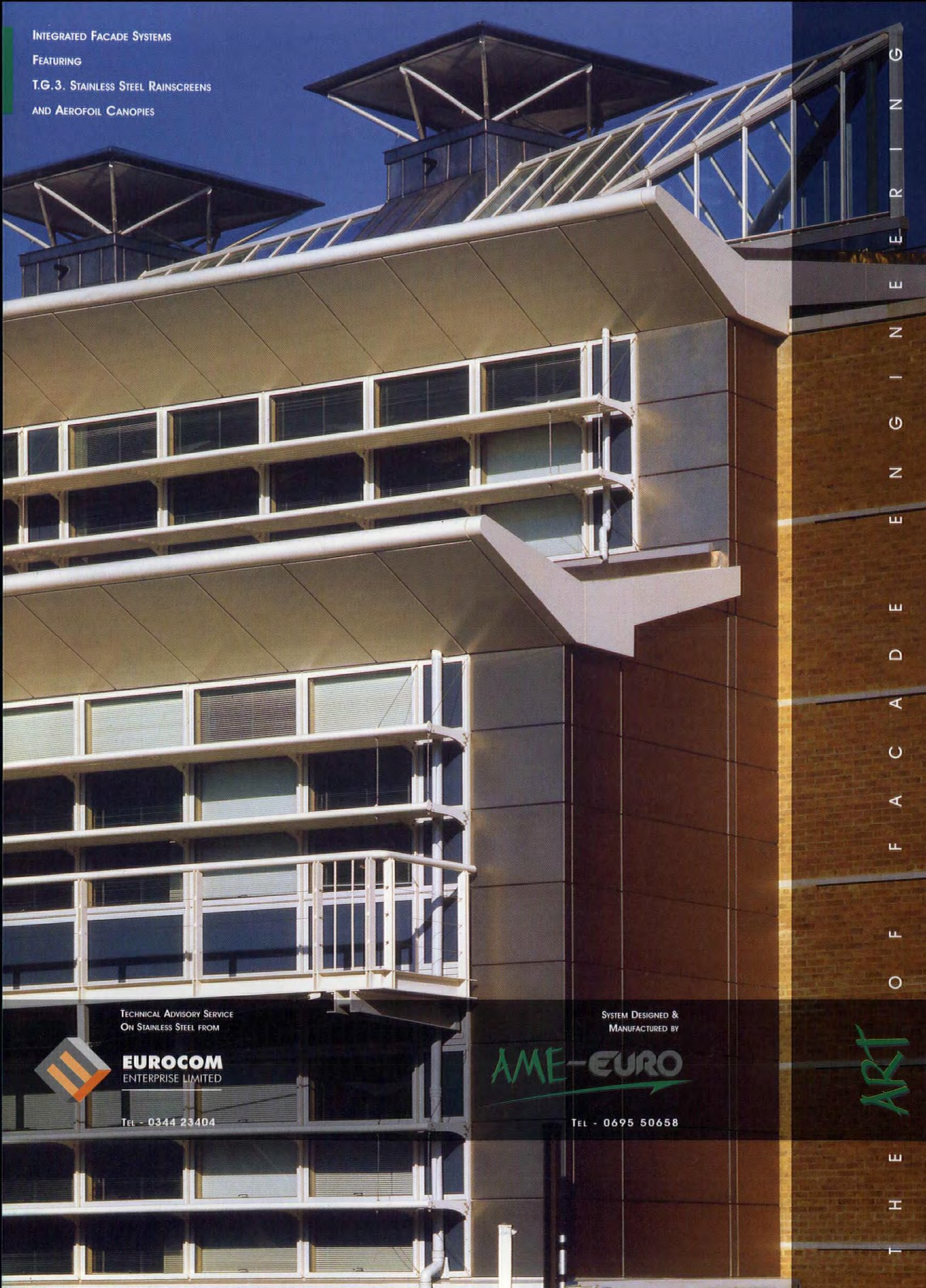
Besides, with WICLINE 125, WICONA uses a series of coupled windows which meet the requirements of thermal insulation. The double insulation area in the inner and external sashes are typical. A good thermal insulation for WICLINE 125 remains as well as a high sound insulation.

New to the programme! The windows and doors series WICLINE and WICSTYLE 70 replaces the L-70A windows and doors. With WICLINE 50N and WICSTYLE 50N, the traditional windows and doors series are adapted to the actual WICONA detail technic. The well known drawbacks such as incompatible fittings, high cost prices and restricted use have been suppressed. This is also valid for the WICLINE or WICSTYLE series 60N which is more robust. The particular added asset is a s follows: thermal insulated profiles of the WICLINE 60 series can be treated together with traditional window profiles. A repeated use of rarely requested profiles in both versions enables a stock reduction. The exhibition stand Hall 2, n° 233 will offer the appropriate background for the presentation of these numerous novelties.

But all these novelties will also be presented at the Swissbau, where this time WICONA will have an exhibition stand at Hall 300, n° F 51. □

This administration-building in Kerpen-Sindorf (below) was realised with the section series WICTEC 80 of WICONA, in which the window sashes can be integrated within the facade without being visible from the outside.

The Dolmen-Verlag in Saarbrücken, Germany (below right) can be recognised from far away by its blue shining, upside down constructed triangle.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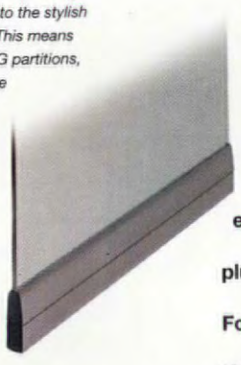

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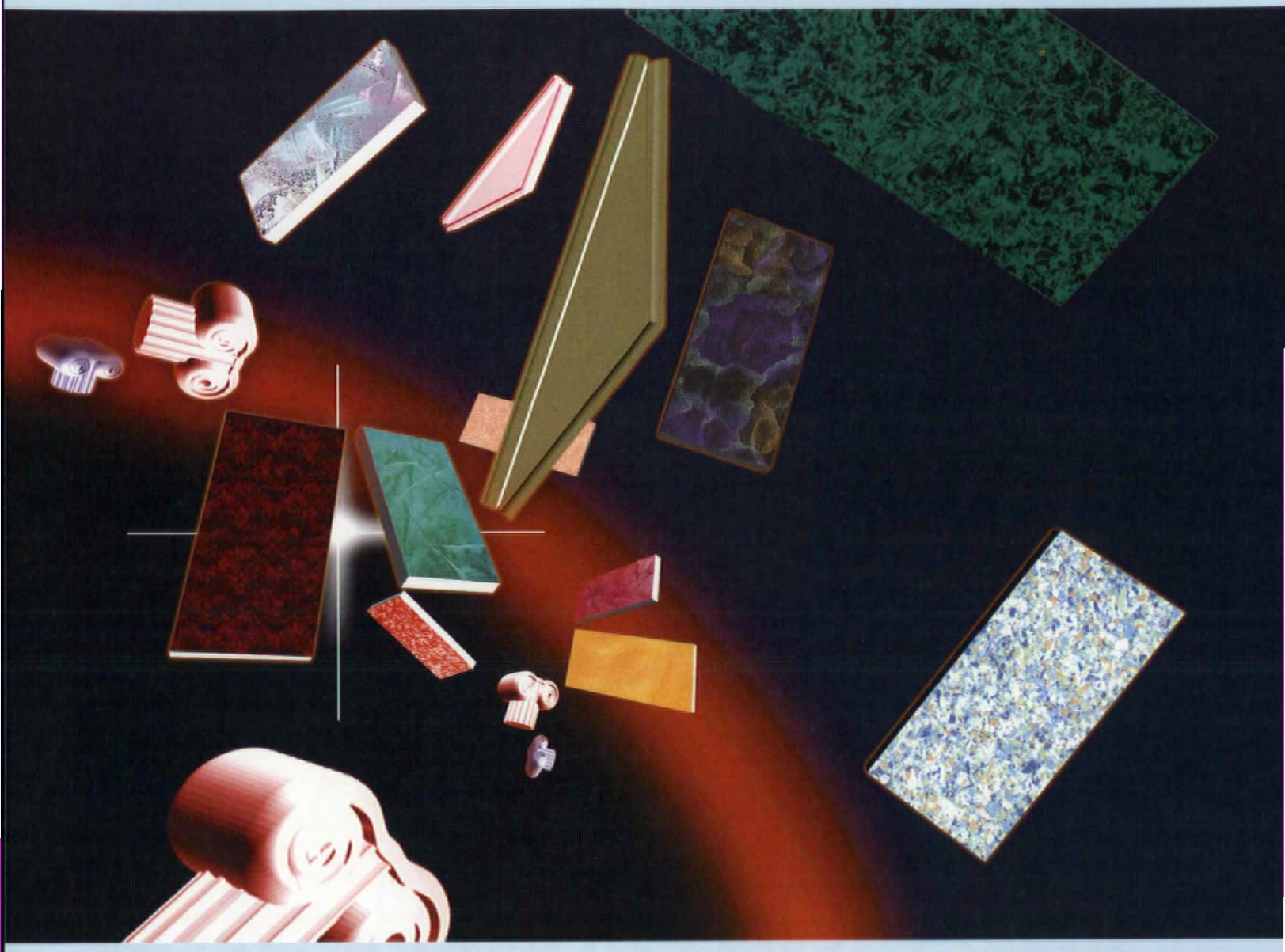

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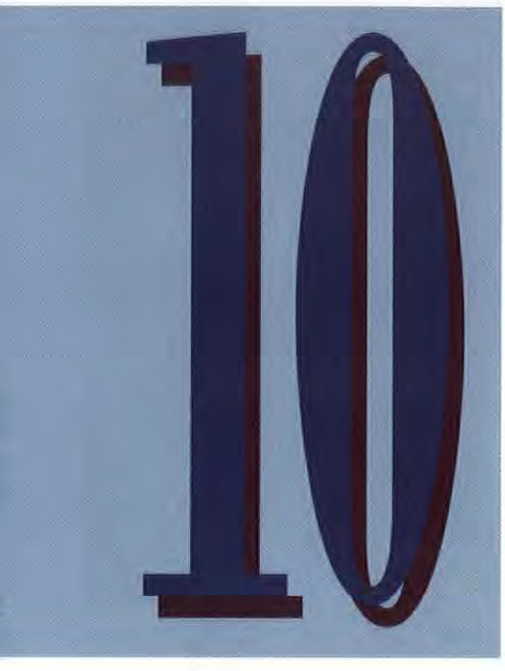


Say hello to ten times a year

World Architecture is about to make a great leap forward, the biggest since the launch of the magazine. From March 1995 *World Architecture* will appear ten times a year instead of six, with 100 editorial pages instead of 88. The heart of this new expansion lies in the profile section. When *World Architecture* was launched six years ago, Profile was one item among many. Within three years it had developed into an exhaustive 24 page bi-monthly survey of the life and work of a living architect. Now Profile has been expanded again, into a full-blown 40 page analysis that will focus, not only on celebrated architects, but on some of the largest and most powerful architectural practices in the world.

Profile has brought *World Architecture* readers 32 studies of such architects as Jean Nouvel, Kiyonori Kikutake, Oscar Niemeyer, Sir Norman Foster, Paul Rudolf, Arthur Erickson, Renzo Piano, Fumihiko Maki and Thomas Herzog. From now on these famous names will be joined by a new class of architectural practice, so that Profile will develop into a unique window on the world of global commercial architecture, focusing on the big players in construction and development in the United States, Asia and the Pacific Rim, Eastern Europe, the Middle East and Africa, as well as matters closer to home.

The subject of this month's profile is a good example. Callison Architecture, the fourth largest architectural firm in the United States and the eighth largest in the world, is a name few people outside the American Northwest have heard of. Yet Callison's client list contains global household names. Callison Architecture masterplanned the world famous Microsoft Place in Redmond, Seattle, the home of the world's largest software company. The firm has built 25 buildings there in the last ten years. Callison are also architects to the Boeing Commercial Airplane Group, manufacturers of the Boeing 747, 757 and 777 airliners. Further abroad they are the designers of the massive twin-towered Grand Gateway to Shanghai, the Taisho Insurance tower in Tokyo, and many other major projects in Southeast Asia, South America and the Pacific Rim. Practices like Callison represent the new shape of the *World Architecture* Profile.

Ten issues a year and a transformed Profile section will not be the only new developments in *World Architecture* in 1995. Ten months ago, in March 1994, the magazine published the first *World Architecture/Hanscomb Index*, a pioneering global construction cost index based on data from the 40 offices of Hanscomb International. Next came the *World Architecture* Top 100 practice survey. Over a year in preparation, this ranking by fee income and number of employees of the world's biggest architectural practices has now been expanded and developed into the *World Architecture* Top 200, which will appear in March 1995. Together, the six monthly *World Architecture/Hanscomb Index*, and the annual *World Architecture* Top 200, will provide our readers with the most up to date and authoritative information on construction costs and practice performance available in the world today.

Finally this issue of *World Architecture* itself marks the long-awaited publication of Blow Up, our remarkable new format technical feature. A specifier's guide based on easy to read exploded drawings and on-drawing supplier details, the first Blow Up consists of a 12-page analysis of Sir Norman Foster and Partners' technically revolutionary Business Development Centre in Duisburg, Germany.

I think you will want to read *World Architecture* even more from now on.

Martin Pawley

CALLISON ARCHITECTURE
THE ANATOMY OF AN EGALITARIAN ORGANISATION

Callison Architecture is not a typically organised architects' office. In trying to understand them, it is fruitless to try to find dominant personalities, pyramidal structures or Venn diagrams that will explain the lines of communication that lead from the directors of the firm, through the partners and the studio leaders, to the 300 design professionals who make up the bulk of the Callison staff. What is unique about Callison is the way that it is structured around markets for architectural services rather than projects. As a result, the firm has a more than usually decentralised structure despite having only one satellite office. It is, in management jargon, a flat organisation, and probably the only one of its kind.

"Strongly against any hint of egotism." Callison's directors from left to right: Bob Tindall, David Olson, Mike Whalen and Bill Karst

Callison's approach to architecture has been formed by the firm's unique geographical position. The Pacific Northwest has a growing importance in the United States economy today and Seattle, its self-styled capital city, prides itself on its new role as gateway to the Pacific and the economic focus of the 14 nations of the Pacific Rim. Seattle citizens point with pride to the fact that the 1993 Asian Pacific Economic Conference was held in Seattle and boast that the city's international airport, together with its best known native product, Boeing commercial airliners, offers the most direct link to Japan, China and all the key cities of Southeast Asia. As established Seattle architects, the directors of Callison Architecture are aware of this mild Northwestern chauvinism, but they are also aware of the benefits of the Northwestern moderation that is a parallel part of their corporate personality.

"The Northwest is normally very resistant to big business and reacts strongly against any hint of egotism," says Principal Director William Karst. "That resistance gives Northwesterners a kind of reserve and modesty that I think is present in Callison Architecture too. Let me give you an example. The most popular place in downtown Seattle is Pike Place Market on the waterfront. That is not the creation of a big firm of architects, nor is it a development done by Rouse or by any other big developer. It is an old place, a people place that grew up out of the history of the city. We like to think that we have an appropriate humility when we try to design such people places. That is why people places have become our forte."

"Carillon Point is a good example," adds fellow Director Mike Whalen, who was the Principal-in-Charge of design for the project. "A massive amount of thought went into the waterside development, and it shows. So when we offer that expertise internationally we know that we offer a little Northwestern reserve and a little Northwestern appreciation for human needs with it. We don't focus on designing trophy buildings, that's not our style. What we want to do is to show that we have a proven ability to address public and private, cultural and commercial, quality of life and quantity of profit, all at the same time, in all sorts of different environments."

"Take shopping centres and retail spaces for example," says Robert Tindall, another Callison director who is an acknowledged international expert in retail design, including specialty stores and shopping centres. "We are currently working on projects across the United States and

around the world which dissolve the boundaries between shopping, socializing and entertainment. The ultimate goal we have as designers is to capture the spirit of creating places where people want to gather at virtually all hours of the day. That means creating people places that get the customers in the door, keep them there as long as possible, expose them to as many retailers as possible, and make them want to come back again and again."

Karst and Whalen are the Callison directors chiefly responsible for work in Asia and, despite Karst's espousing of Northwestern values, unlike the other three directors he is not a Northwesterner himself. He took a master degree in architecture at Clemson University in South Carolina and moved to Seattle shortly after he graduated in 1975. Whalen, who holds a master degree from the University of California at Berkeley, is originally from Seattle, as is Director Robert Tindall, a University of Washington graduate. Fellow director David Olson, who is president of the company, also has his roots in the Northwest and graduated from the University of Washington in 1968. Olson has special responsibility for the firm's largest client, Nordstrom, having overseen the design and planning of more than a dozen stores over the last four years for the largest fashion retailer in the United States, and he is guiding Callison's effort in South American markets. Whalen is also actively involved in the design of Nordstrom stores as well as other retail, mixed-use and entertainment projects, and he oversees the firm's work in Japan and Korea. Tindall too has worked on Nordstrom projects and now oversees the Microsoft commissions and the firm's work in the Middle East.

If these loose definitions of directorial roles in the eighth largest architectural practice in the world serves as a guide to the highest management level at Callison Architecture, it is only because they are simplifications. Under closer analysis they soon break down into a more complex structure, for while the responsibilities of the directors are, broadly speaking, defined by the market sectors in which they specialize, all of them seem to work "across their boundaries" for much of the time. With so many mixed-use projects there are inevitable crossovers of expertise and as many combinations of experience as the permutations of four make possible. This is particularly true in relation to the connection between the directors and the eight Callison "studios", the teams of between 10 and 100 architects and assistants who work together in a group on specific projects within the defined market sectors.

The link between the directors and the studios is a middle tier of Callison management that comprises shareholding partners. Among them are John Gish, an award-winning designer with a special affinity for retail projects; Spencer Johnson, who is a specialist in the master planning of mixed-use developments; Andrea Vanecko, a former designer with Skidmore Owings and Merrill and now Callison's leading authority on interior design for commercial clients, and Douglas Stelling who is in charge of Callison's graphic design studio, another service that invariably finds a place in mixed-use projects.

The board directors and other principals can be separated out from the studios in order to discern the Callison hierarchy, but the organisation of the studios themselves is much more difficult to pin down. In many ways its constantly changing structure resembles that of a living organism. As fast as a new market for architectural services is recognized, Callison Architecture starts to develop a studio to respond to it. Depending on its workload, a "studio" complement at Callison can range from half a dozen individuals to nearly a hundred. At any one time some studios are expanding and others are contracting, some of them run down to a skeleton staff between projects. At the same time new studios are coming into existence in foetal form, two or three individuals are waiting for a project to crystallize in order to bring their operations to life. At present there are eight fully-fledged studios at Callison with most of the 300 Callison employees distributed between them. Under the watchful eye of principals, each studio operates like a small autonomous firm. The largest studio, because of its fairly constant workload, is Nordstrom, which employs between 60 and 90 persons and is headed by Olson. Hospitality, which has experienced a depressed market recently but appears to be coming back in both the U.S. and internationally, is the smallest studio. The Corporate Offices studio, managed by Jim Rothwell, and the Retail studio are both buoyant and at the heart of Callison's workload. Bob Hutnik oversees the Residential studio and Healthcare, which has continued to strengthen its market share. Still not formalized as a studio is Arts and Entertainment, which is involved with a number of prominent theatre projects in Seattle, and a special Biotechnology buildings group, which could be led by Principal Mark Ludkta, who along with Principal Rick Meyer lead the Public Sector/Educational Studio. The firm's San Diego office is managed in a very similar way to the studios as Principals Tom Anglewicz and Bill Engle use it as a launching pad to work in the Southwestern United States, as well as Mexico and South America.

"The true effectiveness of the studio organisation is that we can bring the best of everyone's skills and depth of knowledge to a project," explains Olson. "Our experience with Nordstrom stores brings added value to shopping centre projects. In trying to bring a more comfortable and pleasing environment to healthcare patients we can tap our experience in hospitality. The high-technology elements of a hospital, with its massive operating equipment, brought value to the Boeing Customer Services Training Center, which incorporates the latest flight-training technology."

To understand this constantly changing pattern of organisation it is necessary to remember that Callison Architecture deals with nearly 500 projects every year. Projects that range in size and scale from a small signage problem in a shopping centre, to a complete building, or one phase of a much larger development. At any one time as many as 70 out of 300 Callison staff can be travelling, either inside the United States or abroad. Typically, the Corporate Offices studio, which takes care of financial service buildings and banks as well as office buildings, handles nearly 300 projects annually.

It is in its ability to survive and adapt, to diversify from being a local firm of architects, to a regional firm and now to an international firm, that Callison Architecture demonstrates its essential flexibility and creative energy. In the autumn of last year the Callison directors signed and circulated a mission statement to all employees. Harking back to the economic crisis of the early 1980s, which the practice has survived by converting itself from a generalist firm into a regional leader and retail specialist, the directors set forth another vision, this time on the global scale.

"Our goal is to be the preferred architectural firm for business leaders worldwide. We develop innovative solutions in partnership with our clients - creating value by enhancing their success."

As a statement of purpose for the next century, it has a great deal to recommend it. □

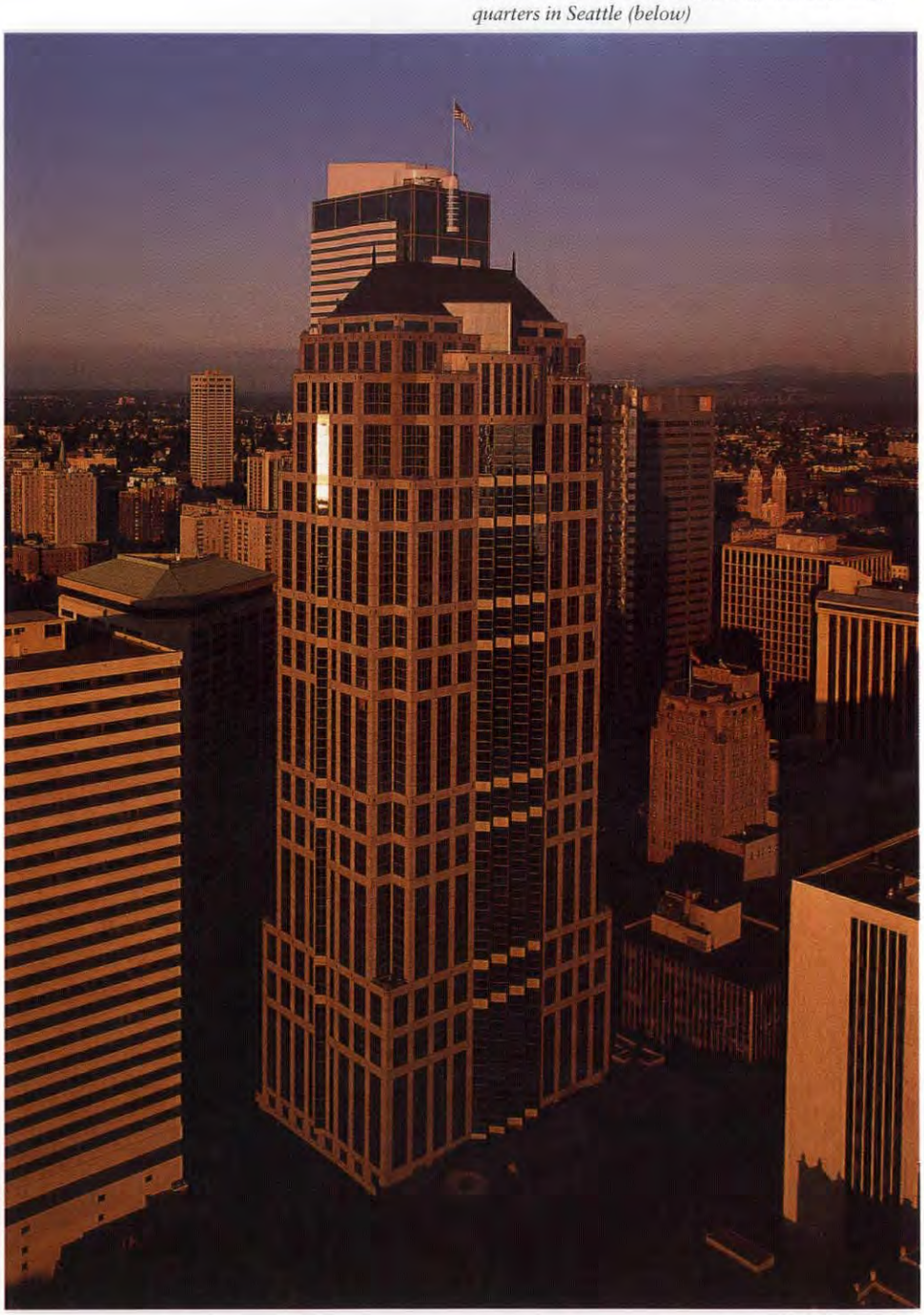
CALLISON, THE BIG NUMBER EIGHT

The characters in the photograph look slightly self-conscious, and above them is a picture of four buildings that look like UFOs in formation, but the front page news item in the Daily Journal of Commerce *is historic. Dated August 13th 1985, it records the breaking of ground for a new world headquarters for the Microsoft Corporation at Redmond, Washington. Among those posing in the photograph are the then president of Microsoft, Jon Shirley; Howard Wright, general contractor for the project, and architects Tony Callison and Gerry Gerron of The Callison Partnership, a firm that, under its new name of Callison Architecture, is the largest architectural practice in the Pacific Northwest, the fourth largest architectural practice in the United States, and the eighth largest architectural practice in the world.*

It is a paradox of architecture worldwide that the biggest practices are not headed by the biggest names. The cult of personality, valuable though it is as a means of enabling ordinary people to identify heroes and villains in the architectural firmament, is a currency that rapidly depreciates as practices grow in size and global reach. Even where an individual serves as the figurehead of a large firm, the huge workload required to produce a fee income in the $35 million range ensures the presence of a large supporting cast behind the scenes, with the figurehead seldom taking a direct hand in the day to day running of affairs. More commonly it is not the name of one individual that survives, but the names of several individuals, either minimised into the form of a series of initials; buried, as in the names of partners subscripted under a generic title, or maximised posthumously as in the case of famous law firms or publishers.

Anthony Callison, the founder of Callison Architecture, died in 1988, only three years after the firm's connection with Microsoft began. Born and raised in Seattle, he studied architecture at University of Washington and opened his first office as soon as he graduated in 1960. He was an entrepreneurial man by nature, well suited to the times he was living in. As an architect he was not doctrinaire. He concentrated on enlarging his office by taking in work of all kinds. In the 1960s he was taken up and swept forwards by the wave of growth in the Northwest symbolized by the 1962 Seattle World's Fair, and the massive development of the Boeing Commercial Airplane Group that accompanied the introduction of wide-bodied jets in 1969. During those years, the Seattle region attracted industry and population as a result of its geographical position: midway between America's largest cities and newly oil rich Alaska, and the closest continental US city to the growing economies of Japan and Southeast Asia. Symbolically Boeing's famous 40-acre assembly building at Everett dates from that time. Today these strategic advantages still underlie the growth of the Seattle economy, but 20 years ago Tony Callison took advantage of them at a tactical level. In 1975 his small firm expanded into the Callison Partnership and forged its first links with the Nordstrom chain of fashion retail stores by designing one of its earliest outlets. Starting out as a family-owned downtown Seattle shoe store, Nordstrom was just beginning the process of growth and expansion that was to turn it into a fashion retail

Callison's award-winning inn at Semiahmoo, Blaine, Washington (opposite page). Pacific First Centre, now the US Bank Centre, home of the firm's headquarters in Seattle (below)



giant. After that first store, Callison took part in and aided this expansion, so much so that collaboration between architect and client became a two way street. From Callison, Nordstrom derived its new up market retailing identity, characterised by cool, calm interiors, dense and luxurious displays of merchandise, unprecedented levels of in-store comfort for shoppers, and a series of grand architectural entrances. From Nordstrom, Callison derived an ideal of customer service that is rare in a profession best known for its arrogance and conviction of superiority. By the early 1980s, the still small Callison team had learned from their mentor how to strengthen relationships with clients by seeking out and servicing their needs. They strove to create a a kind of creative synergy out of the retail world's combination of product, service and customer satisfaction. The result was Tony Callison's ideal - "A firm that is built on client relationships and the value our people offer." Callison began to become bigger and to accumulate more important corporate clients. "Tony Callison wasn't focused on building trophy buildings, or holding forth on design" remembers director David Olson, who joined the firm in 1977 when its office numbered only 20 staff. "What he wanted was for us to know as much about what our clients need as Nordstrom knew about what its customers wanted."

In pursuit of this aim, in the early 1980s, in the teeth of a recession, Callison, with partner David Lindsey strove to broaden the firm by making those crucial relationships with clients all over the Northwest and focusing on markets where they had demonstrated expertise.

"They were the guiding forces during that period, laying the foundation for what the firm is today," explained Olson. "They not only played a key role in developing our client relationships, but also defining and nurturing the overall culture of the firm and its business focus."

Nor did they neglect new technology. Many current partners remember the 1982 recession when Callison was investing $1 million on computer aided design and drafting systems while they endured a 10 per cent salary reduction. Nonetheless, the Callison Partnership continued to grow at an average rate of 20 per cent a year in the decade from 1982. The turning point came in 1989, the year after Tony Callison's death, when the staff "stopped wearing jeans" as Tindall puts it, and moved downtown to a newly designed suite of offices in Pacific First Centre, a 44-storey skyscraper they had designed themselves – their tallest completed building to date. The move was a milestone in the firm's development in ways that it might not at first have grasped. It marked the end of the priority of regional expansion and the beginning of global reach.

If today the word "Architecture" has replaced the word "Partnership" in the Callison name, this is not just because the firm is incorporated. It is because it operates in distant markets where clarity is required about the nature of its business. The retention of the Callison signature as the firm's distinctive logo has another purpose: it is there to show that the firm is still determinedly diverse in its sources of style and inspiration and, perhaps most importantly, is still committed to the personalised style Tony Callison believed in.

The heart of Callison Architecture today is still the 44-storey Pacific First Centre, now renamed U.S. Bank Centre. A rose granite-coloured $80 million skyscraper in Seattle's downtown area that glistens in the city's morning

and evening raking light, the building has unrivaled views over Puget Sound to the West and Lake Union to the North. With its distinctive pitched-roof "hat" it presents an unmistakable profile on the Seattle skyline as well as a demonstration structure for urban multi-use complexes. Callison's unique flavour is stamped, not only on the signature top of the office tower and on the Callison studio floors themselves, but on the design of the three-storey retail podium that links the complex to the city street pattern with a dynamic blend of retail and restaurant facilities, cinemas and a day care centre. Unusually for a speculative project completed on the eve of another recession, U.S. Bank Centre was 75 per cent leased on completion and to this day it remains the most distinctive of the clutch of towers that delineate Seattle's downtown district.

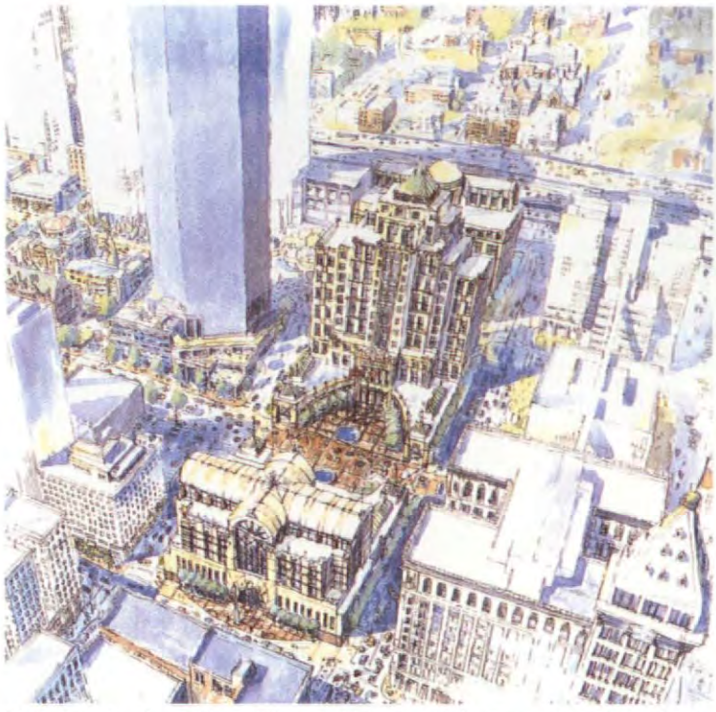
The way in which Callison's fortunes have followed those of its parent city can be seen from the physical proximity of the firm's major clients to Seattle itself. A few miles East of U.S. Bank Centre is Microsoft Place, the World Headquarters of the Microsoft Corporation, headed by the legendary William Gates, III. Today the Microsoft campus at Redmond is 25 buildings and five planning phases larger than it was when the firm first hired Callison, and now it houses nearly 10,000 employees. Microsoft also boasts a huge 30,000 square metre Callison-designed distribution centre in nearby Bothell.

"I don't think that any of us could honestly say that, in 1984, we had any idea of how a small company, with only about 400 employees, would grow into the international leader we know it as today," remembered Tindall. "But Microsoft is a great example of how important our team approach to architecture is. The dynamics of such rapid growth means very stringent scheduling requirements and the ability to work with more than 15 different groups at one time, including consultants, contractors and government agencies. It's been a very exciting project."

Today Microsoft is probably the most glamorous internationally of all Callison's long-term clients, but it is by no means alone. A few miles to the South is another client, even more famous. The Boeing Commercial Airplane Group, established in Seattle for more than 60 years, boasts two Callison buildings at its Tukwila facility, near Seattle-Tacoma International Airport. The oldest is the Boeing Employees' Credit Union building, completed in 1990, and the most recent an $108 million Customer Service Training Center that was opened last year. By 2005 it is anticipated that this small university of the air will host no less than 6,000 flight crews and maintenance personnel a year from all over the world for training in the use of Boeing commercial aircraft.

The only large client nearer to Callison's offices than Boeing is Nordstrom, America's leading fashion retailer, one of whose 75 department stores is directly across Seattle's Fifth Avenue from the U.S. Bank Centre. Nordstrom is powerful in retail, and remains important to Callison, not only because almost one-third of the firm's $36 million annual fee income is derived from Nordstrom's restless expansion, currently running at five new stores every year, but because there have been fruitful staff exchanges between the Nordstrom retail organisation and the Callison practice, including the move of partner David Lindsey in 1990 to become Nordstrom's Vice President of Store Planning. It is no accident that the handwritten "Callison" signature has an up-market retail look about it. The interaction between the two apparently very different organisations in two apparently different worlds goes deep.

Apart from the presence of Callison's major clients, there are other significant developments in the Seattle area that bear the stamp of Callison design. Three blocks west of their office is Harbor Steps, the newly completed 17-storey first phase of a major residential development overlooking Elliott Bay that is destined to be joined by a 24-storey companion in a year or two's time. Further east, across Lake Washington in Bellevue, is the 27-storey Koll Centre, a slick glass-clad office complex completed in 1987. On the edge of Lake Washington at Kirkland is Carillon Point, a carefully designed brick-faced $150 million mixed-use development with retail, marina, restaurant and office elements that with exquisite design skill was painstakingly



Major interiors by Callison. The refurbishment of the Benson Hotel, Portland, Oregon (opposite page left), and a contrasting style at Wells Fargo, San Diego (opposite page right)). The Seattle Government Center concept drawing (above). Bay View condominiums project, San Diego (right)

tucked into an otherwise residential suburb in 1991. Located on the 31 acre site of a former shipyard, Carillon Point embodies a carefully concealed, 1,700 car underground parking structure. The Carillon in the name of the development commemorates the inclusion of six tall working bell towers in the central plaza, a pedestrian space surrounded by shops and adjoined by a discreet hotel called the Woodmark, where Paul McCartney has been known to stay. Elsewhere in the city region can be found numerous other Callison buildings. There is a corporate headquarters and laboratories building for Westmark International's Spacelabs division; a corporate headquarters for Alaska Airlines, and others for Washington Mutual, SeaFirst Bank, Blue Cross, McCaw Cellular, IBM, and countless law firms and office tenants. Their Seattle projects also include the Crowne Plaza Hotel, and renovations of both the Space Needle Restaurant and the Pacific Science Center. In all there are more than 400 Callison buildings and refurbishments in the Puget Sound region. Perhaps the most fascinating of them all is a GTE-Northwest Corporate Headquarters completed in 1989 that was fashioned out of the enclosure of an existing building from the 1950s within a new double cruciform four-storey complex. Through a remarkable exercise of design ingenuity this encapsulation is virtually impossible to detect.

Up until five years ago, the phrase "Big in Seattle" might have been the story of the Callison Partnership. Apart from opening a small satellite office in San Diego and building Nordstrom stores all over the United States, the firm had confined most of its activities to Washington State, California and Oregon for nearly 20 years – and most of its achievements were even closer to home than that, in the Seattle area itself. Remembering the recession of the early 1970s – when the famous message "Will the last person leaving Seattle turn out the light" became a by-word for stricken American industry in Seattle. Combined with the warning signals of an increase in the number of job applications being received from other parts of the country – first in New England, then the South, the Midwest and California – things at Callison began to change in the late 1980s in preparation for the coming economic downturn.

In truth the recession struck the Seattle based Callison Partnership less severely than architects were hit in other parts of the country. Throughout the recession Callison was sustained by the ability of some key clients to continue to provide a reduced volume of work - one or two of them, like Nordstrom and Microsoft, bucking the trend and continuing with large projects that others might have cancelled or put on hold. At the same time new clients like the Eddie Bauer retail clothing chain, with its new corporate headquarters project, began to come aboard as promising newcomers. Additionally, because the partners recognised those early signs that the coming recession would make their domestic markets vulnerable, Callison had stayed one step ahead by establishing projects and clients in Asia as early as 1988, when the firm collaborated with a long-term client on the renovation of the famous Raffles Hotel in Singapore.

Chile's first enclosed shopping centre at Apumanque in Santiago

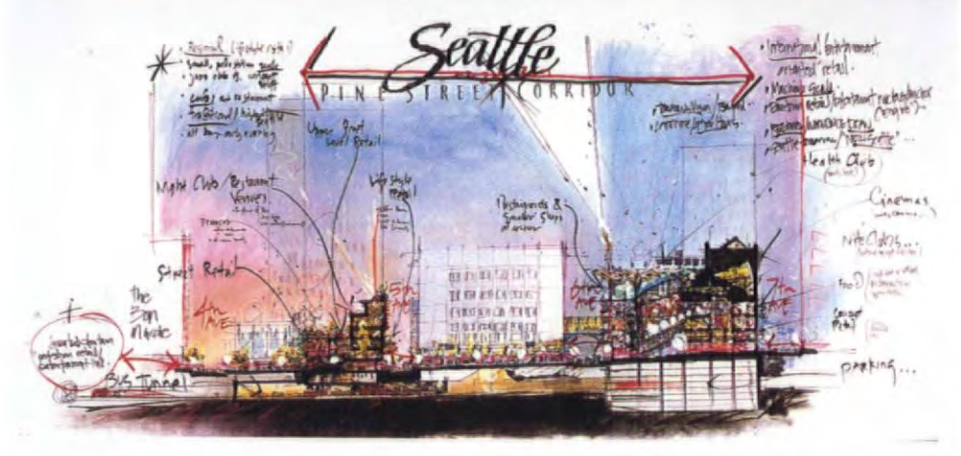
In 1990 representatives of the firm went to Thailand and carried out work on two large resort complexes at Palm Hills and Blue Canyon in Phuket. Despite the fact that only portions of those projects have been completed to date, they provided a valuable lesson for the partners on how to do business in Asia, something they collectively had very little experience in to that point. A parallel mission to Japan was more successful, leading to more than 20 different commissions, including a headquarters building for the Taisho Life Insurance Company in Tokyo in 1992 (in association with Kajima Architects & Engineers), and the execution of some early design work on a medical research institute in Hobara. A third Japanese project that was only abandoned at a very late stage was the ingenious Yohga retail, restaurant and billboard building, a remarkable high-tech structure incorporating a scaled-down replica of part of the Coliseum in Rome that gave a dramatic demonstration of the versatility of the design talent present in the Callison organisation.

In addition to Thailand and Japan, another fruitful direction for overseas expansion proved to be the Middle East, where the firm gained a foothold with a project in Dubai in 1991. In 1993, following the Gulf War, Callison was referred by its Dubai client to opportunities in Kuwait, where it secured commissions for a shopping and entertainment complex, and a city centre redevelopment for Kuwait City. Similar success followed an expedition to Latin America. Trading on their strong retail reputation in the United States, in 1994 Callison designed a large shopping centre project for Mexico City and two more in Santiago, Chile, all of which are expected to be completed.

Promising though these expeditions may be, in the long run however, the most productive market so far has turned out to be China. There the year 1994 saw the beginning of site works for the construction of Callison's massive twin-towered Grand Gateway to Shanghai, a mixed-use development the first phase of which is scheduled to be completed next year. The entire project, which incorporates retail, entertainment, corporate office, hotel and residential components, will eventually add up to over 320,000 square metres of new accommodation including the twin 53-storey Gateway office towers. The entire complex is scheduled to be completed in 1997. Two more large projects include a high-rise regional headquarters for the Bank of China in Shanghai, and a massive urban project named Beijing International City which will total 390,000 square metres of mixed-use urban development – including a 65-storey office tower, plus retail and residential towers – when it is completed in 1998.

"One of the benefits of working in emerging countries like China, is being able to view the culture in an anthropological perspective," Karst explains. "In some ways, China is similar to the US 50 years ago, except that because of the accelerating pace of change, in four years China may go through the equivalent of 20 years of social and economic evolution. At this rate, they may surpass the western countries in technology

Superplaza Miramontes, Mexico City and the Seattle Pine Street Corridor project (below). Plaza La Serena, La Serena, Chile (bottom)



and innovation in five or ten years, much the way Japan has excelled over the past 20 years. Right now there are people in China who are still living without basic services while the others are rapidly buying cellular phones and Mercedes. There is no doubt that Shanghai is rapidly closing on Hong Kong as the business hub of Asia. Those who still believe that international practice is economically impractical, must look at the trend, and see that the unique challenges of working in emerging countries today will soon merge into the mainstream of leading-edge practice in developed countries. For instance, we see prospects in Europe, but counterbalanced by the presence of more entrenched firms and therefore those projects seem less compelling for Callison.

"Beijing and Shanghai have not had high rise buildings until recently, but they now have hundreds of 30 to 60 storey buildings either under construction or on the boards. You have to ask yourself about the rapid change in traditional living patterns that are brought on by this sudden boom. Many international firms have dusted off unbuilt design solutions from Manhattan or Chicago, adding a pagoda or Asian design idiom and selling them as the western answer to Chinese culture. We try to seek out the unique aspects of each project more carefully – the culture and sociological issues definitely have an influence, but many of the programmatic and utilization issues drive our design solutions the same as they might in Mexico or Seattle. I doubt that Western style buildings overlaid with Chinese ornamentation are the real answer any more than 88-storey towers that trade lucky numerology for a more contextual pedestrian experience at their base.

"One of the benefits of Asian culture is the traditional interrelationship of many building uses, shop houses for instance, which promotes more mixed-use type developments and ultimately encourages a richer, more energetic urban environment. Many developers, new to high-rise construction, may focus on height or technology – we try to look beyond these issues to the latest structural systems necessary to support the edifices, or combining 'smart building' technology with people spaces like health and day care facilities. These priorities may be slightly ahead of the curve in a developing economy, but that balanced insight will pay dividends by the time the building is constructed and competing with its peers."

In 1995, with none of these massive China projects yet completed, it is difficult to see what the ultimate effect upon Callison Architecture of a large commitment in Asia will be. So far the firm has established no office in the Far East and the Seattle region itself remains an important source of demand for the firm's unique brand of architectural services, but the directors clearly anticipate great things of the Pacific Rim. At this point in time one thing is certain: with its large Chinese projects under way, and Shonan Nagisa, a major mixed-use waterfront project in Tokyo scheduled for completion before the year 2000, no American firm of architects is better placed to take advantage of the emerging markets of the East than Callison Architecture. □

Microsoft Headquarters, Redmond, Washington 1984-94

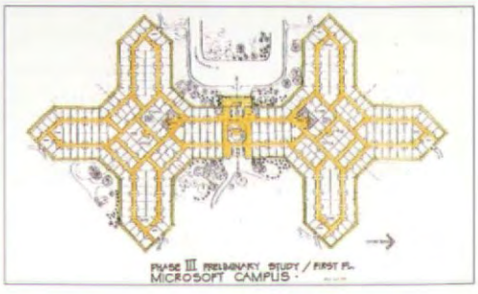
Now the largest software producer in the world, Microsoft corporation has been a client of Callison partnership since 1984, when the firm was asked to design its first international headquarters. At that time the young company employed about 400 people. Today that number is closer to 15,000. Callison's challenge was to create an environment to support the varied and committed work habits of Microsoft's creative staff while staying ahead of its dramatic growth.

The master plan for the software giant's 260-acre campus in Redmond, Washington, effectively unites form and function to accommodate one of the fastest growing companies in the world. The unobstrusive architecture and rich landscaping create informal, collegiate-like surroundings that reflect Microsoft's dynamic image while maintaining the natural beauty of the site.

Rapid design and construction schedules keep pace with Microsoft's growth, with the team relying on cutting-edge CAD applications to produce 3-D images and documents that guide and shape the process.

Since 1984, Callison has designed over 3.2 million square feet of facilities for Microsoft including design, research, marketing, administrative and distribution functions. The most recent project completed in 1994 is Building 25, which is 225,000 square feet.

Building 25 at Microsoft, completed in 1994 (above right). The two phases of original "Starships" (right). "Lake Bill", named after William Gates III (far right) and a drawing showing the internal planning of the original "Starship" design with its standardised 3m x 4m offices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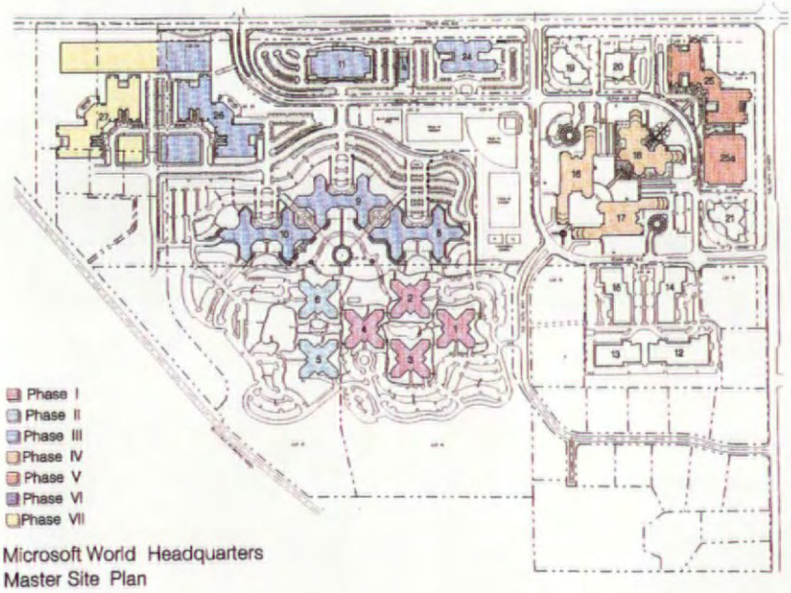
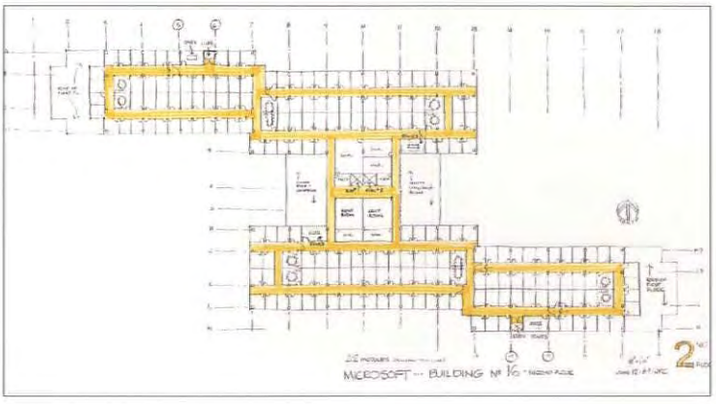
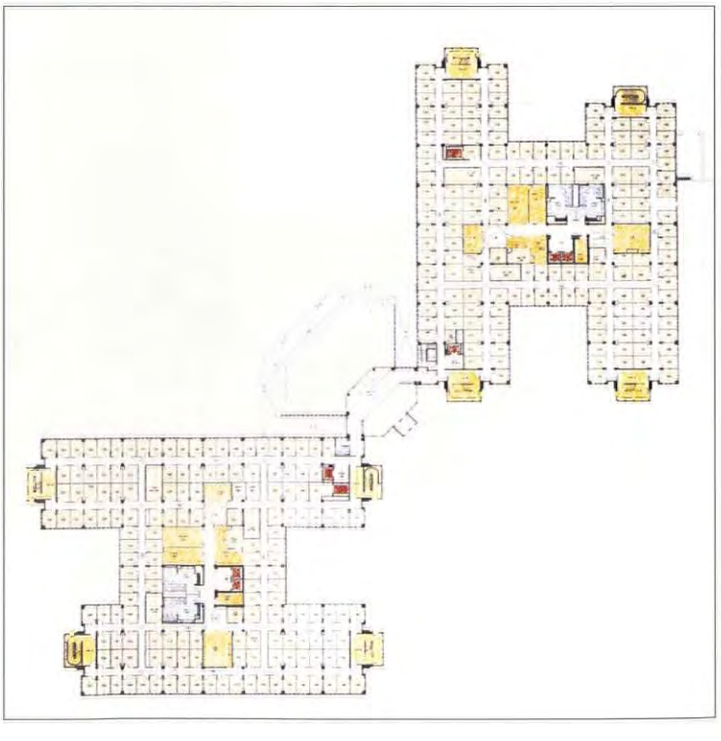


Microsoft World Headquarters
Master Site Plan

The brick-clad building 18 at Microsoft (top), and the reverse view of building 25 (middle). Staff restaurant at building 25 (above), and Master Plan (left)

Aerial view of campus with building 25 in foreground (left). Plan of buildings 16 (below left) and 25 (below)



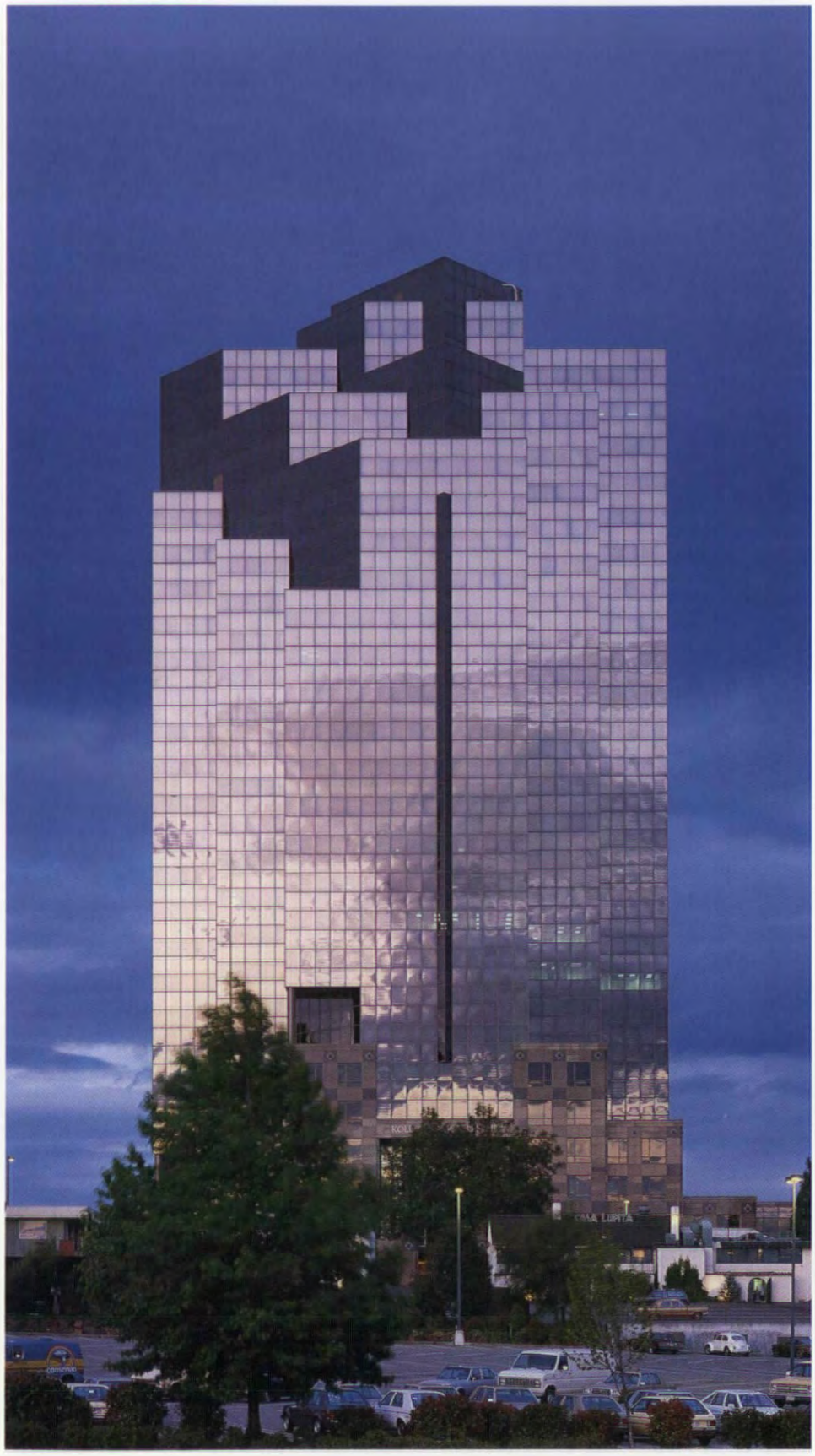


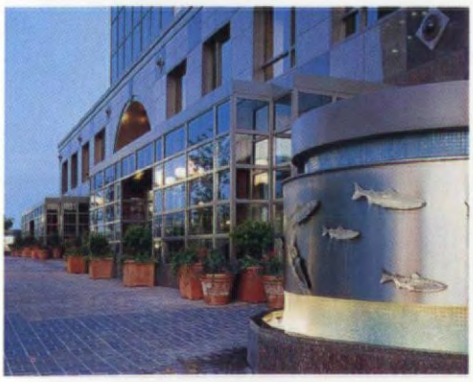
Koll Center Offices, Bellevue, Washington 1987

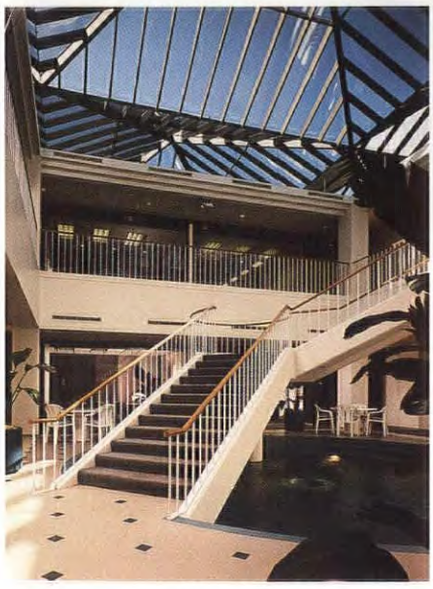
Situated in the heart of downtown Bellevue, an edge development on the outskirts of Seattle, this 27-storey office/mixed-use project was designed to capture the intimate yet growing character of the surrounding community.

The 18-sided tower maximises corner offices, and the 25-foot grid caters to the relatively small space requirements of the typical Bellevue tenant. The skin of the tower is reflective solar glass and the ground level is pedestrian-oriented and features outdoor cafes, a four-star restaurant, a shopping arcade, health club, fountains, landscaped seating areas, and a clock tower.

Callison's services for this project included master planning, architectural design, interior design and space planning for tenants.







Alaska Airlines Headquarters, Seattle, Washington 1988

Callison provided programming, planning, architecture and interior design for this 35,000 square foot building for Alaska Airlines, as well as a major renovation of the firm's existing 38,000 square foot corporate headquarters, built in 1976.

Expansion of the corporate headquarters involved the design of a new building that would complement the original, while achieving a distinct character of its own. A glass pedestrian walkway connects the two buildings and serves as a grand entrance. Work spaces maximise natural light, with vistas provided to the lush natural landscaping outdoors.

The project received a design award from the Institute of Business Design, in the 1989 Contract Design Competition. The project was cited for achieving a "light and attractive design" within a cost-effective budget.

Microsoft Distribution Centre, Bothell, Washington 1989

Microsoft's new 262,000 square foot distribution centre in the Canyon Park Business Center in Bothell, north of Seattle was carefully designed to reduce the apparent scale of the building and complement the surrounding environment with heavy planting, while at the same time accommodating and expediting distribution of the enormous volume of software products generated and distributed by the firm throughout the year.

A free-standing arch at the entry way, canopies at loading docks, and reflective glass panels were used to minimise the scale of the facility, which is itself a combined large scale storage warehouse, automated manufacturing centre, and 33,200 square foot administrative office annexe to meet administrative needs.

Main entrance to the distribution centre (top) is centred on the plan, as can be seen from the aerial view. Interior shows automated dispatching zone

GTE-Northwest Headquarters, Everett, Washington 1989

The Callison Partnership provided architecture, programming, space planning and interior design services for GTE-Northwest's new 20-acre headquarters complex in Washington. The project involved construction of a new 120,000 square foot building and total renovation and reconfiguration of an existing 160,000 square foot structure.

The requirements that the existing 1960s building be retained, and a modern and unified facility created, were achieved by encapsulating the original t-shaped building within an octagonal/star-shaped exterior that mirrored the design of the new building. Although the work space of each building has a unique character, the exterior appearance is cohesive - mirror-image buildings connected by a four-storey glass entry galleria.

The complex's main entry is identified by an open pavilion linked to a bridge which spans a waterfall and pond. The complex's large 30,000 square foot floor plates are penetrated by three-storey atriums that bring natural light and vertical circulation closer to all work stations.

GTE exteriors (top and above) show completed building concealing incorporation of original 1960s structure. Progress shot (right) shows original structure gutted in foreground

US Bank Centre on completion and in context (right). One of the six street level entrances to the offices and retail core (below)

US Bank Centre, Seattle, Washington 1989

Home to the headquarters of US Bank, the design objective for this dramatic mixed-use development was to reflect both historical and contemporary architectural elements of surrounding buildings and provide a dynamic and compatible blend of public and office spaces. The goal of the public space was to provide an inviting and comfortable environment that would encourage pedestrians to mingle throughout the three-storey retail atrium.

By creating an inviting retail display at street level, designers brought vitality to the US Bank Centre beyond the typical 9 to 5 corporate hours. Easy access is provided by six street-level entrances that encourage pedestrian flow with the neighbourhood's business/hotel/retail core.

Office and retail components were given separate identities by providing unique public activity space for each function. Heroic-scale rotunda entries provided public landmarks at each major pedestrian entry point and connected retail and office components.

Located in downtown Seattle, this 44-storey mixed use high-rise offers up to 20 corner-style offices on each floor through an innovative design that creates two corner offices at each corner of the building and three "prow" offices along each side. The building was designed with three floors of retail/public space totalling 150,000 square foot and including a theatre, restaurant, daycare facilities and seven below-grade parking levels. The exterior features light-coloured granite and glass.

Callison Architecture's Seattle offices, Seattle, Washington 1989

The design of Callison's 60,400 square foot offices in the US Bank Centre in downtown Seattle involved concentrating the design budget on the public reception areas and the provision of state of the art conference facilities, while providing functional office space elsewhere.

Standardisation of floor plans and work stations was carried out in order to maximise flexibility for growth and reorganisation, and facilitate effective working relationships between different studios on complex multi-use projects.

Entrance to the Callison offices in the US Bank Centre (left). Reception area (above) and an office interior and a computer graphic visualisation (right)

Carillon Point, Kirkland, Washington
Phase I - 1989, Phase II - 1991

Carillon Point is a premier waterfront development featuring office, retail, hotel, restaurant and recreational components. Located on the shore of Lake Washington, this 31-acre development includes a 100,000 square foot luxury hotel, 450,000 square foot of office space in five buildings, 20,000 square foot of retail facilities, two restaurants, condominiums and apartments, a 201-slip marina, and 1,750 parking spaces in four garages.

The buildings at Carillon Point are organised around a central plaza, with one end open to the water and the other enclosed by two buildings. Six contemporary carillons provide an effective focal point for the plaza, as well as a strong architectural element to identify the project. The carillons are situated around a platform that can be used for musical presentations, public events and other gatherings.

Office, retail and dining facilities are located around the perimeter of the plaza. The plaza is connected to the public esplanade that parallels the waterfront and the public fishing pier, by two grand staircases. Buildings are positioned to maximise access to lake views, while maintaining corridors from Lake Washington Boulevard.

Callison provided master planning assistance, architectural and interior design, documentation and administration services, permit coordination and also provided public and retail improvements to assure proper coordination between the tenant and landlord.

Office buildings (above) at Carillon Point flank main access route leading to marina (left). Aerial view (below) shows general arrangement

Rogue Valley Medical Center, Medford, Oregon 1993

The Callison Partnership provided programming, planning, architecture and interior design services for a comprehensive addition to Rogue Valley Medical Center. The addition included ambulatory surgery center, 10 inpatient operating rooms, a 32-bed critical care unit, a 14-bed obstetrics unit and a 20-bed neonatal care unit.

Careful development of the overall master plan, which evaluated current work load and anticipated growth, allowed the hospital to stay open and operating during the construction and reorganise itself from an inpatient business to a model for outpatient care.

The project included one of the most advanced Labor Delivery Post Partum (LDRP) units and neonatal intensive care facilities in the United States. However, for all of the LDRP's sophistication with technology, hospital administrators were determined to provide a facility that would offer unpretentious and warm surroundings for the mothers and their families. Callison accomplished by providing each room with indirect lighting and dimmers for above the beds; other lights highlight specific work areas. The new mothers give birth in a private room with inviting finishes, floral bedspreads and fall coverings, and wood casework on the floors and ceilings. This approach of humanizing health care supported the clients goal of having a healing environment which in turn reduced the patient's length of stay.

Nordstrom Stores, Santa Ana, California and Pentagon City, Washington D.C. 1988-94

The 169,000 square foot Santa Ana store (top) has only one exterior facade, which is clad in granite and accented by a curved restaurant terrace and clock tower. Large trellises flank the main entrance for seasonal flowers.

The Fashion Center at Pentagon City (right) occupies two separate but adjacent sites. One of the primary design objectives was to provide a unified interior appearance and encourage circulation throughout the three-storey, 241,000 square foot store.

The design concept involves a central escalator court on each of the separate sites, with a well-defined corridor connecting the two courts, each of which features a skylit rotunda with a central lantern.

Red brick and grey Indiana limestone is used to enliven and give scale to the exterior. The limestone main entry and is punctuated by an arched portal announcing the store's front door and providing a formal backdrop for the courtyard in front.

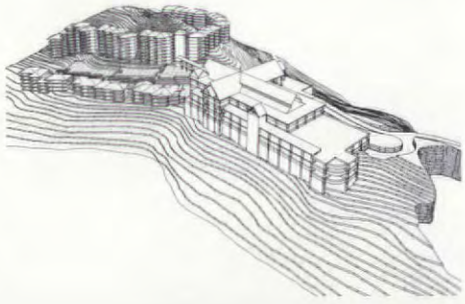
The Nordstrom store at Pasa Nuevo, Santa Barbara, California, (below left and centre) was designed to blend in with the traditional architecture of the town's historic district

Nordstrom stores at Oakbrook, Illinois (below left) and Annapolis Maryland (below) show different elevational treatments

Artist's impression and computer generated images (below) show hilltop composition of Blue Canyon resort

Blue Canyon resort, Phuket, Thailand 1990

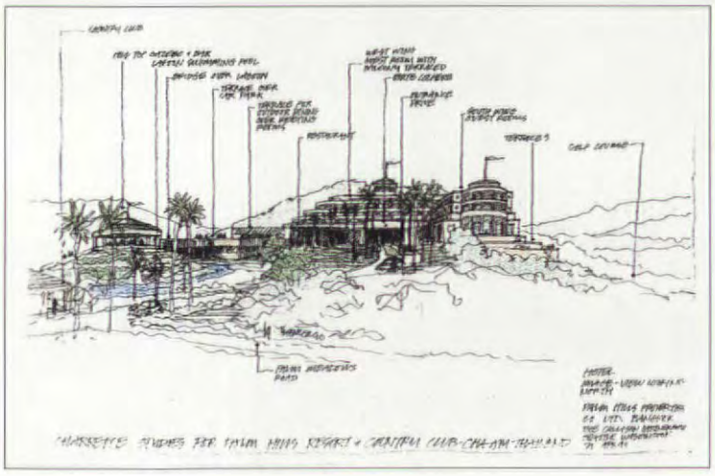
Blue Canyon Resort is a tropical hideaway located in the hills of Phuket, Thailand. Callison provided master planning for the resort and architectural services for a proposed 140-room hotel. The golf support facilities have been open for several years, and the hotel is ready to begin construction. The resort features a 36-hole golf course, two clubhouses, golf lodge and sports complex.



Palm Hills resort hotel, Thailand 1990

Situated near the sea on the Gulf of Thailand, the resort is master planned around an 18-hole golf course and country club facility. Callison provided master planning, architectural and interior design services for the country club, a sports facility for residents and a proposed160-room hotel.

dominium village.



Artist's impression (above) and sketch design showing features to be incorporated into the Palm Hills resort hotel complex

Boeing Employees' Credit Union, Tukwila, Washington 1990

Callison provided architectural and interior design services for the Boeing Employees' Credit Union comprising an 8 acre headquarters and main branch complex.

The 149,000 square foot project provides office and banking space for the Credit Union's 15 departments. An 18-teller, 17,000 square foot branch office on the ground level offers an adjacent six-lane drive-up teller facility. The complex also contains a 24-hour computer and processing centre, executive offices and numerous loan departments. An 8,000 square foot archive storage area is located on the ground floor with loading docks and 24-hour security access.

The design of the building reflects and conforms to the project site, with a floorplate that integrates the curve of the adjacent Duwamish River. At the same time, the typical commercial/institutional requirement for orthogonal planning is fully met by by the basic design which responded to the soft curve generated by the river's edge, then combined it with an efficient 30-foot bay module. This was further delineated in the building's vertical massing by stepping the facade in 15-foot increments. Window glazing mullions were then divided into equal 5-foot sections.

Taisho Life Insurance Co. Corporate Headquarters, Tokyo, Japan 1992

This building occupies an exceptionally prominent site in the Marunouchi District of Tokyo - the centre of Japan's financial world, located close to the Imperial Palace. Hibiya Street, where the building stands, defines an important "edge" condition in central Tokyo: its eastern side is lined with the ten-to-twelve-storey office buildings characteristic of the Marunouchi District, while the opposite side follows the edge of the historic moats which form the eastern boundary of the Imperial Palace Outer Gardens.

With its formal, symmetrical frontal elevation, the building acknowledges the prominence of its site, as well as the structured business-like character of the corporation for which it was designed. A slender, soaring quality is emphasised through the use of vertical articulation, which culminates in a penthouse "crown" and spire. The office building provides a clear, visual landmark within a highly irregular street grid.

Given Tokyo's high land costs, the building needed to develop the maximum floor area allowed under the zoning regulations. The building floor plates sizes are derived from the internal need for the most flexible office space possible within the zoning limitations of the site.

To provide a visual link to its specific location, the building is clad in granite panels which match the colour and pattern of the granite moat walls of the neighbouring Imperial Palace.

Seattle Heights, Seattle, Washington 1992

The design concept behind this large, multi-family residential building centred on creating a sense of individuality, both in terms of the building itself, and between its 240 residential units.

The building's mass is broken down into distinct sections allowing the occupants to clearly identify where they live within the complex from outside. Horizontal features such as stepping and banding are emphasised with the use of varying colours on the building's facade, while verticality is accented with a "spine" that terminates in a rooftop spire.

The building's warm earth tones stand out on a grey, Northwestern day and attract visitors to the 12,000 square foot of retail and commercial space located at street level.

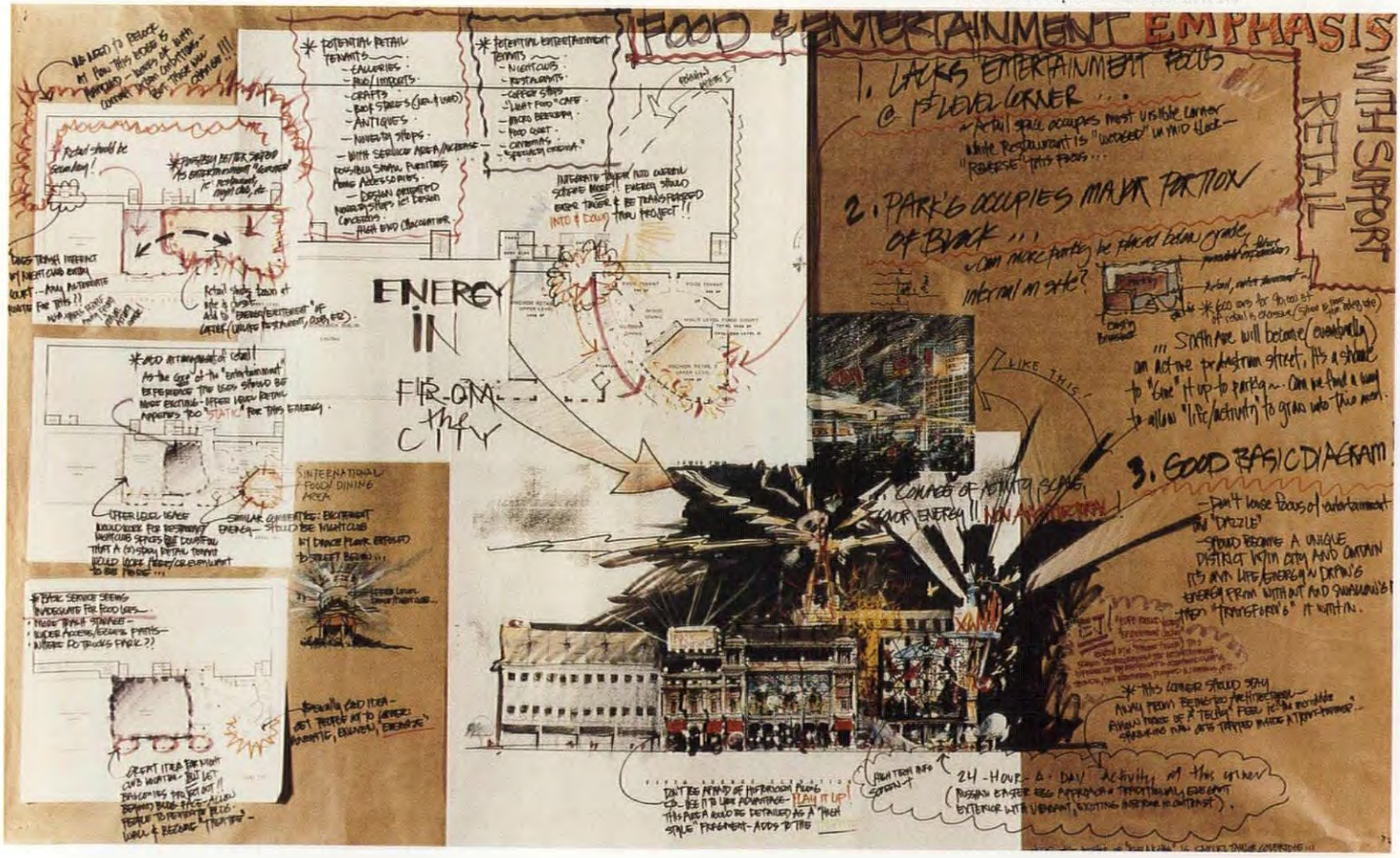
The 26 different residential unit configurations are arranged to maximise privacy. They include a mix of penthouses, one-two-three storey townhouses and one-two-three bedroom units. Amenities include an indoor lap pool, spa and sauna, an aerobics room, locker rooms, library, and an open terrace.

Live From Xanadu, San Diego, California 1993

This 280,000 square foot, four-level multi-use entertainment centre with underground parking is proposed for San Diego's historic Gaslamp district.

The four-storey building, which will include retail shops, restaurants and a nightclub, is designed to blend with its surroundings in scale and shape while conveying the style of a contemporary, industrial structure that reflects the traditional warehouse use of the southern end of the city's justly famed Gaslamp District.

Artist's rendering of Xanadu (above) conveys the project's unique mixture of industrial and entertainment uses. Dramatised sketch design (below) shows conceptual element drivers



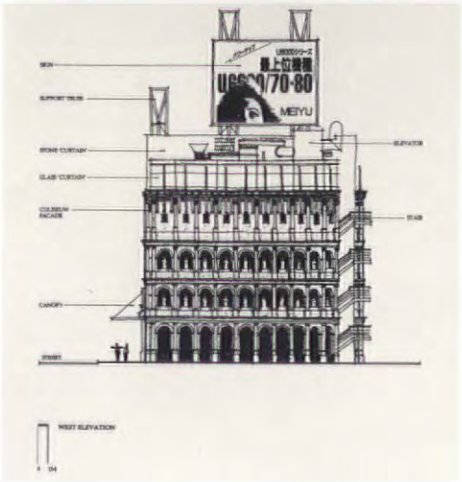
Yohga billboard building project, Tokyo, Japan 1993

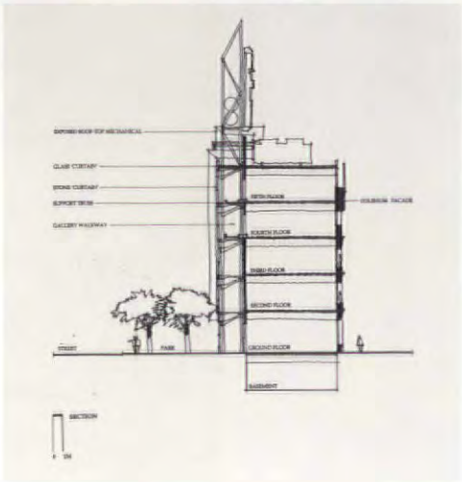
This project is located in Tokyo's Yohga district, adjacent to the New Tokyo development and across from the elevated Shuto Expressway.

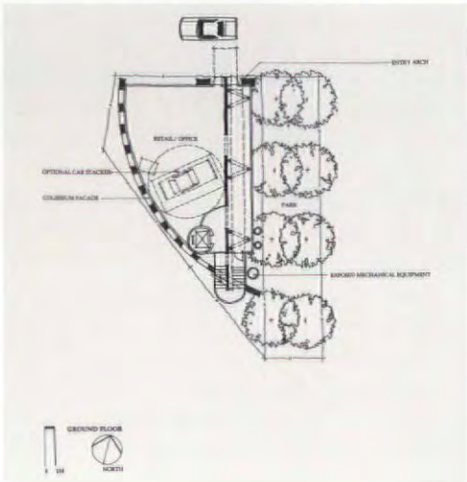
The brief was to design a high-visibility building on a limited site that would accommodate high-end retail and restaurant tenants. In addition, the design had to incorporate a large advertising hoarding oriented towards the nearby expressway. The revenue from the advertising hoarding was expected to contribute largely to the viability of the project.

Callison was selected to provide design services because the owner wanted to introduce a spirit of Classical Western architecture into the project. The design is a playful but beautifully integrated combination of classical and modern elements. A curved stone facade faces the expressway, designed as a replica of part of the Colosseum in Rome. In complete contrast the rest of the building is defined by two high-tech glass walls which allow visibility into the tenant spaces. A flexible floor plan would have adapted to the needs of retail, gallery and restaurant tenants.

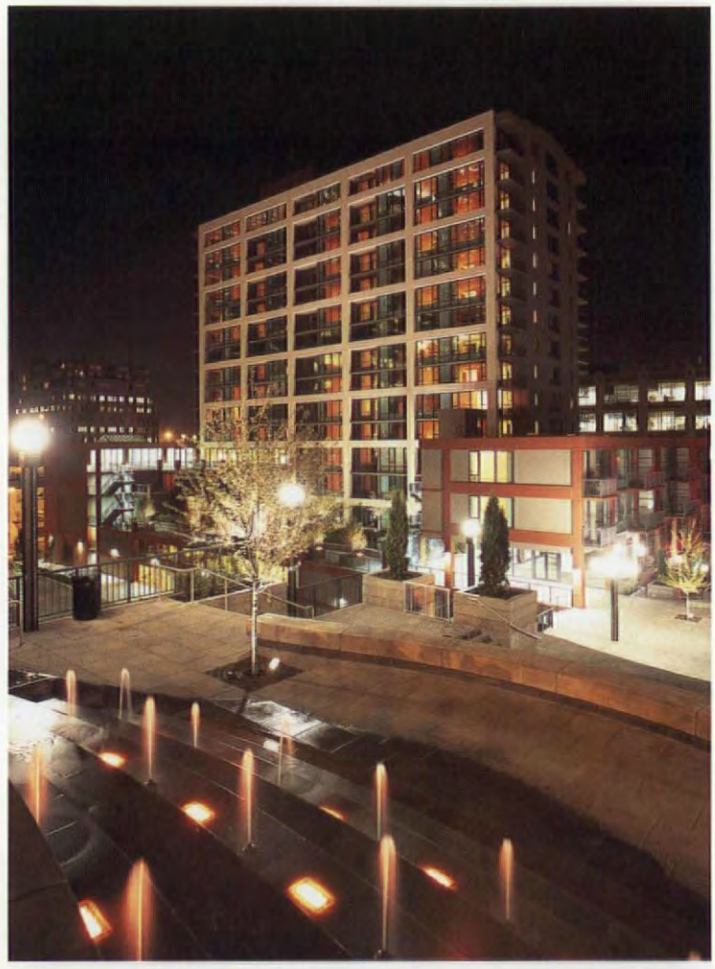
Colosseum wall (left) with billboard close to passing expressway. Early drawings (below) show ingenuity of multi-faceted project







Two views of the completed first phase (below). Model of completed development (bottom)



Harbor Steps - Phase 1, Seattle, Washington 1994

Harbor Steps is a major urban mixed-use development that incorporates retail, residential, hotel, and parking components. Callison's involvement included a study to establish an approach to the public street-level spaces within the area bounded by First Avenue, Alaskan Way, Pike Place Market and the old Federal Building in downtown Seattle.

Goals for this multi-phased project included establishing the site as a focal point of the surrounding area, providing east/west linkages from the waterfront to the uplands/uptown neighbourhoods to encourage traffic flow, creating a series of public spaces that take advantage of the expansive views, and ensuring a strong water to land perspective.

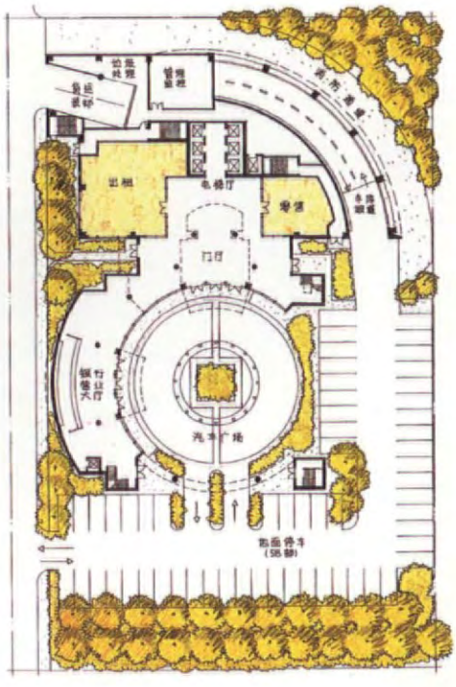
A series of landscaped terraces were developed to ease the steep 60 foot grade between First and Western Avenues, and to create a major public plaza within the Central Waterfront neighbourhood at the intersection of Post Alley and University Street. Building massing forms were selected that frame and maintain the University Street view corridor.

Bank of China Regional Headquarters project, Shanghai, China 1994

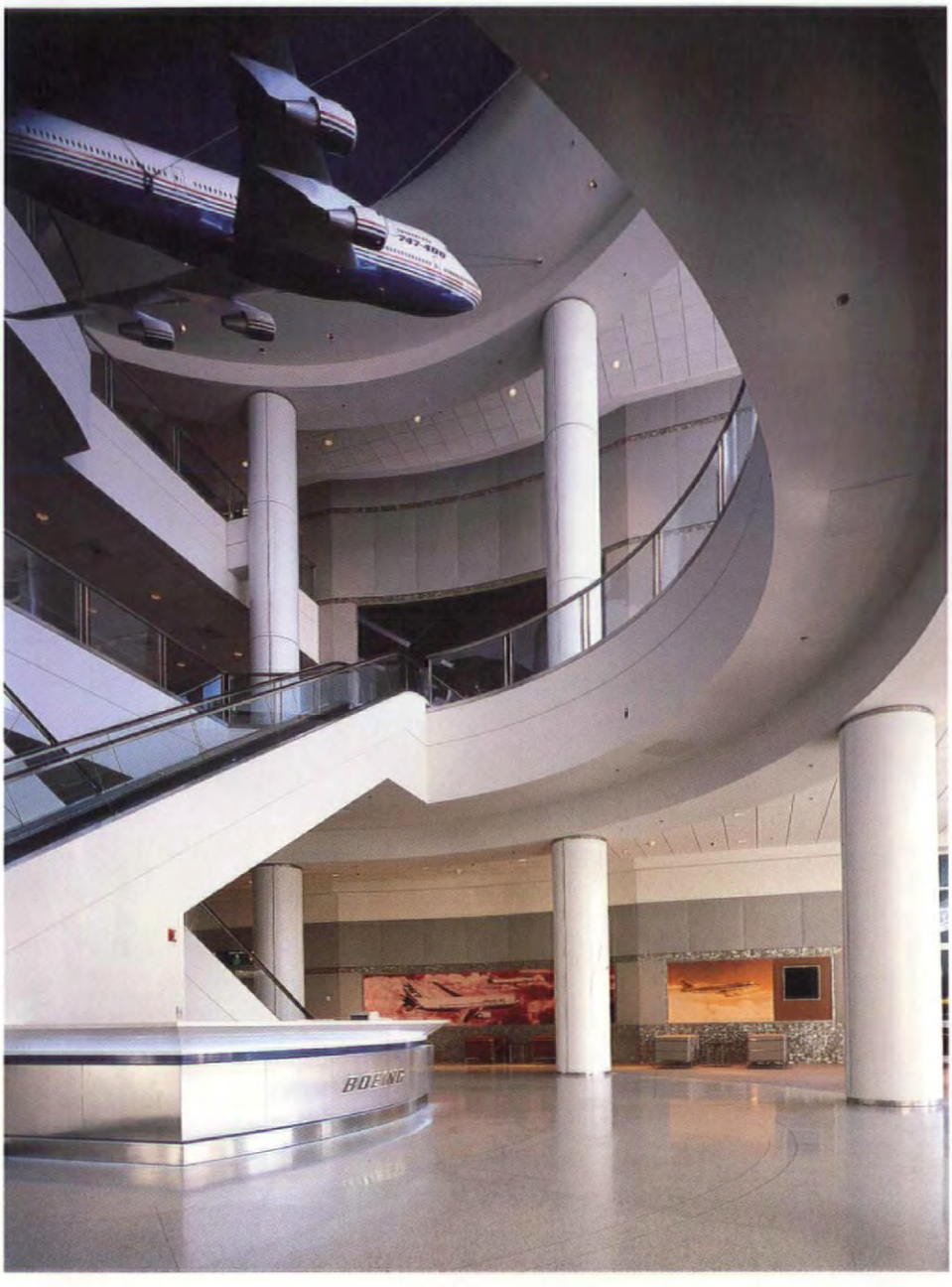
Located in the new Pudong development area of Shanghai, Callison is providing master planning and architectural design for this 32-storey, 41,000 square metre office tower incorporating a large volume of ancillary accomodation including a conference centre, business centre, entertainment facilities, retail banking and a restaurant.

The design incorporates the basic principles of the Chinese art of feng shui. *Its site placement takes full advantage of surrounding green space while its curved tower facade presents a dynamic and dramatic image to oncoming traffic.*

Office tower dominates large and complex development (left). Street level plan (below) shows access, parking and support facilities



Dramatic location of Boeing training centre is enhanced by carefully detailed aluminium cladding (top). Entrance hall and atrium are dominated by circular setting for scale model airliner (above in computer visualised form and top right in reality). Hall of flight simulators (right) shows accuracy of computer visualisation. This volume will accomodate four full-flying simulators operating simultaneously



Boeing Customer Service Training Center, Tukwila, Washington 1994

Boeing's new 600,000 square foot customer training facility was designed to train Boeing pilots and maintenance crews from airlines throughout the world. The centre includes classrooms, flight simulators, technology and physiology labs, a video studio, conference facilities and athletic and food service facilities. As many as 800 students will attend the training centre each month in addition to 1100 instructors and support staff from Boeing.

The goal for the Customer Service Training Center was to provide a functional, efficient and budget-oriented facility within a technically superior learning environment. One of the challenges was that the facility is to be used by an international clientele, so the layout has to be instantly understandable to students from diverse cultural backgrounds and with communications barriers - the primary one being language.

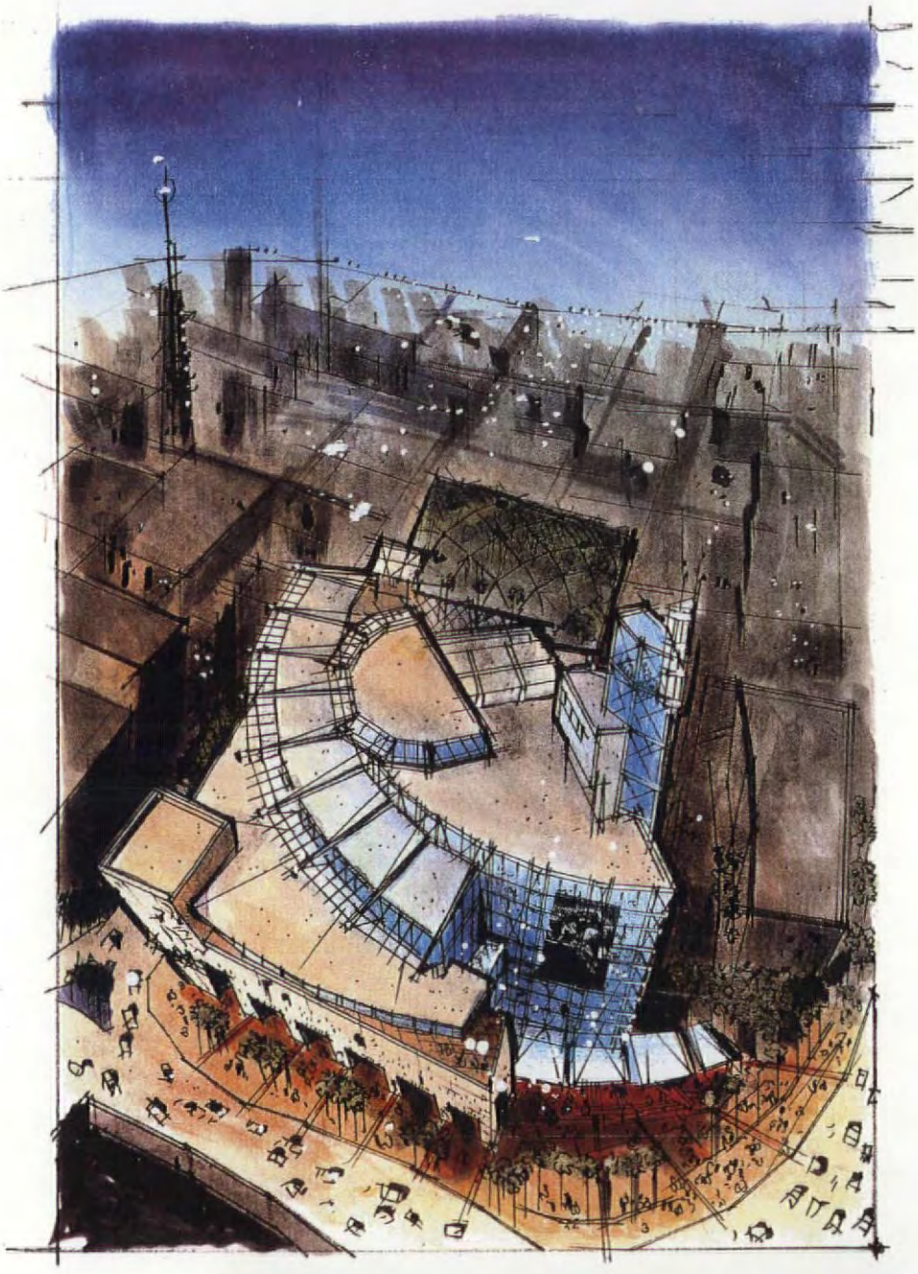
In response to this challenge, the entrance hall and atrium was designed to firmly direct visitors to their required areas. All learning activities occur on the second floor only. Classrooms are located on the left, simulators on the right. Since the building is an international facility, as well as being Boeing's principal showcase for products and teaching, the atrium's circular shape reflects the worldwide nature of the Boeing enterprise, while serving as the backdrop for display of their newest technological achievements.

Zaid Centre, Kuwait City, Kuwait 1994

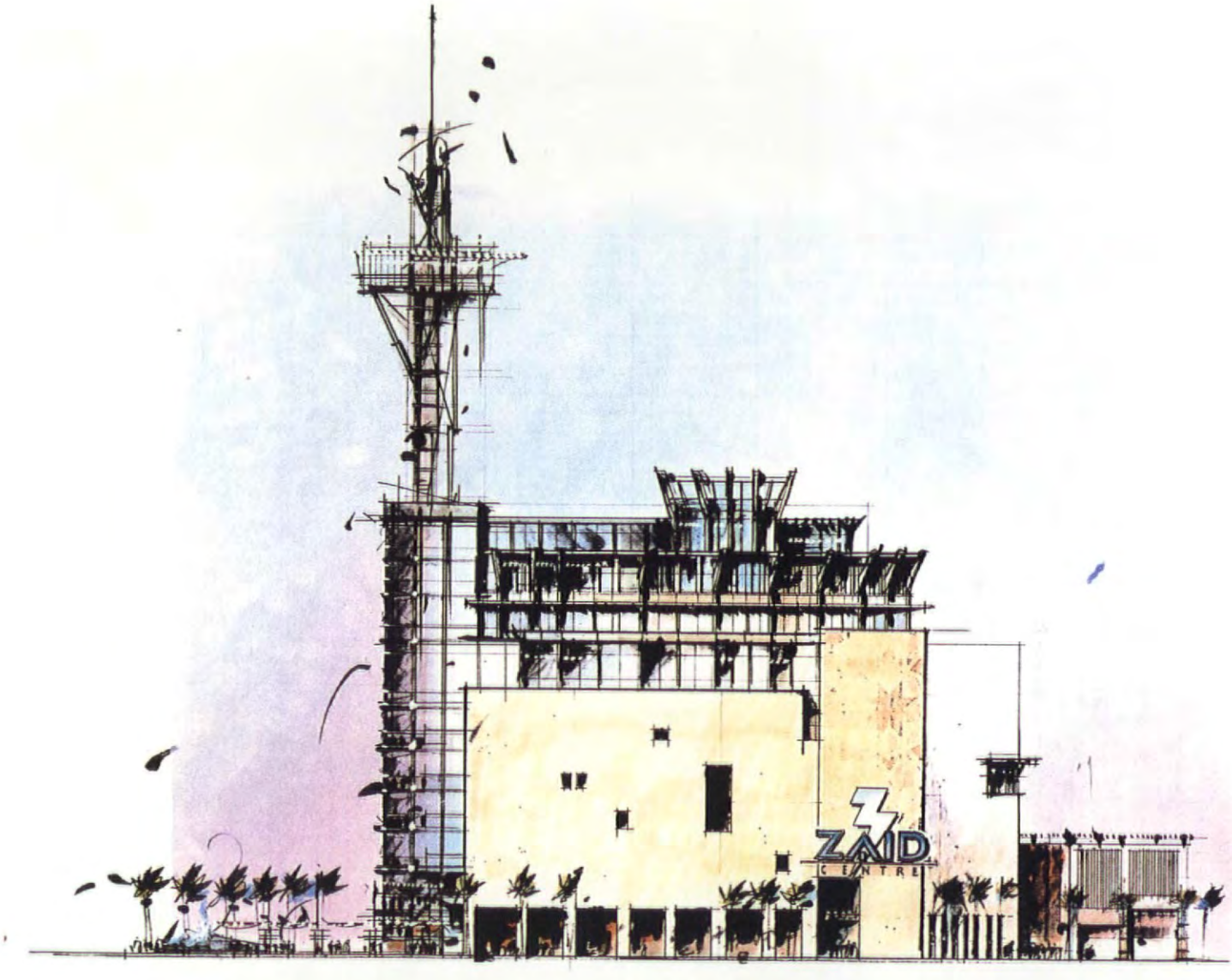
Callison is providing architectural and interior design services for the 28,000 square metre Zaid Centre, a proposed gift to the people of Kuwait City to honour the memory of the client's father. Conceived as a cultural centre, it is a place to gather, learn and socialise.

The design balances contrasting architectural elements – Kuwait's modernistic yearnings and its Islamic heritage. The modernist component, constructed of a light skeletal framework, features international retailers in the lower floors, with communal functions such as lecture halls and dining occupying the middle section of the building. The top floors are dedicated to an educational reference library and health centre. This dynamic 10 story landmark is revealed through a glass and metal curtainwall.

Thick sculptural masonry walls define the traditional architectural component and veil the "modernist" building from view and heat gain. Organised in a vernacular "souk" typology, local retailers are located on an internal street which mediates the two components. The street culminates in an atrium housing a kinetic multi-media assemblage, reinterpreting the minaret's heraldic traditions with a 21st century beacon.



Sketched aerial view (above) and model (right) show compact nature of complete Zaid complex. Sketches (left and far right) show design development. Elevation and detailed drawings (opposite page) show integration of curved elements at conceptual stage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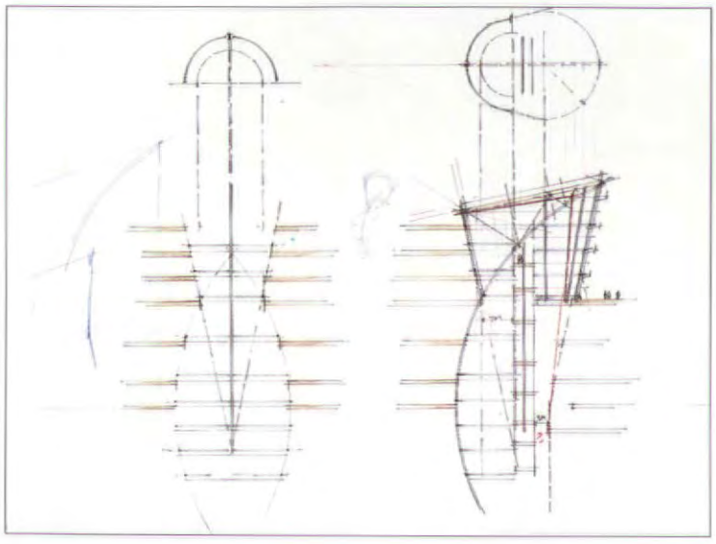
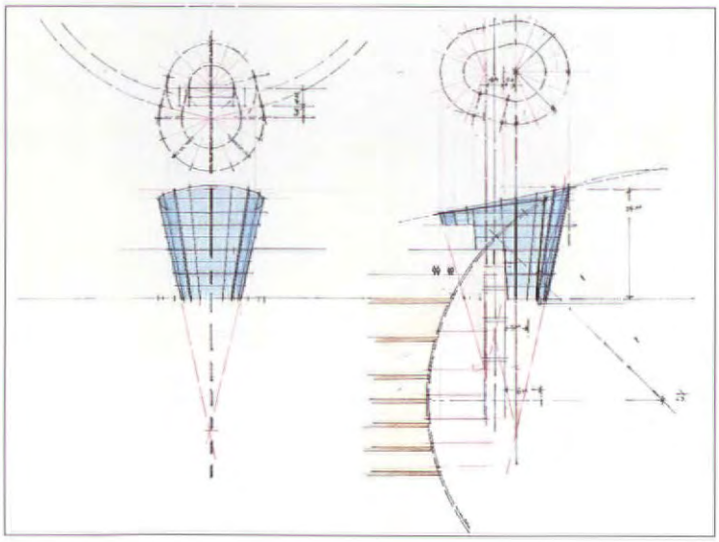


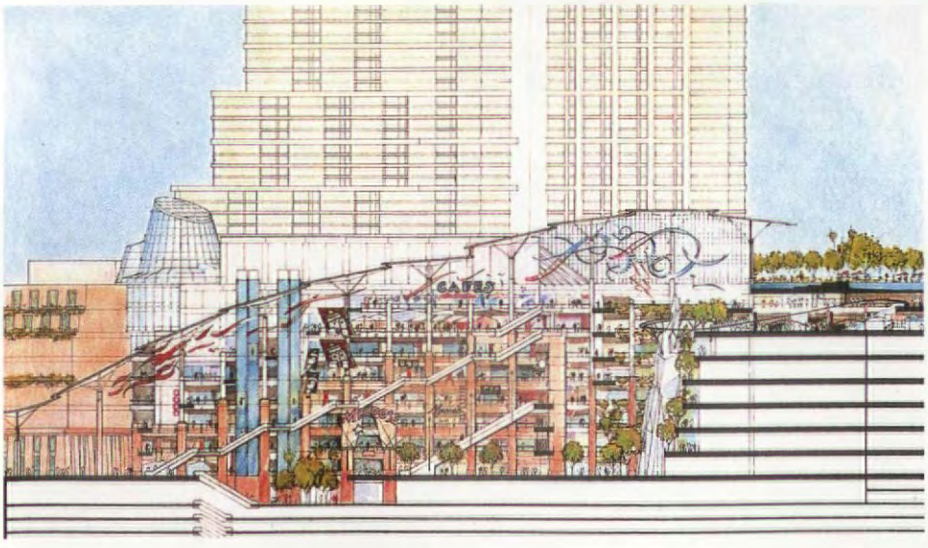


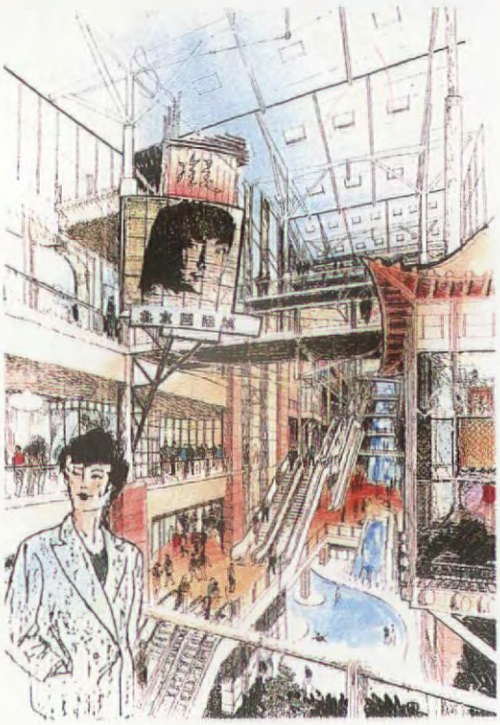
Beijing International City project, Beijing, China 1994

Callison is providing design services for this 390,000 square metre mixed-use development that includes a 65-storey office building, a 23-storey residential tower, a 500-room hotel and a 136,000 square metre, eight storey shopping and entertainment complex.

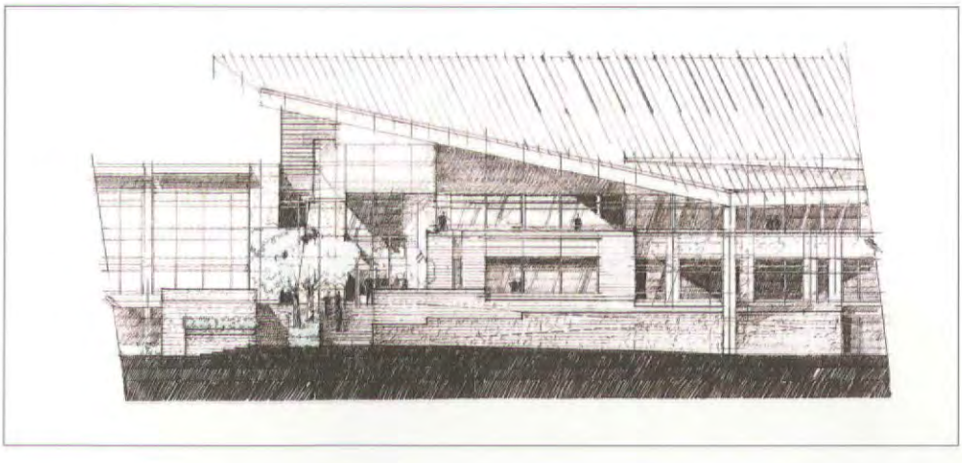
Incorporated into the design is a free-form expression of modern and futuristic retail experiences that embraces both the office work environment and the residential character into one very dense and massive building.

The design provides a very exciting experience inside, offering a sense of order and direction - but a series of surprises in the architectural form as well as entertainment elements.





Site plan (below) shows general arrangement and essential conceptual elements. Part elevation (centre) shows junction of new and "renewed" buildings. Full elevations at bottom



Eddie Bauer Corporate Headquarters, Redmond, Washington 1995

Callison is providing master planning, programming, architecture and interior design for the renovation and expansion of this 300,000 square foot corporate headquarters.

Eddie Bauer's corporate vision is to continue carefully-nurtured growth, while remaining an employee-oriented company. They want their new corporate headquarters to help facilitate this vision. Eddie Bauer's growth over the past ten years has caused the company to expand - the company leases and owns space spread over a dozen different buildings in the Redmond vicinity. This new headquarters will "bring each department back home".

This multi-phase project will entail both new construction and renovation to existing Eddie Bauer facilities, both in owned and leased buildings. The new and "renewed" headquarters facility will include two wings. The Commons wing will house the company food service facility, fitness facility and meeting and training room complex which includes an auditorium. Its location encourages circulation to and from all campus buildings, allowing active participation by all departments at this new "hub".

The Development Centre wing will provide a terminus to the public entry drive and drop-off zone leading up to the main building entry. The North wing will house Design, Merchandising, Sourcing and Visual Presentation departments of the company. The South wing will contain marketing, advertising and executive functions. Building massing and material selections will enhance the site's natural amenities while supporting Eddie Bauer's corporate goals.

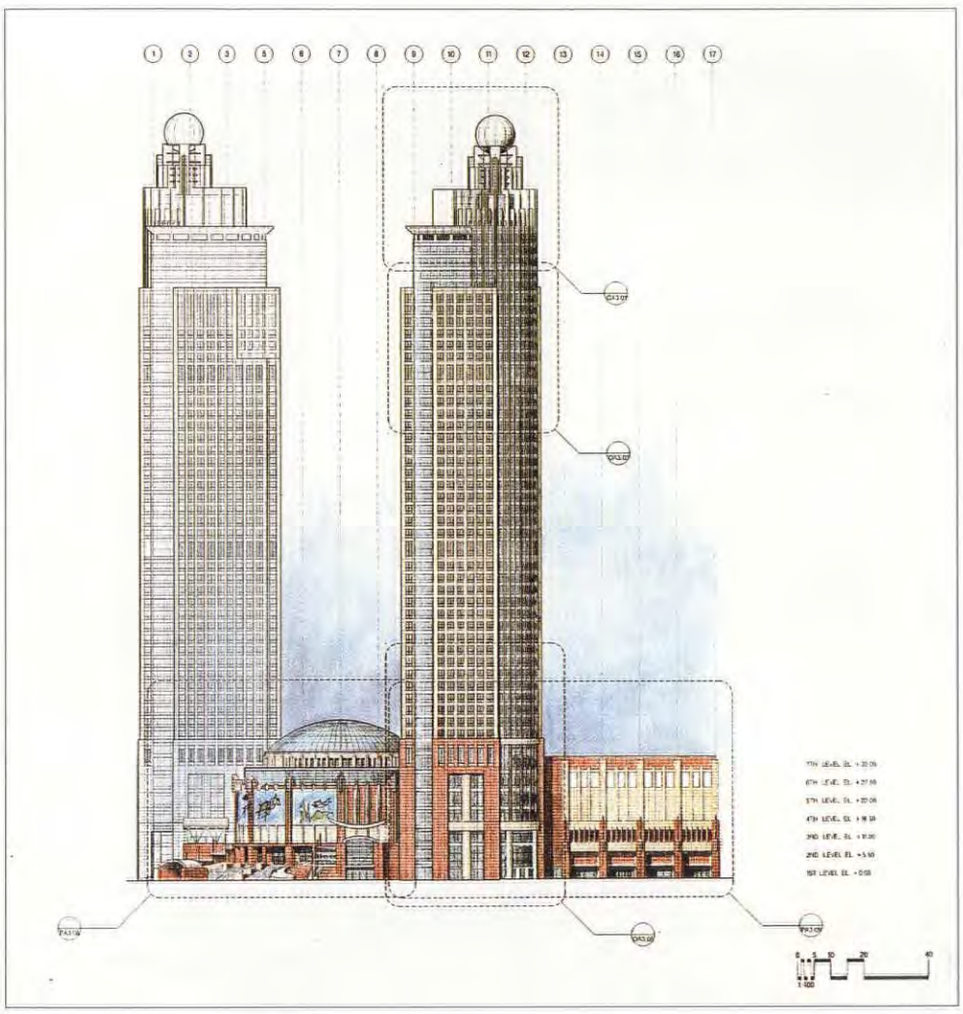
The Grand Gateway Project, Shanghai, China 1996-7

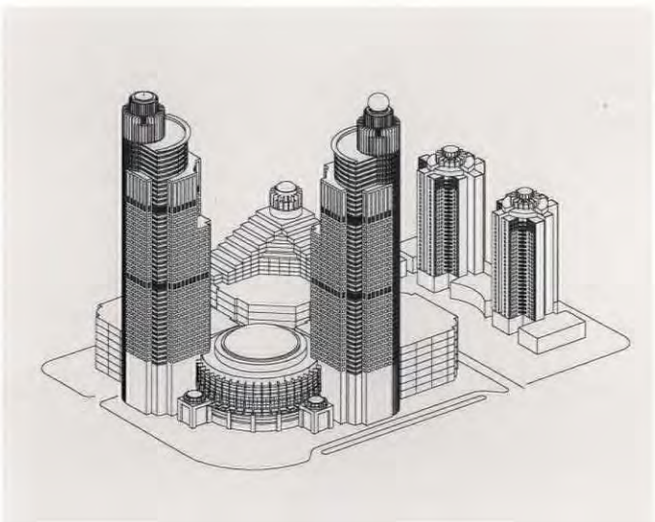
The Grand Gateway at Xu Jia Hui Centre occupies a premium site of approximately 546,700 square feet at the Xu Jia Hui subway station, the largest subway station in Shanghai and a major hub of people movement in the city. The project is intended to serve as the gateway to this burgeoning commercial district. The 3.3 million square foot mixed use development includes twin 53-storey office towers that rise over a seven-storey, 1.4 million square foot retail podium, flanked by 4 nine-storey apartment buildings.

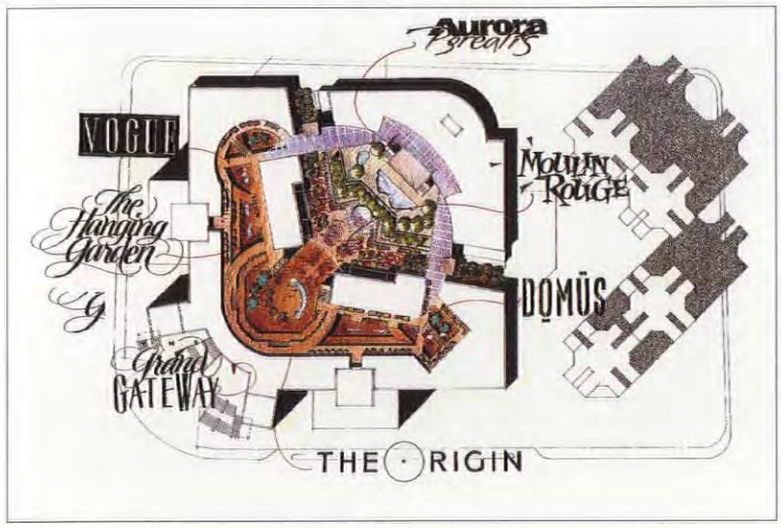
The scale of the project's retail programme required Callison to break it up into different zones that would have various themes and international characteristics. Callison also developed a retail merchandising strategy for the client and the proposed tenants.

The client on the project had been working with another architectural firm for 10 months and had been unable to gain the required government approvals to move forward with the project. Callison was hired in November 1993 and helped secure the required permits in six weeks and, three months later, completed schematic design of the project to allow the structural work to begin in January

Callison's services include planning, architectural and interior design, as well as retail planning and graphic design for this major mixed-use development.

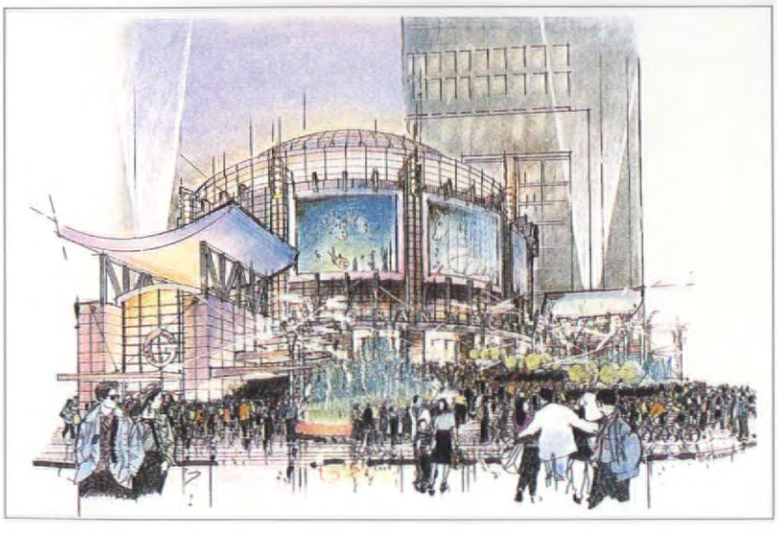






Twin towers (above and below left in computer-generated form) rise above subway station complex. Conceptual plan (below) shows arrangement of attractions

Twin towers have austere power (below). Conceptualisations (bottom) show lighter retail environment

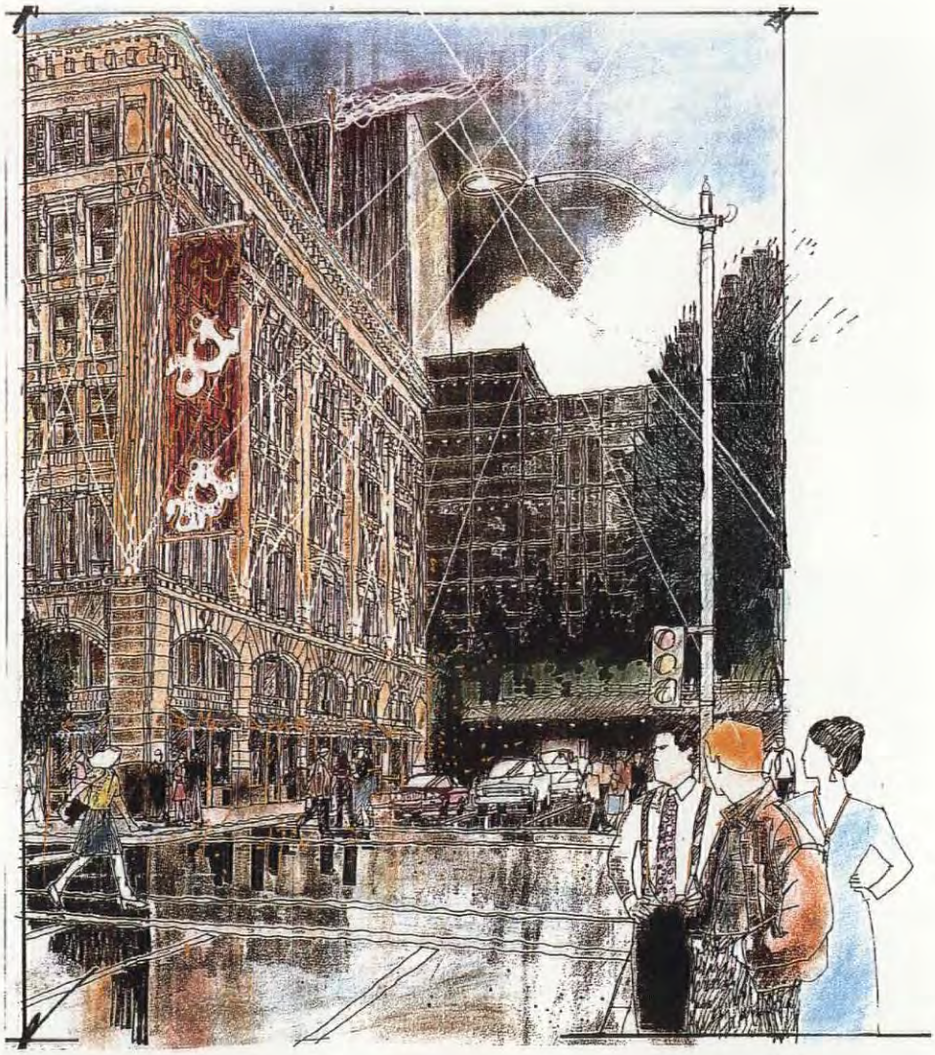


Eagles Auditorium and Theater project, Seattle, Washington 1996

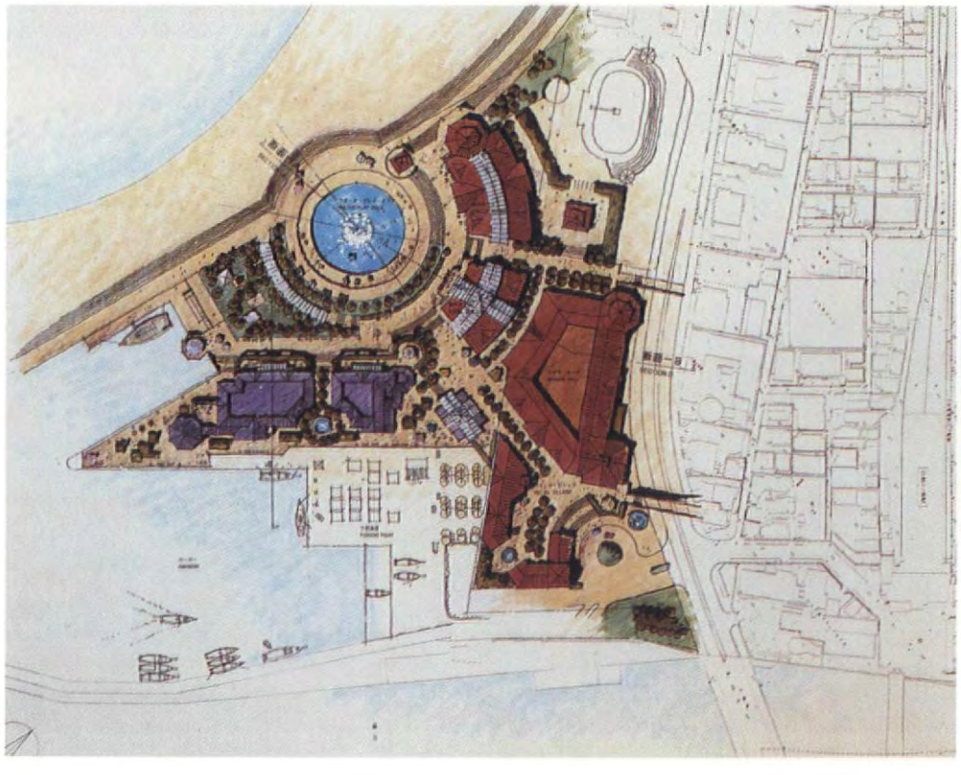
Callison has provided pre-design services and design for the renovation of Seattle's historic eight-storey Eagles Auditorium to accommodate a Contemporary Theatre's two 360-seat performing arts auditoria, associated administrative and workshop areas and the top storey's low income housing.

Design objectives included providing the opportunity for daily interaction between the staff and the actors, and natural light to workshops, administrative areas and other support spaces.

The interior and the exterior of the building will be restored to its original grandeur with new exterior terracotta and new interior decorative plaster. The existing housing units on the top floor of the building will be renovated to accommodate 44 housing units for the Seattle Housing Resources Group.



Upper sketch shows rejuvenated exterior, with computer rendering of auditorium interior (right)



Shonan Nagisa Point, Tokyo, Japan 2000

The focus of this waterfront development located south of Tokyo was to provide a new facility that would be attractive to visitors as well as the families and seniors in the local area. The 42,800 square metre development also responds to the existing fishing industry and provides a facility for community and musical and dramatic performances.

The 15,000 square metres of retail features include open-air retail grouped around a large pool and along a fishing pier, as well as an enclosed Western-style shopping centre. The central plaza with a vista promenade focuses on Mount Fuji across the Sagami Bay.

Callison developed the winning site plan, architecture and environmental design for this limited design competition.

Aerial view of proposed development (top), and early site plan

GLOBAL REVIEW

SPANNERS

Such is the impact of long-span building structures such as Piano's Kansai Airport that whole conferences are now convened to discuss their implications. Engineers, naturally enough, are heavily involved in the design of these ever-larger public spaces and some of them are feeling a need to catch up with the structural and public safety implications of big-span design.

Accordingly the International Association for Bridge and Structural Engineering met in Birmingham, England, in September 1994 to discuss the issues. As far as the IABSE was concerned, "highly technological" architecture of this kind was engineering-led, and the organisation came up with a definition of what that means: "The dimensions and distribution of the structural members gives the building its refinement and the structural details give it whatever modest decoration it requires".

Engineering practitioners such as Jörg Schlaich of Germany, Mamoru Kawaguchi of Japan and Anumolu Ramakhrishna of India were joined by a British pair oddly described as "prima donnas" in the conference information: architect Michael Hopkins and engineer Sir Ted Happold of Britain. At issue were matters of fire safety, crowd control, and maintenance of this relatively new generation of long-span structures. This was timely in view of the fact that, as Kansai opened, Piano was also about to embark upon a large-scale refurbishment of the building that, in the public perception, began it all - his and Richard Rogers' 20-year-old Pompidou Centre in Paris. No-one really knows how long these structures can last, or how much change they can take.

Information on the findings of the conference from IABSE, ETH-Honggerberg, CH-8093 Zurich, Switzerland. Tel: +41 1-633 2647. Fax: +41 1-371 2131.

CZECHS NOT BOUNCING

The inflation figures say a great deal, and hide a great deal more. It used to be taken for granted that the former Western Europe enjoyed relatively stable and low inflation, while the newly unfettered markets of former Eastern Europe witnessed inflation on a grand and disruptive scale. True enough, but things are beginning to converge a little.

A year ago, Romania was reporting inflation of 249 per cent per month and Bulgaria 94 per cent. Those same countries are now running monthly rates of six, and eight per cent.

The gap between these nations and the affluent "western" states now emerging from recession is therefore still huge, but lessening. The Old West now enjoys annual inflation figures roughly between two and five per cent (the extremes are Greece with nearly 11 per cent and Switzerland with 0.6 per cent).

The economic good boy of the eastern states, at least on this measure of economic performance, is the former Czechoslovakia. The Czech Republic is now likely to bring its annual inflation rate into single figures, which is the kind of target that the Old West used to struggle to achieve only a few years ago, while Slovakia, a country without quite the same trading oomph, nonetheless shadows it reasonably closely.

Did we say "good"? Of course, low inflation figures frequently hide gloom and empty order books in the construction markets, where boom and an overheating economy - as in Turkey and China - are more often the indicators of luscious contracts to be had. But as far as

The second post-electronic Mackintosh at Farr in Inverness, Scotland

the former Eastern European states are concerned, declining inflation is taken as a good sign - it might become possible to start pricing projects again, for instance. Most analysts since Gorbachev have accepted that a period of hyper-inflation was part of the necessary pain of liberalisation. Of course, they did not predict such matters as gang warfare, Mafia-run local economies and plutonium smuggling - activities that so far seem to be absent in the still whiter-than-white former Czechoslovakia.

RIM MASTERS

It no longer makes sense to regard separate countries in the Asia-Pacific region as separate markets, as far as property analysts are concerned. You might think that New Zealand and Sri Lanka, for instance, had little in common with each other, or Australia with Vietnam, but as far as international property advisors Jones Lang Wootton are concerned, Asia- Pacific is "a single real estate market, with cities/countries behaving as different sub-markets, each with its own characteristics".

Proof of this, according to JLW's Asia-Pacific chairman Chris Brown, is that developers and investors increasingly operate across the whole region, not just in their countries of origin or adoption. Thus Sri Lanka's new World Trade Centre in Colombo - the standard 100,000 square foot package of offices and retail - is largely being developed by Chinese money.

JLW has now published an Asia-Pacific property investment guide covering ten countries: Singapore, Indonesia, Malaysia, Thailand, Vietnam, Sri Lanka, Hong Kong, Taiwan, Australia and New Zealand.

It is not a "how to" guide, rather a dry compendium of information relevant to all the countries in question - such as which countries charge Value-Added Tax, which have treaties with other nations to avoid double taxation, are there foreign exchange controls, are there restrictions or incentives on foreign property ownership, and so on.

For further information contact Chris Brown at JLW Australia. Tel: +61 2 251 5888. Fax: +61 2 232 8120.

MACKINTOSHES BREEDING

Just as it is has long been possible to commission houses by Frank Lloyd Wright that he designed but never built, so you can now do the same with the rather less prolific output of Wright's near-exact Scottish contemporary, Charles Rennie Mackintosh.

Given the veneration in which Mackintosh is held in Scotland these days - his once-distinctive graphic style has been diluted into a virtual symbol of Glasgow, for instance - and given his propensity to enter competitions and design speculatively, it was only a matter of time before someone started to build unbuilt Mackintosh.

Already, Glasgow has seen the building, in Bellahouston Park, of Mackintosh's "House for an Art Lover", a failed entry for a German ideas competition in the 1900s. The Art Lover's House however remains incomplete internally due to shortage of cash: it was intended to double as a Mackintosh museum and rent-paying offices.

Now we have another: the "Artist's Cottage" at Farr, Inverness. Like the Art Lover's House, this design was originally dashed off by Mackintosh with no particular site in mind. There is some evidence to suggest that, having been designed in the year of his marriage to the artist and designer Margaret MacDonald in 1900, this cottage and studio was meant to be the family home. The plans remained on the shelf, latterly in the possession of the Hunterian Art Gallery in Glasgow, until a wealthy Scottish family decided, in the mid-1980s, that they wanted a new house, and that it had to be Mackintosh.

The plans and elevations were consulted and the house was eventually built in 1992 by Inverness architect Robert Hamilton Macintyre, who has a connection with the successors to Mackintosh's old firm, Keppie Henderson and Partners. As with all such exercises, there were areas where it was necessary to use the imagination: Mackintosh had provided few clues as to the interiors, nor had he prepared any working drawings. As a result the house interior inevitably appears

to be a vague amalgam of other built Mackintosh designs while everything that did appear on the original drawings is copied exactly, right down to the rather casual and obtrusive rainwater pipes on the rear elevation.

As so often with such costly labours of love, the owners who built it had to sell up less than two years after completion, which suddenly brought the existence of this private house to public attention. It is undoubtedly a powerful form in the Highland landscape, its white, softly moulded appearance (this is not the sterner, Baronial Mackintosh) strangely reminiscent of some 1990s housing experiments in Tokyo.

FRENCH BILLIONS

France is, somewhat to its surprise, beginning to emerge from recession. Those who thought that the state, with its much-publicised privatisation programme now under way, must have spent its coffers dry during the bad years, can think again. France is planning to spend an awful lot of money on capital projects and development grants over the next five years.

"An awful lot" means FF250 billion, which the government has managed to accumulate from a mix of central, regional, local and European Union funds.

This money is to be spent on what is termed "regional development". But France, the centrist state par excellence despite its regional governmental structure, is making sure that the spending of the cash is not left entirely to local discretion. The money is to be administered in each "departement" by the Prefect, who is the central government representative.

There seems to be some idea of avoiding corruption and achieving even-handedness in this. But whatever the reason, the result is that France's drive out of recession, unlike in other western European countries, will depend as much on public spending on capital and infrastructure projects as on spending by consumers. Much will go in the form of grants for the development of business: which means, over the next five years, rather more new factories and office buildings in France than would otherwise have been the case.

STARK LOOS

Philippe Starck designs a bathroom and the marketing men quote Mies: 'Today, less is once again more'. A shame the iconoclastic Starck could not pen his own copy: *WA* remembers with affection the words with which he opened an exhibition of his work at London's Design Museum last year ("It's all rubbish. Go in there and destroy everything").

Anyhow, this Starck bathroom is not for a specific building project, such as the hotels he is famous for, but rather is a range of sanitary ware for the German makers Duravit. The result is meant to be back-to-basics and style-free. The inspiration for the taps, lavatory, bidet, basin and bath is meant to be the ancient forms of the handpump, the bucket, and the wooden tub. Hooks for clothes and towels and the various other surface-mounted bits and bobs? Derived from the idea of a nail driven into the wall.

One has to admire Starck. Looking at the forms of his sanitary ware, you can almost believe this basic-form stuff. It is, however, distinctly opulent: not too many buckets have pear-wood veneer, for instance. The bath in particular is most reminiscent of King Nestor's bath, made from a single piece of terracotta and dating from around 1300 BC, which is to be found in the remains of his palace near Pylos in Greece.

T.R. Hamzah & Yeang have recently completed this structural glass curtain wall at the headquarters of the South East Asia Development Corporation in Kuala Lumpur. Engineers were Whitby and Bird

The Duravit marketing types do not have appear to have picked up this allusion, and it's probably best not to tell them. Oh, and the stuff looks great.

Details from Duravit AG, Postfach 240, D-78128 Hornberg, Germany. Tel: +78 33 700. Fax: +78 33 8243.

CHINESE CHEQUERS

As China's leader Deng Xiaoping slips slowly into history, the status of China as the world's fastest-growing economy remains intact, despite bearish warnings posted in earlier editions of Global Review. We maintain that the fall will inevitably come; in the meantime China's momentum, established by 14 years of economic growth at the rate of around nine per cent a year (much more in the southern provinces) shows few signs of slackening yet. But what do such figures translate into on the ground?

One medium-sized British architectural practice, RMJM, has experienced a high level of commissions from China over the past decade, from hotels and factories to masterplans for whole new towns. Headlines tend to go to American-designed developments in China, such as plans for a succession of "world's tallest buildings", but in truth it is the accumulation of projects by smaller firms such as RMJM that give the clue to the level of construction now going on.

Completed or under-construction RMJM projects are of the predictable kind: a Holiday Inn in Dalian, a food products factory in Beijing. The future stuff is on a grander scale, however. Take Huang Pu Gardens, in Guangzhou. This is a complete new commercial and residential district for this port area in the Pearl River Delta, where economic growth averages 20 per cent a year. It's a mix of everything, including the kind of cruciform high-rise block familiar from Hong Kong, and it totals more than 800,000 square metres.

There's a similar but slightly smaller, $52m project at Shanghai, called Butterfly Gardens. There's a not wholly dissimilar

Pont Royal. Not quite the same as the artist's impression

50-hectare new town called West Zhuhai. There's Xinhui New Town, for 150,000 people. All masterplanned by a modestly-sized practice, which represents a tiny amount of the construction work being currently approved.

Not all of this kind of thing makes it into reality, of course - not much has been heard recently of Richard Rogers' Shanghai New Town, for instance - but soberingly large numbers of such projects do.

We'll tell you how many. RMJM calculates that 62,789 projects involving foreign participation, valued at $83bn, were approved by the Chinese authorities in the first nine months of 1993. Nineteen-ninety-four will be, if anything, still more intense. Can development possibly continue at this pace? So far, the consensus seems to be that it can. A starved home market of a fifth of the world's population, combined with a global demand for low-cost manufacturing capability, is keeping it all going. So far.

ROYAL BRIDGE

Ever since Francis Spoerry's Port Grimaud in Provence, the French have always seemed more proficient at the matter of creating pseudo-vernacular holiday villages than almost anyone else. What other country, *pace* Seaside in Florida, would find its developments held up, as Spoerry's is, as a model for new urban modes?

Subsequent variations on the theme, despite being generally better than attempts by other Mediterranean nations at building holiday "villages" in the olive belt, have nonetheless tended more towards the pseudo than towards the vernacular. And always, whatever country they are in, they have to have golf courses, which rather tends to ruin the authentic air they strive to attain.

Take the development of Pont Royal, sited between Avignon and Aix-en-Provence. This will be a collection of three villages, dropped into 450 acres of mainly low-grade vineyards, olive groves, orchards and pine forests. The first tranche of development, called the Village de l'Eglise, is well on the way to completion, under the architectural direction of one Chuck Legler.

This offers us the chance to judge the difference between the artists' impressions produced when such developments are first planned, and the end result. The village square as built appears to be a wider and bleaker place than the rather smaller, café-lined affair of the original presentation.

As for the houses, these are done reasonably well, as is not uncommonly the case in France. If you don't mind pure repro Provençal style, you'll find the limited vocabulary of tile, iron, wood, stone and colour wash is expressed plausibly enough.

There are two main problems. The first is the eternal one of making an entirely new place seem as if it had evolved over centuries, which logic and experience tells you is impossible; and the second is that this has to be reconciled with a vast golf course designed by Seve Ballesteros.

Significantly, Pont Royal is being marketed strongly on its investment potential. No-one is expected to live there for more than 10 weeks of the year. The deal is that you buy a flat or house and then have your capital gradually returned to you in rents from others, all managed for you remotely, of course. Real Provence cannot offer anything so convenient, but in real Provence, real unmanaged property is much cheaper.

JAPANESE BOOTSTRAPS

Notwithstanding the news on China, Asia's largest economy is still Japan. In contrast with Beijing, Shanghai and elsewhere, the Japanese property market remained virtually dead during 1994, not least because of a high vacancy rate in offices - around nine per cent of empty space, when "normal" vacancy rates there are nil.

Japan's great development and construction companies, off the world stage for the past few years, are expected to make a cautious return as home conditions improve. Typically, Japan has invested hugely in its new Renzo Piano-designed, Ove Arup-engineered airport at Kansai, built during the slump years and opened in September 1994 bang on time for the expected recovery.

Until that comes Japan - and even China - can only marvel at Hong Kong, where capital values have risen by well over 90 per cent in the past year. That rate of growth is by no means sustainable. However, public infrastructure projects such as Sir Norman Foster's new Hong Kong airport and its associated metro system will continue to act as a spur to development. □

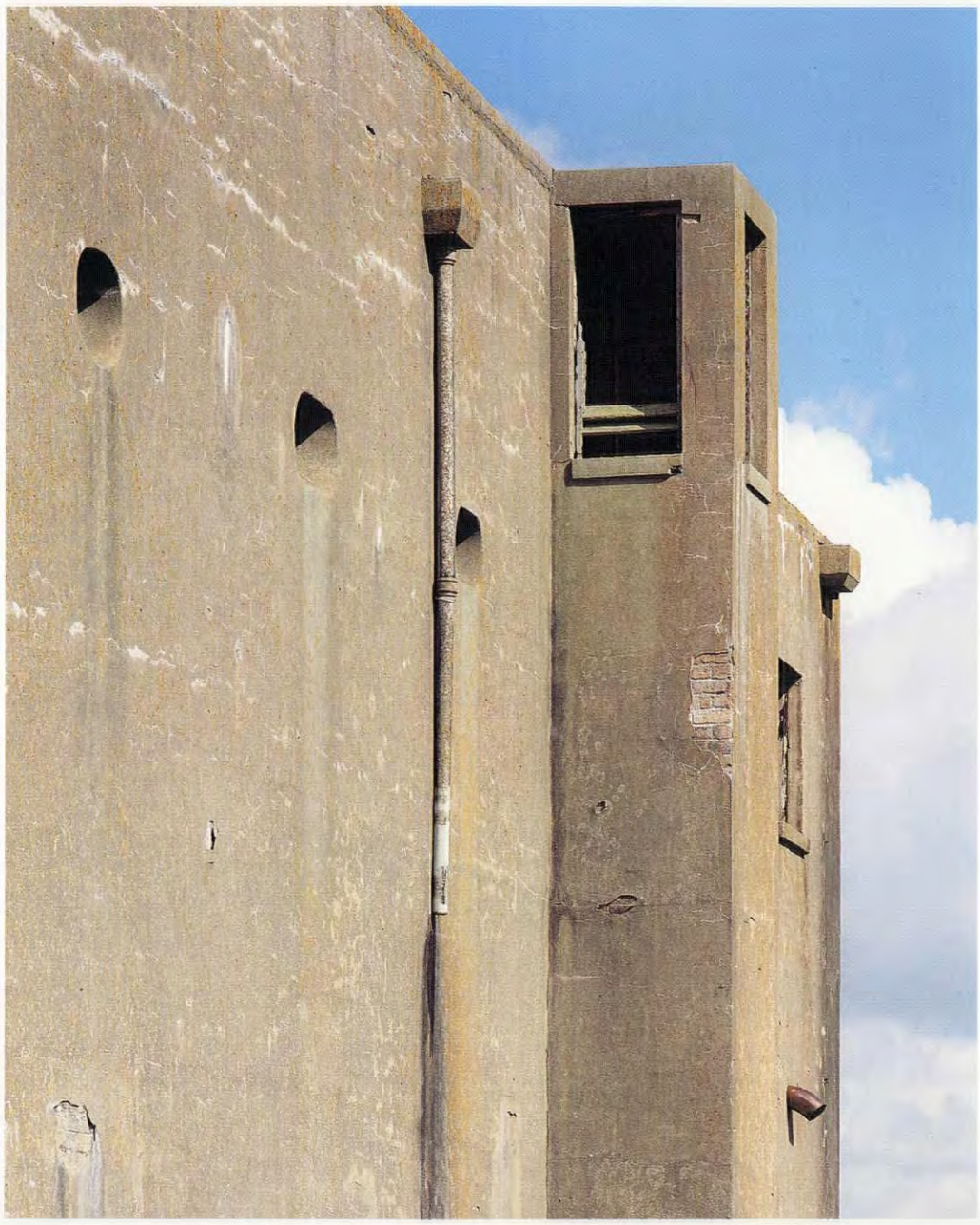
MARTIN CHARLES

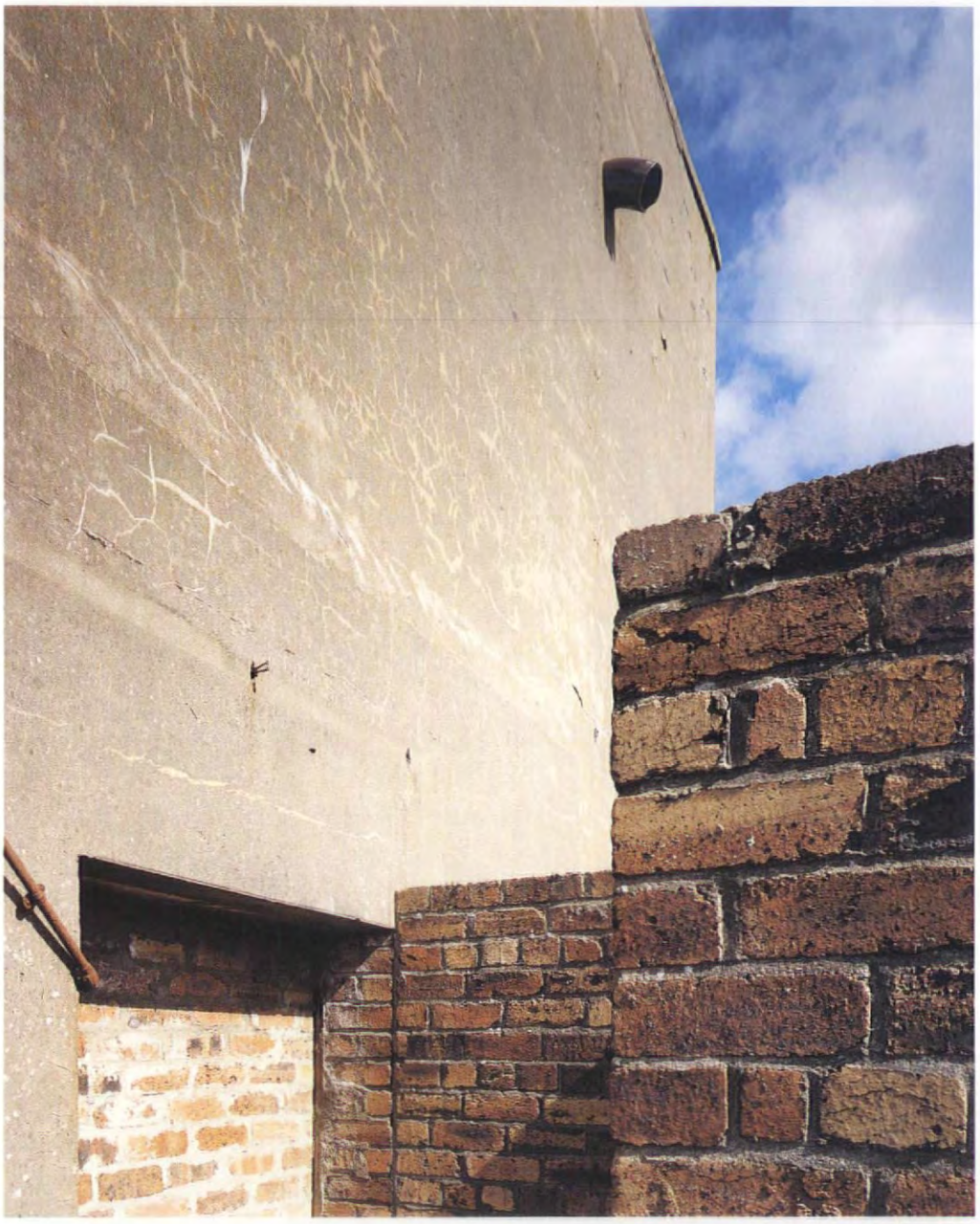
Into the *WA* menu of the best of the new, it seems rewardingly salutary to insert an anonymous wreck. Now well into its second half-century, this powerful design, badly let down by indifferent materials, suffers the elements and random assaults of human and pigeon.

It refuses to merge with its environment, and betrays no clue as to its function. Unlike more traditional structures which grow in individuality as they age, this has become ever more abstract.

I have approached it in the same spirit.

Telephone 0181 560 6694





EUROPE'S DOOR

One of the strangest architectural stories of modern times concerns the striking Kuwaiti Investment Office towers in Madrid. Designed by Johnson & Burgee nearly ten years ago, work on them was abandoned at the time of the Gulf war and has only just been resumed. Photographs by Carlos Dominguez.

The saga of the construction of Madrid's KIO towers finally seems to be reaching its conclusion. F.F.C. (Fomento de Construcciones y Contratas), the company building the leaning towers, resumed work in September 1994 and are aiming for completion by May 1995. This completion phase for "Europe's Door" alone is going to involve an investment of about 7,000 million pesetas (£35 million), provided there are no last minute complications or changes in the design.

The construction of the towers stopped with the onset of the economic crisis in Spain in 1989, so many see the resumption of the work on the towers as a symbol of industrial recovery. The KIO Towers had major problems before even before work on the project ceased. The peculiar design of the two buildings, designed by the American architects Phillip Johnson and John Burgee, challenged both the architectural context of the Spanish capital and the laws of gravity, as both rise from the ground at an angle of 15% to the vertical.

The trouble with KIO started in December 1989 when the development company Urbanor suspended payments to contractors and subcontractors. From then onwards construction work ground to a halt, since Intemac, the company charged with quality control, also stopped work. This task must now be resumed with special zeal because the long cessation of work may have produced some structural weaknesses.

The suspension of payments by Urbanor provoked a big controversy. Although some voices suggested that the best solution to the problem would be to demolish the towers, the only way for Urbanor to repay its debtors was to sell them to another developer. Between 1990 and 1993 the towers were auctioned three times before a buyer was found. Then, on 22nd November 1994, this time without a reserve price, the Koplowitz sisters and the Caja Madrid-Banco Central Hispano consortium bought the incomplete development for approximately 8268 million pesetas (£41 million).

Now that F.F.C. has resumed work on "Europe's Door" the complete project needs to realise a price in excess of 20,000 million pesetas ($100 million) more than the price paid at auction in order to show a profit.

In order to enhance the project F.F.C. has started work on landscaping and water features. At the same time the municipality of Madrid expects to complete work on the neighbouring transport terminus. □


FCC
PUERTA EUROPA

Tim Soar

FUTURE TOILETS

Bramante architects have completed the refurbishment of the main public toilets at St George's Hospital, Tooting, within a modest budget and to demanding NHS Trust requirements. The result is an almost space age environment of staggering cleanliness and hygiene.

The client's request was for a high standard of design and finish that would make an immediate impact on all those entering the hospital, and serve as a flagship for other public facilities in the building. There were no design constraints except that the new toilets had to be as graffiti and vandal resistant as possible, since graffiti was a massive problem. The other requirement was ease of cleaning and maintenance in an area of very high use. The toilets are located in the main entrance lobby and next to the Medical School as well as Accident and Emergency wards. It was also desirable to somehow squeeze in a designated babycare room where both mothers and fathers could change nappies and feed their babies.

The most significant design innovation introduced by Bramante Architects was a state of the art infra-red control system. This means that there are no taps or WC levers, only sensor plates. Each sensor plate has a customized circuit board to control the flushing flowtime and the sensitivity of the infra-red beams themselves.

These infra-red WC flushes are unique and were especially prototyped for this project. They are the first of their kind to be installed anywhere in the UK.

At the entrance to the female toilets a wash of light from behind an angled wall plane creates a small but ethereal vestibule - beyond is a spectacular panorama of tutti frutti walls and stainless steel elements.

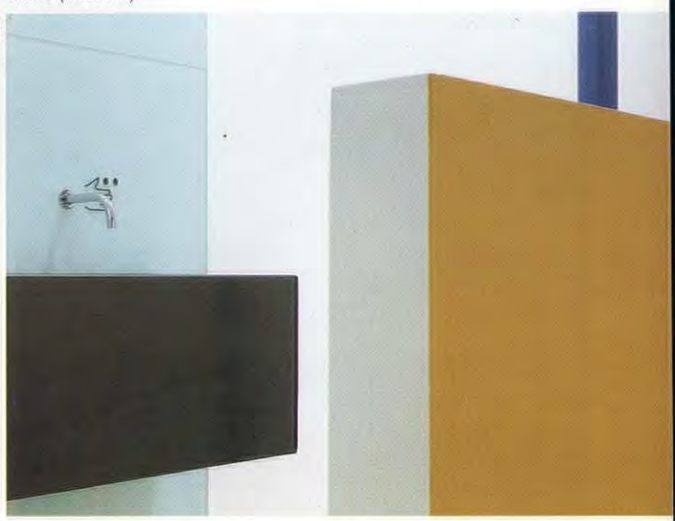
The seamless cubicle walls with their curved backs are cast in in-situ terrazzo. Only the vanitory top is pre-cast. The tutti-frutti terrazzo was designed and prototyped by the architects. The white marble chippings are mixed with fragments of coloured glass. The rough glass globules were annealed and supplied by Nazing Glass. The colourful glass fragments glitter and sparkle under the low voltage halogen lights.

The wavey vanitory-top recedes to allow close proximity to the mirror for make-up. The stainless steel hand basins are mounted underneath the vanitory top so that the thickness of the massive slab can be felt. The transparent glass fragments lead the eye into the walls themselves - like looking into the depths of the ocean. The intriguing three dimensionality of the flat monolithic walls produces a delirious effect. The kaleidoscope of tutti frutti colours reflected in the bright space creates a festive, confetti-like atmosphere.

Cantilevered toilet bowl in the female lavatory (opposite page). The "Mondrian like" experience of the male lavatory (below left) with slate handwash trough (below) and slate covered cubicle walls (bottom)

Tim Soar

Tim Soar



Katsuaki Furudate

The former free-standing plastic waste bins have been replaced by recessed rubbish chutes. Only an opening in the far wall, illuminated from within and glowing brilliant white, intimates their existence. To change the bin-bag the door, lined with acid-etched glass, slides out like a drawer.

The WC cubicles are deliberately overdimensioned at 1.2 metres wide. They feel exceptionally spacious and allow room for walking sticks and zimmer frames. The back wall is gently curved to avoid awkward dirt collecting corners. All WC pans are cantilevered rather than floor mounted to maintain a clear floor plane.

The stainless steel cubicle doors are also specials. The large cloud-shaped indicator panels make it easy for partially sighted people to determine whether a cubicle is vacant or occupied. Also, each door is fitted with a custom made ajar setting. With these and the rising butt hinges, the doors always return to their pre-determined ajar position which is approximately 20 degrees - thus a vacant cubicle is clearly indicated.

The visual impact of the fixtures and fittings in the disabled toilets has been minimized by the simple expedience of flush-mounting, recessing, use of mirrors, good lighting and creating a sense of transparent space.

The disabled WC pan is a new design. The cantilevered unit is 700 mm deep so it is no longer necessary to create the depth needed for a wheel chair user. The time-honoured stainless steel grab-rails were replaced by crystalline acrylic rods which provide elegant support and, like lenses, magnify the coloured glass in the terrazzo walls. They were prototyped for this project and fabricated with a special fixing that eliminates the use of cover plates.

The rear terrazzo wall is cut down to allow for an acid etched clerestorey light. It borrows light from the adjacent female toilet and visually enlarges the space.

The special handwash basin has a hidden bottle trap. This was an important design consideration to create an unobstructed plane under the basin. This makes it easier for a

Geoffrey Beeckman

The female lavatory shows lavish sculptural and lighting effects for such a utilitarian space

Mike Thomas

wheelchair user.

Despite having the largest maternity ward in London, St George's had no babycare facility for parents available in the entire hospital.

Although only tiny, the room we have provided uses clear and acid-etched glass and subtle, indirect lighting. The nappy changing table is covered with green rubber. The hand basin is set into the table so that the mother never has to turn her back on the baby.

The entire lighting scheme is carefully considered so that no direct light shines into baby's eyes when it lies on its back. A full length fluorescent tube runs along the back of the nappy table - it is covered with a strip of toughened acid-etched glass. The diffused light illuminates baby toys.

In the corner a built-in seat and modesty panel provide a comfortable an secure place for breast feeding. The white seat hovers freely in space and a fluorescent tube fitted to its underside washes the wall behind with light and throws light across the floor. The light under the seat also has the effect of keeping the seat warm. All other lighting in the babycare room is borrowed through acid-etched and clear glass from the adjacent gents' toilet.

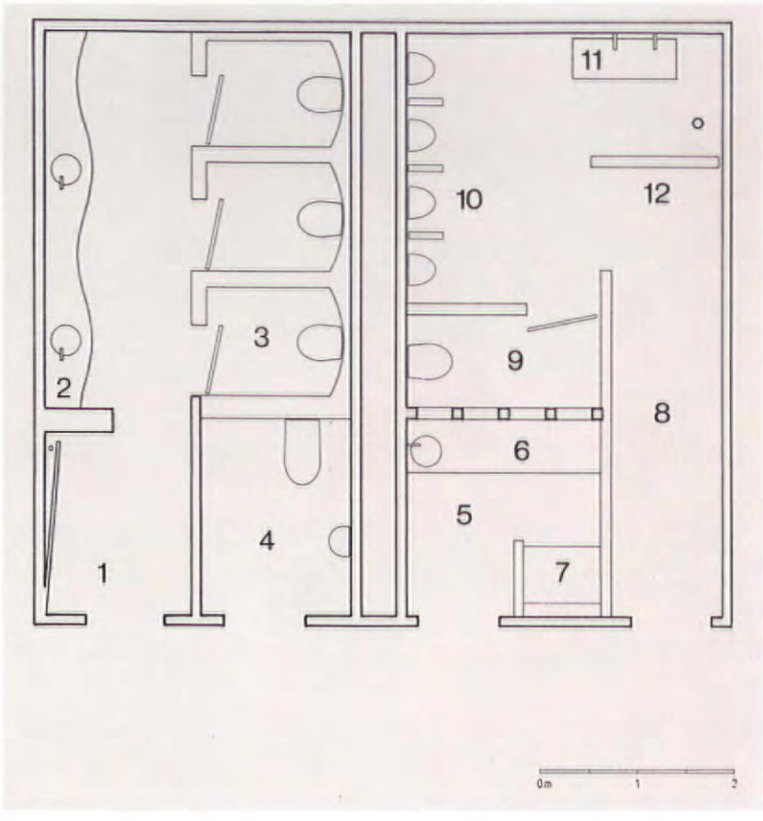
Soiled nappies disappear through a flap in the wall. The stainless steel nappy bin was specially fabricated.

To enter the short corridor to the male lavatories is to step momentarily into a Mondrian composition - on the far wall a translucent, glass panel hovers behind a slender, blue column and a bold yellow dwarf wall. A vertical sliver of slate set into the light grey wall foreshortens this narrow passage.

The square mirror that bleeds out of the acid-etched wall reflects the gents' cubicle with its walls of Welsh slate. This stark contrast of colour and material, thus framed, reads like a window into a surreal space beyond.

The urinal partitions are fabricated out of Corian. Their curvacious, cloud-shaped form contrasts with the strict rectilinearity of the

The babycare room (below left), plan (below) and "cloud-like" divisions between urinals (bottom)



space and help to make sense of the entire composition. All dimensions are based on a geometric gird - they either enforce or counter each other.

Graffiti in the gents' cubicle was the biggest problem. After countless tests with proprietory anti-graffiti surfaces, we suddenly hit upon the idea of lining the walls with natural slate. Slate is not very expensive and fell well within the limited budget. Its black colour renders black felt pen or biro invisible. A solid core material, it is black throughout and any indelible ink can be easily polished out with an electric sander. Also, the acid-etched clerestorey lights in the gents are cut deliberately low to create the unnerving psychological effect of being overlooked.

The handwash trough takes its reference from the troughs found in theatres. Carved out of a single block of Welsh slate it belies its exterior form by being surprisingly shallow. To one side a cylinder was carved into the block to contain the reservoir for the built-in soap dispenser.

There is a clear gap between the trough and the acid-etched wall. The trough sits on cantilevered steel supports invisible to the eye. This creates the impression that this massive, monolithic block is suspended in the air.

The acid-etched glass wall behind the trough was coated to make it impervious to dirt. The decal signs, in the form of two hands, are acid-etched into the glass. The infra-red sensor plates are mounted behind the glass. The beam travels through the circular cut-outs in the glass. The blue column has a simple steel peg spot welded to its side to double as a coat hanger.

As in the ladies, the illuminated opening in the rear wall serves as a waste bin. The gents' toilet is illuminated through a specially constructed bulk-head in the ceiling concealing a long fluorescent tube. It has a purpose made reflector that throws a long narrow strip of light across the wall above the urinals. All the downlighters have individual transformers to facilitate easy replacement.

The new hospital toilets at St. George's successfully solve the unrelenting problems of graffiti, vandalism and maintenance. The fact that the toilets have now been open for some months and no graffiti has appeared on the walls is a testimony to their success. What was a shameful and decrepit corner of a leading London Hospital has been transformed into an exciting and uplifting space. □

Key to plan

1 Ladies' entrance vestibule
2 Terrazzo vanity top
3 Cubicles (terrazzo)
4 Disabled toilet
5 Babycare room
6 Nappy changing table
7 Breast-feeding seat
8 Gentlemens' toilet
9 Cubicle (slate)
10 Urinals
11 Slate basin/trough
12 Half wall

Tim Soar

EARTHQUAKE

The arrival of the great earthquake has been part of the mythology of Southern California for the best part of a century. It still has not happened, but there have been intimations, notably the great tremor of January 17th 1994 when over 5,000 buildings were damaged. Only later did the implications of this disaster upon Californian building regulations become clear. Lori Stocker tells the story.

On an early holiday morning, when no-one had yet awakened, the earth shook with a force so strong that freeway overpasses collapsed, sections of other freeways buckled, houses moved off foundations and, in some cases, continued down a hillside. Fortunately most Los Angelenos survived the Northridge earthquake of January 17, 1994 but many of the buildings which they frequented on a daily basis had lost their functioning ability within that 15-second seismic event.

The earthquake damaged close to 6,700 structures of which some 2,200 were single- and multiple-family housing units. For weeks afterwards, structural engineers combed the Los Angeles basin, inspecting homes, hospitals,

Spectacular damage. Parking garage near the epicentre (opposite page) and apartment building (below) show degrees of racking. Furniture store roof fell in (bottom left) and medical office building had to be demolished following sheer cracking (bottom right)

offices and public facilities.

"Homeowners were panicky", said John A.Martin Jr., president of John A.Martin & Associates, one of the largest structural engineering firms in the United States. "They believed that cracks in sheet rock walls were indicative of severe structural damage - in most cases it was cosmetic only." Martin was appointed by Pete Wilson, governor of the state of California, to serve on the Northridge Earthquake Panel, formed to study the tremor's effects.

Unfortunately not all buildings escaped with superficial cracks and broken windows. Structures which didn't survive the strong forces failed for different reasons. Structural engineers expected that nonductile concrete and precast buildings would fare poorly, as well as those buildings constructed before current codes had been adopted. (These codes resulted after studying the effects of the 1971 Sylmar earthquake.)

In some instances the jolt caused older homes to jump off their foundations and land out of kilter. This could have been prevented had the structure's columns been bolted to the slab foundation.

A multiple-storey office building in West Los Angeles was torn down just days after the earthquake hit. It has been in operation for 30 years but could not handle the rocking motion, likely due to its lack of adequate shear walls, thin columns and wide spacing of spandrels.

Closer to the epicentre, a large three-storey department store, 22 years old, failed in punching shear and pancaked. The earthquake's forces literally tore loose the column-slab connections throughout the nonductile concrete-frame structure.

Buildings with clear load paths for lateral loads or those whose architects had included symmetry in their design were better able to withstand the earthquake than those with clerestoreys, for example, explained Martin.

"Modern ductile concrete-frame buildings did well," added Thomas A. Sabol, president of Englekirk & Sabol Consulting Engineers, Inc. Ductile concrete-frame buildings fared better than many people expected – welcome news to their architects and engineers.

One of the most prominent of these is the 3900 West Alameda building in the Burbank Media District. This 30-storey poured-in-place concrete structure "is amazing" said its architect, Herb Nadel of The Nadel Partnership & Shapiro in West Los Angeles. "It's located as close to the epicentre as many buildings which suffered damage yet it didn't even get a hairline crack."

The design of 3900 West Alameda included closely spaced columns, spans of 30 feet in each direction, lots of reinforcing steel and thick floor slabs. This detailing is what made the difference in performance.

Although many buildings failed because they did not meet current standards, newer buildings which did meet the code sustained damage that is not visible from the outside. As their inspections progressed, structural engineers began to realize that many steel-frame buildings suffered moment frame connection failures. At this writing over 90 buildings in the Los Angeles basin have been inspected and found to have sustained connection failures. The number is expected to rise as more owners are encouraged to inspect their structures.

Nadel voiced the concerns the steel industry is feeling, "We don't think of steel, with a 60,000 psi, as breaking. Bending and stretching, yes, but not breaking."

Another of Nadel's projects was a four-storey steel-frame structure in Valencia, U.S. Borax. It suffered cracked welds in 80 per cent of its 700 connections. A one-storey laboratory building, also steel-frame, suffered damage when it rocked against a concrete garage adjacent to it.

Department store wrecked by column/slab joints wrenched apart

Many of the steel-frame buildings had bolted web-welded flange connections in the seismic moment frames, according to Sabol. He is serving on a Los Angeles city panel studying steel-frame buildings. Sabol has identified five attributes which contributed to moment connection failure:

1) failures of the frame girder bottom flange welds,
2) failures of the frame girder top flange welds,
3) cracks in the shear tab or shearing of web bolts,
4) cracks in the frame column, and
5) divots of steel removed from the face of column flanges.

These weld failures occurred in buildings from one-storey to 22-storeys high (taller buildings sustained more failures in the upper 1/2 to 2/3 of the structure). Column flange stiffeners and return welds on shear tabs did not affect whether the building sustained damage.

Hoping to answer why welds failed in the moment frame connection, the American Institute of Steel Construction asked the University of Texas to conduct a variety of tests. Sabol and Michael D.Engelhardt, professor at the University of Texas, Austin, are co-principal investigators of the tests. The tests were also part of a request from a private corporation in the midst of a major construction project in West Los Angeles which had sustained damage in the Northridge quake. The project manager wondered, could our plan's current design be seismically upgraded before construction is completed?

Because of the urgent need to repair and rebuild, the testing was to determine the most reliable column-beam welded joint as soon as possible. Initial test results revealed that specimens were not performing up to expectation. Specimens designed to meet current building standards were not able to withstand a simulated 7.0 earthquake (Northridge measured 6.8). In one test the connection broke after one up-down shake.

Initial base line tests were done on a column-beam weld to determine if minor improvement to welds would make a difference in performance during an earthquake. These tests failed.

Another test was performed on a fully welded joint-beam flange and beam web welded to a column flange. These welds have performed no better than the "improved" welds in the above test. These two tests indicated that rewelding a joint will not measurably improve performance. In fact it would be waste of time and money.

At this point, testing was suspended while the results and procedures were revaluated. But the initial results caused a tidal wave of concern to wash over the Southern California structural engineering community. Said Martin, "We need to know what to do and we need to know now. Structures are being repaired to meet current standards. But it appears those standards are inadequate."

For the general population the quandary deepens when public buildings are being repaired. Can they be renovated to withstand another middle-sized earthquake or perhaps the Big One geologists claim has yet to come?

Testing resumed with tighter controls placed on the welders. Acceptable results were achieved on Test 3B, so tests 1 and 2 were replicated, also with tighter welding controls. Controls included the machine settings and fastness of weldings. One of the welders indicated that he believed he had done a better weld on the first welds tested. Yet those welds had failed.

Awaiting test results is a heart-wrenching experience for everyone involved in the rebuilding process. "I've poured through articles and books looking for answers, but we don't have any yet," said Martin. "People are waiting for us to tell them how to repair their buildings, how to make them safe. We're all looking to these test results to provide the information. We have to give our clients the best and most current information."

Sabol agreed, adding that "we're all aware of the irresponsibility of providing inadequate repair remedies. We are advising people to wait until the testing is completed but many can't wait for the results. In those cases we advise them to strengthen their buildings."

Engineers haven't given up on steel because its qualities make it an ideal building element. "Flexibility is one of the reasons it is so popular," explained Martin. "No steel-frame buildings collapsed during this earthquake, even so we do need to take a second look and revaluate its performance."

During the Sylmar earthquake it was the concrete structure which suffered extensive joint failure. That industry poured money into researching ways to make concrete a safer building element in actively seismic zones. Sabol indicated that "had the steel industry done the same thing we might not have seen the damage we have right now." These tests are a step toward finding the answers.

Martin stressed the importance of these results for use in upgrading those buildings similar in design to and constructed during the same time period as those which collapsed. "We need to keep in mind the life safety factor. Steel buildings typically perform well in this area. The department store which collapsed is an "everybody dies" scenario.

"We have to find those buildings and apply what we learn to renovate them. They need to be reinforced before the next earthquake rumbles through."

Damaged concrete structures (below) with remedial measures (bottom)

All photos on this page by Fred Stocker

Educational Centres Undergo Reparations

The greater Los Angeles area is home to many post-high school educational centres. University of California-Los Angeles (UCLA), California State University-Northridge (CSUN) and California Institute of Arts (CalArts) in Valencia are three of those which sustained damage in the Northridge earthquake. UCLA fared better than the latter two and all three were able to keep classes from being discontinued. CSUN, closest to the epicentre, opened Spring Semester later than originally scheduled, but through the use of construction trailers where classes were held, graduated the Class of 1994. CalArts conducted classes at off-campus locations while construction repairs were made to the entire school structure.

These schools had one more thing in common: John A.Martin & Associates were called in to coordinate the structural engineering portion of the seismic repair work. Reconstruction began almost immediately, and in the case of CalArts, before final renovation plans had been completed. Work is continuing at break-neck speed to meet the schools' deadlines.

UCLA's Royce Hall, a centre for music and arts, is one of several structures damaged on January 17. Currently under a complete seismic renovation, the work includes repairing damage to the towers as well as adding walls for extra support.

CSUN suffered damage to most of its buildings. Students shared walkways with hard-hatted construction workers striving to repair classrooms, laboratories and the Oviatt Library to pre-quake condition. Most repair work on the Science 1 & 2 buildings consisted of sealing the cracks in shear walls, replacing windows, interior ceiling and wall repairs as well as fire damage. Shear walls on building 2 show epoxy injection repair work in progress. These injections will strengthen the shear walls by eliminating gaps and cracks.

Similar injection work is also a major portion of seismic repairs being done at CalArts. Here grout injection was used to repair cracks in stacked bond walls that measured 1/4" or larger. Epoxy injection was used in cracks smaller than 1/4" The walls at CalArts are all stacked bond which suffered damage throughout the structure.

CalArts also suffered severe damage to several load-bearing walls, some of which collapsed entirely. The east-facing cafeteria wall on Block D was rebuilt using Grade 60 A615 rebar in a ductile concrete-frame wall. Extra columns in the Main Gallery, Block A, were added to give additional support. The North wall in Block E, although a load-bearing wall, did not reach to the foundation because a dance studio was located directly underneath the theatre. Ron Lee, with John A. Martin & Associates, was project engineer for CalArts. He designed a concrete diaphragm to give needed support for that wall. The diaphragm is attached to the stair wall and the wall of E316. The added support will dissipate lateral forces from the weak point in the load-bearing wall.

The support walls were made of masonry but are being rebuilt with reinforced concrete. During the reconstruction Leonard Madsen, of Beck/Madsen, general contractors, said that although the structures did not suffer cracked welds, there had been instances where the bolts on steel columns were stressed and in some cases not tightened properly during original construction.

Three hundred tradesmen are working long hours to complete the reconstruction. John A.Martin & Associates and Beck/Madsen are preparing a dynamic structural analysis for a planned seismic upgrade and renovation. This work is planned for 1995. Perhaps not as cost-effective as doing the upgrades while repair work is being done, but an example for a structure that needs to be up and running as soon as possible. □

THE COLUMBUS EGG

Sir Norman Foster & Partners' Business Promotion Centre in Duisburg, Germany, is one of the most adventurous buildings ever produced by the practice. Revolutionary in its climate control systems, triple-glazed envelope, shape and small number of highly finished components, it is a technical tour de force. Here we present an analysis of the design by Gabriele Bramante together with specially prepared drawings by the architects, and a full element and supplier breakdown, right down to the fax numbers.

Jens Willebrand

With its abstract and indefinable shape the new Business Promotion Centre in the north German town of Duisburg looks more like a contemporary urban sculpture than an office block.

Already a landmark and the city's focal point, the building has polarised the people of Duisburg who are equally intrigued and disturbed by its powerful physical presence.

Like a monument to the future, this daring building was conceived, from the outset, to herald the beginning of a new age - the age of microelectronics!

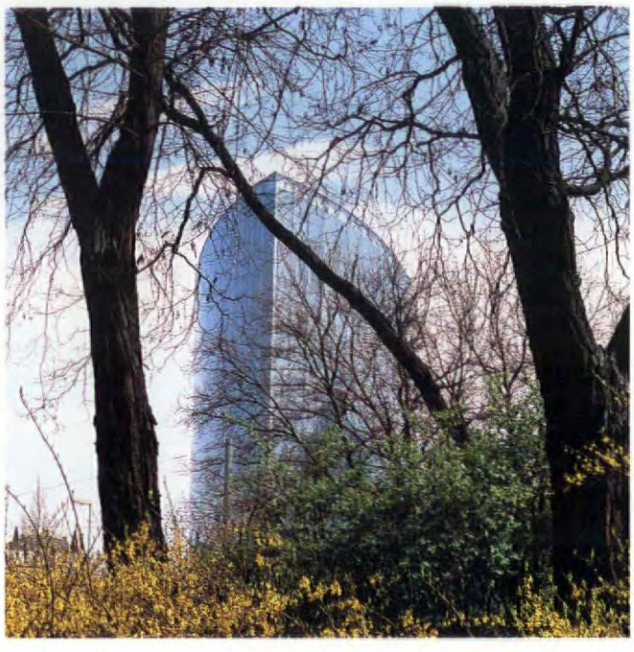
Until a few years ago, the name Duisburg in the Ruhr was synonymous with coal mining. However, with north German pits being shut down at an alarming rate, the region is now forced to rapidly develop a new industry that will support its people. Duisburg's long-term strategy is to become Europe's nerve centre for the research and development of microelectronics.

The transition from generations of coal mining, belching black chimneys and soot laden air to squeaky clean assembly lines with workers in white gowns and face masks, could hardly be more dramatic.

Foster's Business Promotion Centre, affectionately described as "Columbus egg" by the chief planning officer, is the first physical manifestation of the Ruhr's changing industrial landscape from coal to computer technology.

A remarkable building with an interior like a Zeppelin (left), and a prow like a ship (below)

Dennis Gilbert



Dennis Gilbert

This daring building, with a facade that looks as if it did not exist, has no solidity but tremendous posture. It was made possible by the extraordinary vision of its client, Norbert Kaiser. Framed by a Shell petrol station and undistinguished urban blocks, the building makes no attempt to mimic its neighbours, built several decades ago. From the outset, the city's planners supported the scheme's futuristic aspirations in the belief that to reproduce the past must surely be the most anti-traditional thing.

From the very early stages some four years ago, the project was driven by project architect, Stefan Behling. Working in David Nelson's team, they developed the building's unusual lens form which had started life as a banana shape.

The clear and understated floor plan, so skillfully resolved, brings a radical intelligence to bear on the building. There is nothing excessive. The aim was to distil out anything that might break the fluency of the composition. With the structure contained rather than expressed, pencil sharp perimeter lines are employed to create the most dramatic effect.

The building's taut and seamless skin has no focus, no melodic progression, not even the entrance, offset to one side, fractures the relentless frontality of the street facade. The building is animated only by reflections forever setting up new relationships.

At night, in a spectacular striptease, the internal lighting dissolves the substance of the walls and the building assumes an extraordinary transparency.

It is the arresting dynamic of its form, its process of ruthless reduction and its state of the art Building Management System that make the Business Promotion Centre stand out and signal change with all the possibilities that offers.

Structure

By the standard of projects at Sir Norman Foster and Partners, the Business Promotion Centre is a small building. The lens-shaped floor plan is 50 metres long and 16 metres at its widest point. The central lens-shaped service core, the floor slabs and the internal columns at 6 metre centres are all concrete. The facade is essentially a curtain of glass suspended from a steel perimeter beam.

The complex geometry of the perimeter beam caused huge problems on site. No one could accurately draw and prefabricate the many different steel sections required to form a curve that would follow the building's footprint as well as slope downwards to create the shapely sloping roof.

Contractual Situation

Pilkington subcontracted *Anders* to install the facade.
Hoch Tief did the structural frame.
Muller did the interior fit out.

Setting out the positions for the steel sections in mid-air and seven storeys above ground, proved almost impossible. After several ill-fated attempts and costly delays, Hoch Tief, one of Germany's leading general contractors, gave up and another firm came on site mid-project. In the end, the setting out of the steel ring beam was only made possible through an ingenious system of projecting laser beams up from the ground floor through holes in the slabs that determined the exact positions for the steel sections.

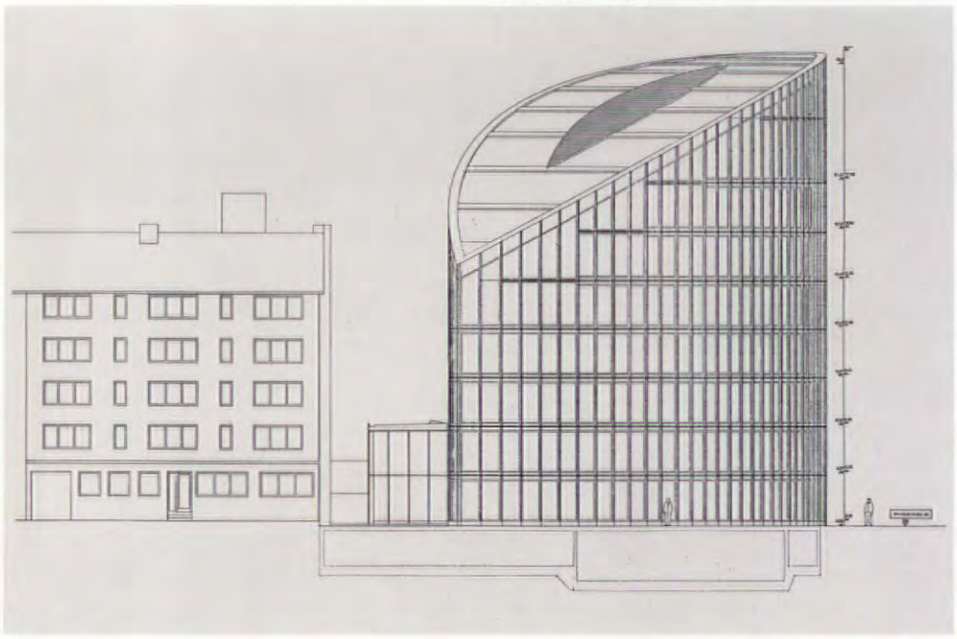
The other major challenge for the design team was to squeeze seven office floors into the building that, due to its height restriction, only allowed for six floors.

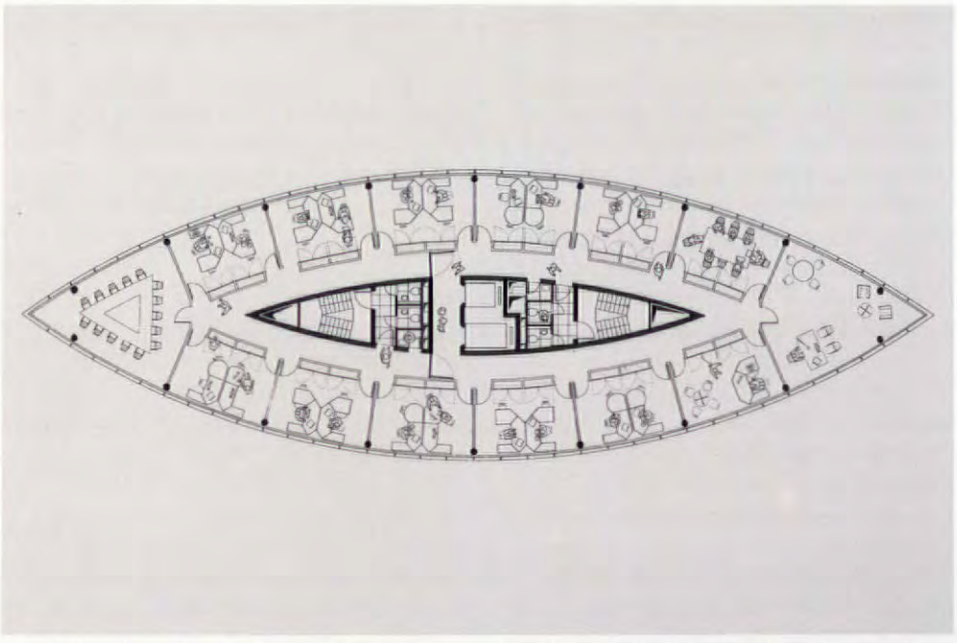
A minimum floor to ceiling height of 2.5 metres was achieved with a 220 mm concrete slab, an 8 mm screed and a 250 mm suspended ceiling. The architects succeeded in the seemingly impossible task of sandwiching under floor heating ducts, fresh air ducts, cooled ceiling and large quantities of cables, controls, sensors, motors, microprocessors and all the gear needed for a fully integrated BMS, into an overall floor thickness of only 550 mm.

The Building Management System (BMS)

The purpose of the BMS is to control the building's distribution and consumption of energy microelectronically. It is a subject lesson in trying to advance building beyond the boundaries of conventional thought.

Oblique elevation (below) shows curved roof to be fitted with solar panels. Office floor plan (bottom) shows narrow elliptical core





The system's brain is a powerful PC and some sophisticated software that analyses current and anticipated weather conditions and uses this data to calculate the optimum heating, lighting and shading levels for the building a day or two in advance.

The necessary data for these calculations arrives via a direct modem link with the regional Meteorological office who download their weather forecasts. The computer also takes constant readings from the building's own roof top weather station with its sun radiation pyranometer. This is £2,000 worth of globe that measures the intensity of the sun rays on the building. Since measurements can only be taken on the horizontal plane, the software is programmed to interpret the data and calculate the intensity of sunlight on predetermined reference points on the facade.

A battery of external thermometers and wind speed sensors, together with soil probes up to 100 metres deep, help to supply enough data to maintain a good energy balance for the building.

Whilst technically this system works very well, the workers are not unanimous in their enthusiasm about the centralised energy control by "big brother". People still prefer to adjust their light, shading and heating levels individually in accordance with their personal preferences.

To address this problem and give staff some individual control, Kaiser Bautechnik and Intelligent Building developed a system of over 200 control panels that allow temperature, light and shading to be individually adjusted in each office space. However, to avoid breakdown of the overall energy balance, individual control is only possible within a limited preprogrammed range.

Each control panel, flush mounted by the door in place of a conventional light switch, has its own "intelligence" to ensure minimum energy consumption for the building. All control panels are connected via a bus link to the central Building Management System.

Air-Conditioning

The air-conditioning at the Business Promotion Centre is only needed to provide fresh air. All the heating and cooling requirements are met by the circulation of hot and cold water.

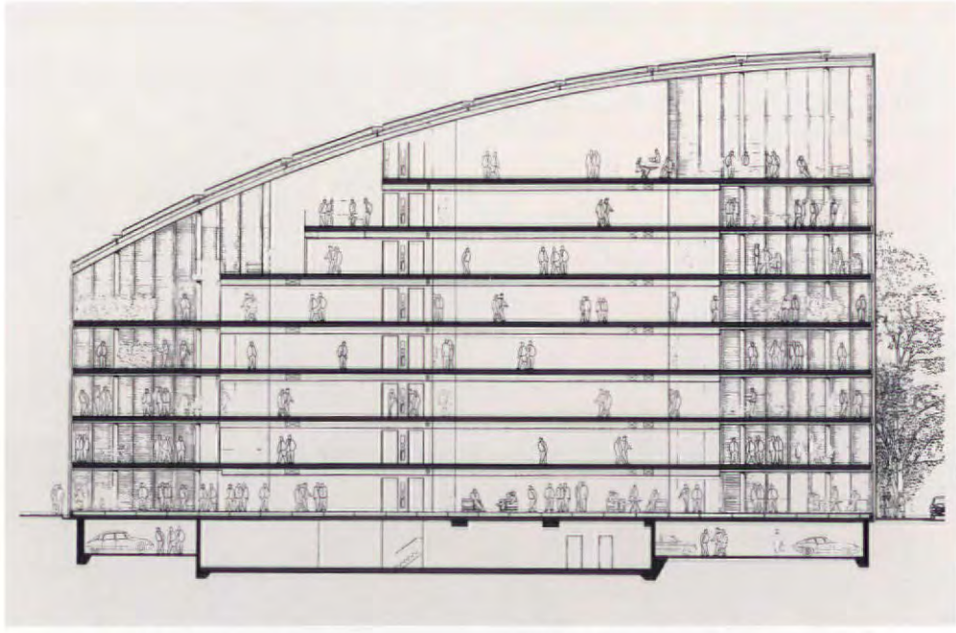
Since the entire building is hermetically sealed without any openable windows and unable to breathe naturally, an adequate and evenly distributed fresh air supply is instrumental in keeping workers awake.

All the fresh air arrives through ducts in the suspended ceilings and escapes through a narrow, continuous diffuser slot set in the floor alongside the glass facade. The slot, a beautifully detailed aluminium extrusion, runs the full length of each room.

Ducts that only need to deliver fresh air, can be considerably smaller than those used in conventional air-conditioning systems. This is important because the air travels at a reduced velocity in a smaller duct and therefore draughts are eliminated at the point of delivery.

As the fresh air escapes from the perimeter slots, it spreads out like a blanket or "fresh air lake" across the floor of the room through its own thermal capacity. In theory, the incoming fresh air is a little cooler (approximately 22 degrees centigrade) than the ambient temperature in the room. Therefore, as it comes into contact with a warmer object, i.e. a table, chair or a person, it quickly warms up and rises to the ceiling where it returns through openings in the luminaires to the

Cross section and long section (below) show general arrangement of accomodation



core as exhaust air. This principle is known as source flow ventilation.

Even though the system is a technical success, Norbert Kaiser, client and developer for the project, feels that in future all buildings should have openable windows. This is not necessary for energy reasons, but is very important for people's psychological well being. Otherwise the answer to, "how many people work here?" ... may well be "20 per cent not more".

Electricity Supply, Heating and Cooling

The building's energy systems are its greatest innovations. Kaiser's business interests in Israel had brought him into contact with the physicist Ofar Novick, who was experimenting with transparent insulation and absorption cooling machines. Kaiser, an engineer himself, was fascinated by Novick's work and had the inspired idea that an absorption cooling machine could be used at the Business Promotion Centre to significantly reduce energy consumption.

The building's generator is fired by gas but already new generators are available that burn biomass like oil seed rape and are cleaner and more cost effective.

Of course, the gas fired generator produces not only electricity, but also a lot of heat. This heat, no more than a by-product, normally gets wasted into the atmosphere.

This is where the absorption cooling machine comes in. It uses the otherwise wasted heat to either cool or heat the water that flows through the cooling pipes in the ceiling during the summer months and the under floor heating during the winter months.

In the summer, the water circulated at an optimum 13 degrees absorbs any excess heat by radiation exchange. All the cooling, normally provided by expensive chillers or refrigeration plants, is thus applied free except for the capital cost of the absorption cooling machine.

In the winter the same otherwise wasted heat is used to warm the water for the under floor heating. Because of the relatively large floor areas a maximum ambient temperature of 35 degrees centigrade can be achieved.

This highly innovative and energy efficient system, using a generator and an absorption cooling machine to heat or cool a building free of charge, is now being copied worldwide. It has even been shown to be cost effective in simple family dwellings where a domestic absorption cooling machine can be coupled with a small co-generator or a hot water collector.

Conclusion

It is the seemingly effortless integration of the building's highly sophisticated mechanical and electrical systems with all the accompanying hardware needed to support it and its clean uncluttered architectural form, that expresses the consummate skill employed by its architects.

When it is so much easier to surface mount everything, it is those invisible details where everything superfluous has been eliminated that distinguish a Foster building from the rest.

Foster himself can no longer have a hands-on approach to his many projects – much of the design responsibility rests with the partner, project architect and his team. However, the fact that the office's work remains at the cutting edge of design is due to the fact that Foster's powerful presence is strongly felt. □

Jens Willebrand

CLADDING DETAIL

1. SILICONE SEALANT - *Dow Corning Ltd (tel: 0932 351911 fax: 0932 340624).*

2. EXTERNAL PLANAR GLAZING - *Pilkington (tel: 0744 692 998 fax: 0744 451 326).*

3. PLANAR GLASS FITTINGS - tooled as "specials" with round rather than octagonal heads. Bead blasted.

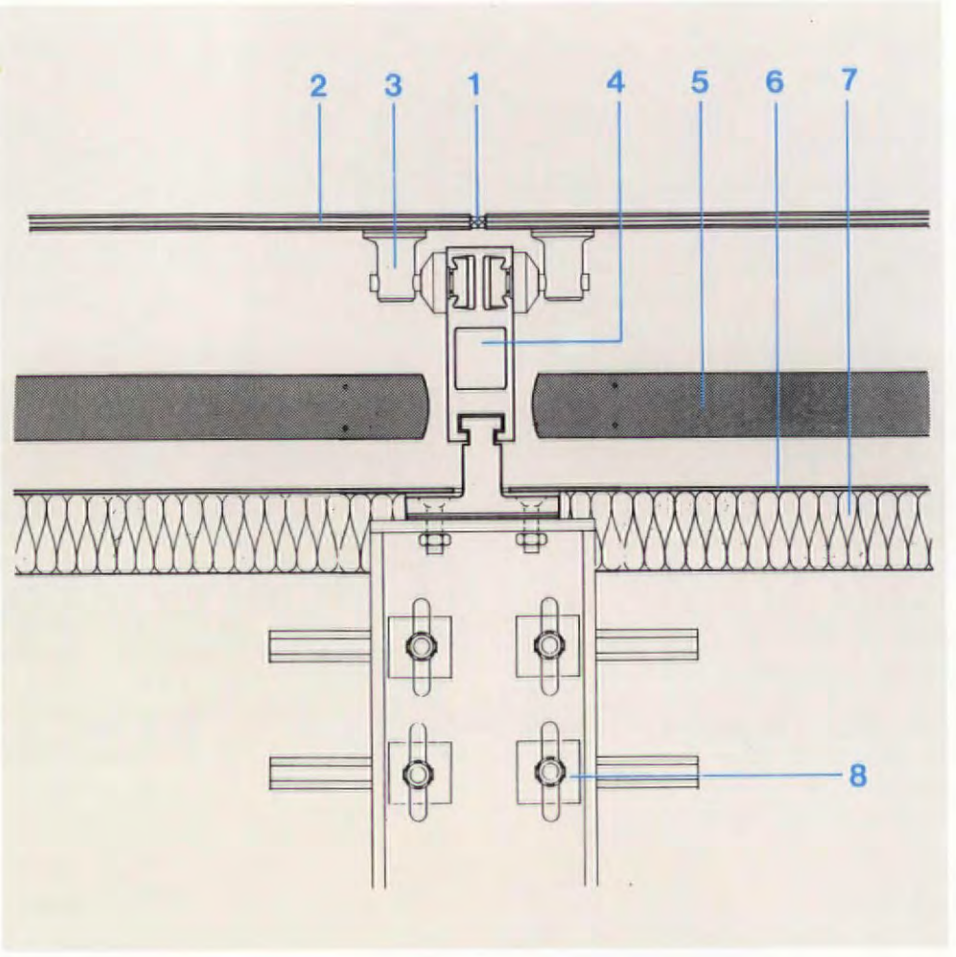
4. ALUMINIUM MULLION - specially extruded for Pilkington by *Reynolds (tel: 3410 64411 fax: 3410 18380)* in Holland.

5. ALUMINIUM BLINDS - *Merlin Blinds (tel: 0181 993 0499 fax: 0181 992 4801).*

6. ALUMINIUM FACIA - *Anders (tel: 05622 98960 fax: 05622 920010).*

7. ROCKWOOL INSULATION - installed by *Anders (tel: 05622 98960 fax: 05622 920010).*

8. STEEL BRACKETS - designed as "specials" by *Pilkington/Bob Marsh (tel: 0744 692 998 fax: 0744 451 326).* Installed by *Anders (tel: 05622 98960 fax: 05622 920010).*



CLADDING DETAIL

1. EXTERNAL ARMOUR PLATE GLAZING - *Pilkington (tel: 0744 692 998 fax: 0744 451 326).*

2. PLANAR GLASS FITTINGS - "specials" by *Pilkington (tel: 0744 692 998 fax: 0744 451 326).*

3. ALUMINIUM MULLION (160mm x 50mm on plan) - extruded by *Reynolds (tel: 3410 64411 fax: 3410 18380).*

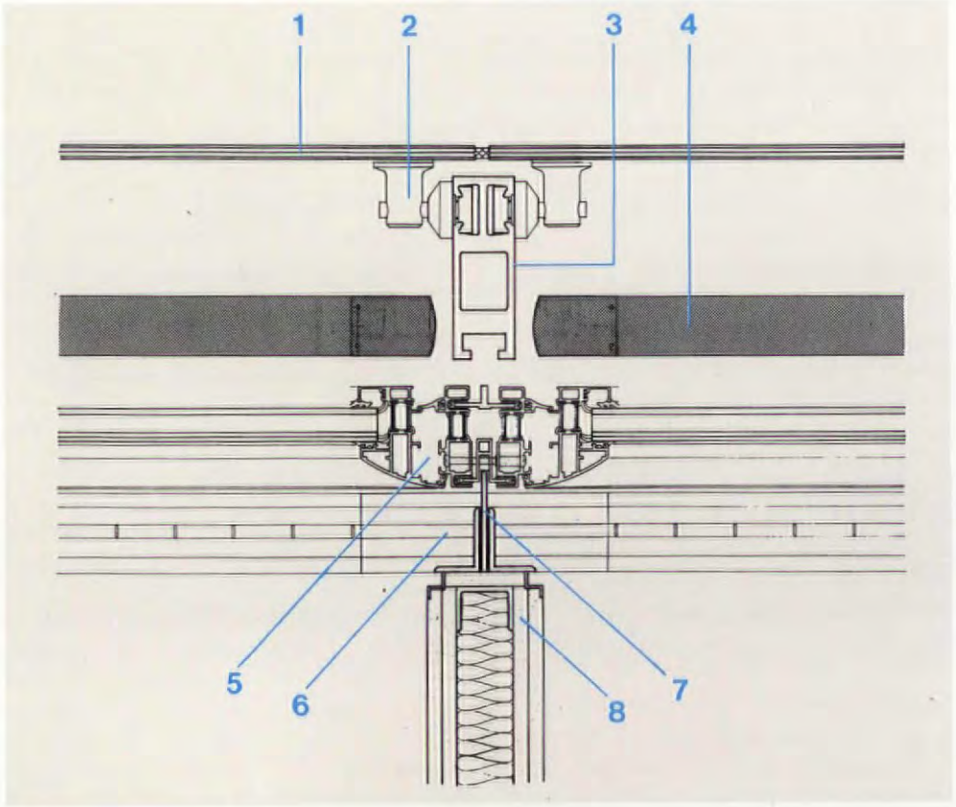
4. PERFORATED ALUMINIUM BLINDS - *Merlin Blinds (tel: 0181 993 0499 fax: 0181 992 4801).*

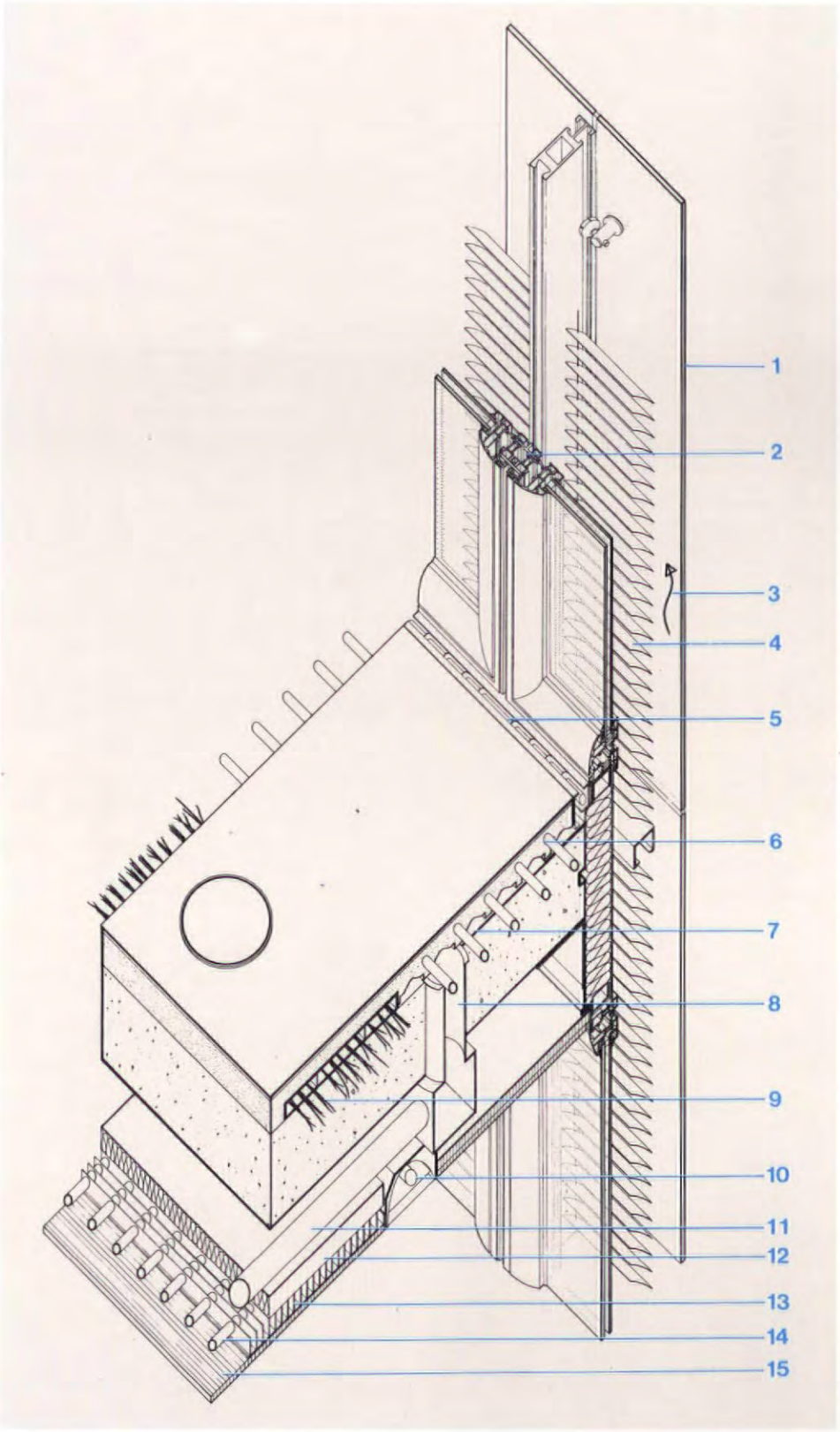
5. INTERNAL DOOR PROFILES - the building's internal skin consists of openable doors, floor to ceiling height. The profiles are designed by Fosters to create the narrowest possible sight line whilst maintaining structural stability. The aluminium profiles are tooled and drawn by *Schuco Germany (tel: 02103 5750 fax: 02103 57547)* as "specials" and installed by *Anders (tel: 05622 98960 fax: 05622 920010).*

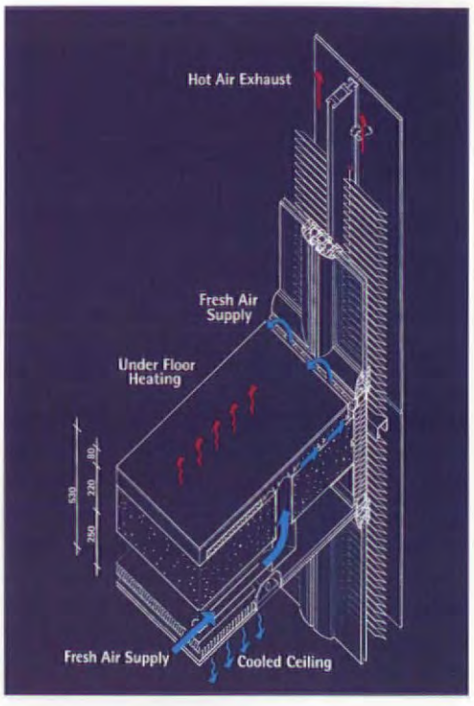
6. LINEAR SLOT DIFFUSER - set into the floor flush with the carpet. Silver anodised aluminium extrusion only 30 mm wide and used to supply fresh air only. As fresh air is supplied through the slot diffusers it creates the "fresh air lake" described in the text, i.e. Quelluftung. Installed by *EHT (tel: 02224 8990 fax: 02224 89980),* who were responsible for pouring the floor slabs.

7. METAL T - connecting internal partition to door frame. This is the only connection between room partitions and the facade. In the end the metal T proved to be a weak acoustic link and had to be built up with additional lead to achieve the required 42dB value between offices. All internal partitions installed by *Muller (tel: 02161 37062 fax: 02161 34557).*

8. PLASTERBOARD - two layers of 12.5 mm on each face skimmed and painted. 50 mm Rockwool insulation. Acoustic rating is 42 dB. Some plasterboard walls are lined with 0.5 mm metals tiles, papered over and painted, allowing the walls to be used as magnetic pinboards.







Dennis Gilbert

TYPICAL FLOOR EDGE DETAIL

1. EXTERNAL CLADDING - by *Pilkington (tel: 0744 692 998 fax: 0744 451 326).*

2. INTERNAL CLADDING - installed by *Anders (tel: 05622 98960 fax: 05622 920010).*

3. AIR MOVEMENT (thermal lift) - developed and calculated by *Kaiser Bautechnik (tel: 0203 30 62 900 fax: 0203 30 62 997).*

4. VENETIAN BLINDS - supplied by *Merlin Blinds (tel: 0181 993 0499 fax: 0181 992 4801).*

5. FRESH AIR SLOT - supplied by *EHT (tel: 02224 8990 fax: 02224 89980).*

6. SCREED WITH INTEGRATED UNDER FLOOR HEATING HOT WATER PIPES - supplied and installed by *EHT (tel: 02224 8990 fax: 02224 89980).*

7. FRESH AIR CAVITY.

8. FLOOR SLAB PENETRATION FOR FRESH AIR SUPPLY FROM DUCT BELOW - installed by *Hoch Tief (tel: 0201 8240 fax: 0201 824 2777).*

9. ELECTRIC TRUNKING IN SCREED - supplied by *Platzek (tel: 02151 590213 fax: 02151 590214).*

10. LOW ENERGY COMPUTER LIGHTING - supplied by *Zumtobel (tel: 06081 10260 fax: 06081 1026121).*

11. FRESH AIR DUCT - supplied by *Gyro (tel: 0201 350040 fax: 0201 369705).*

12. INSULATION - Fermacell supplied by *Fels Werke (tel: 05321 7030 fax: 05321 703321).*

13. COOLED CEILING - developed by *Kaiser Bautechnik (tel: 0203 30 62 900 fax: 0203 30 62 997),* honeycomb cardboard panels fabricated in Israel.

14. COOL WATER PIPES - supplied by *Schneider (tel: 0203 770263 fax: 0203 771604).*

15. PLASTERBOARD (12.5 mm) - installed by *Muller (tel: 02161 37062 fax: 02161 34557).*

SECTION THROUGH EAVES

1. ROOFING EDGE AND GUTTER TRIMS - purpose made from PVC coated steel 1.45 KALIKO by *Ruberoid Werke AG (tel: 0201 831150 fax: 0201 8311550).*

2. PLYWOOD DECKING - installed by *Anders (tel: 05622 98960 fax: 05622 920010).*

3. TOP CHANNEL - *Market Metals Ltd (tel: 0462 683673 fax: 0462 675876).*

4. TOP ALUMINIUM CHANNEL waterproof but allowing air to escape - special extrusion.

5. SILICONE - Dow Corning 797 (black) applied locally. *Dow Corning Ltd (tel: 0932 351911 fax: 0932 340624).*

6. ALUMINIUM CAPPING - "special" designed by *Pilkington (tel: 0744 692 998 fax: 0744 451 326).*

7. ALUMINIUM FACIA - installed by *Anders (tel: 05622 98960 fax: 05622 920010).*

8. RIGID ROCKWOOL INSULATION - 100 mm thick. *Rockwool Ltd (tel: 0656 864696 fax: 0656 864549).*

9. STEEL RING BEAM - the entire glass facade is suspended from the steel ring beam. Its design and construction detail was one of the building's major challenges. It had to be curved in the horizontal as well as the vertical plane to form a lens shaped ring. Setting out was achieved by forming circular openings in each floor slab at carefully calculated intervals and projecting laser beams up 29 metres through these openings from the ground floor to the roof.

10. 12.9 HEXAGONAL BOLTS grade M16.

11. RSA galvanised 203 x 152 x 14.2 mm.

12. TUBE IN TUBE FITTING - forms connection between top bracket (RSA) and ring beam. The tube in tube fitting is one of the most original design details. It allows for the fact that the positioning of each top bracket is different due to the complex curve of the ring beam.

13. TICO ELASTIC SEATING 6 mm.

14. TOP BOLT - M 30 Eye bolt stainless steel 316 S31. It holds the dovetail glazing mullions (longest 29 m) and allows for any final adjustment.

15. GLASWOOL INSULATION - installed by *Anders (tel: 05622 98960 fax: 05622 920010).*

16. HIGHEST PLANAR BRACKET.

17. SG FOIL.

18. SUSPENDED CURVED PLASTERBOARD CEILING - installed by *Muller (tel: 02161 37062 fax: 02161 34557).*

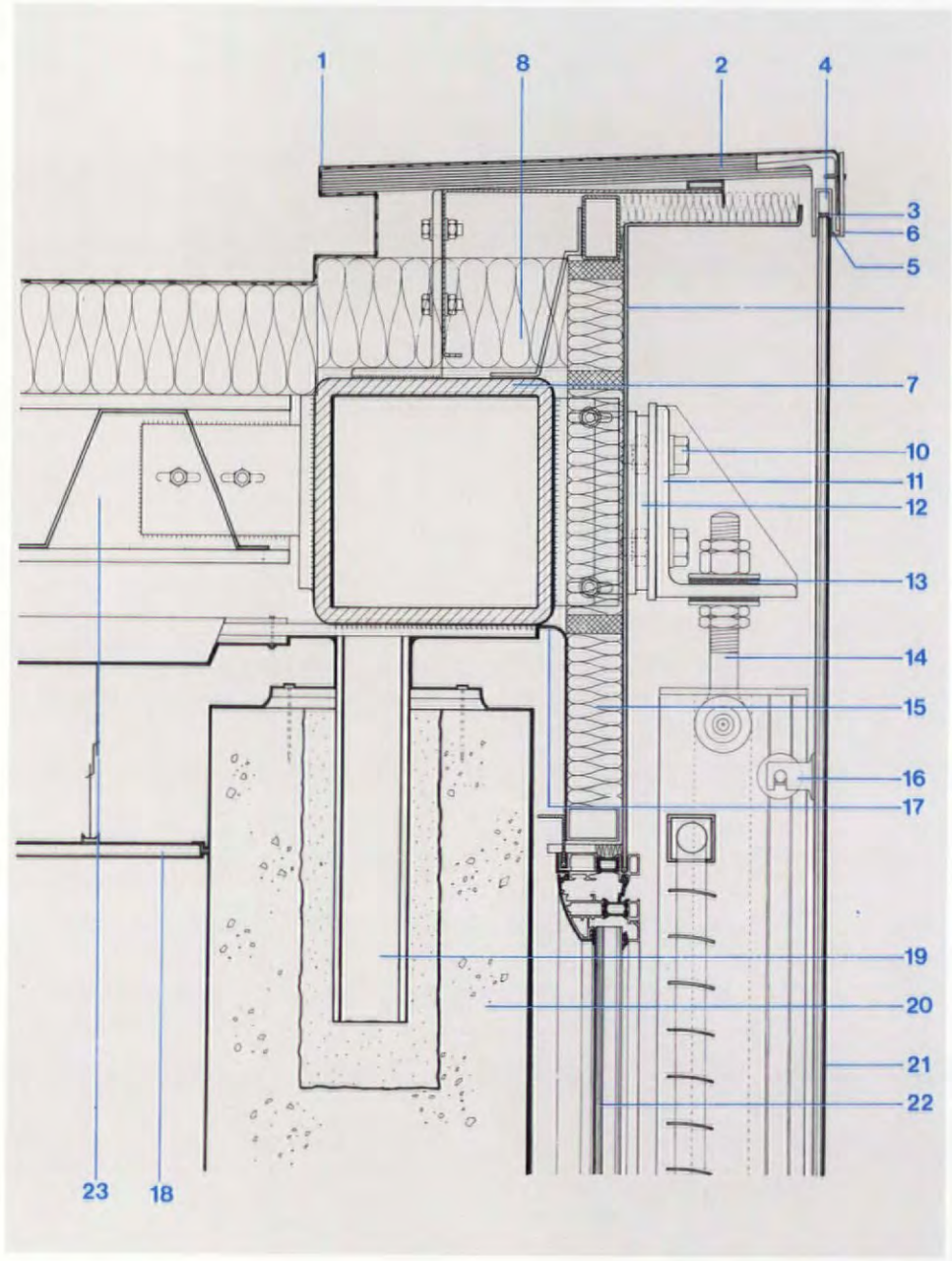
19. STEEL TUBE - fixes seal rings into concrete columns.

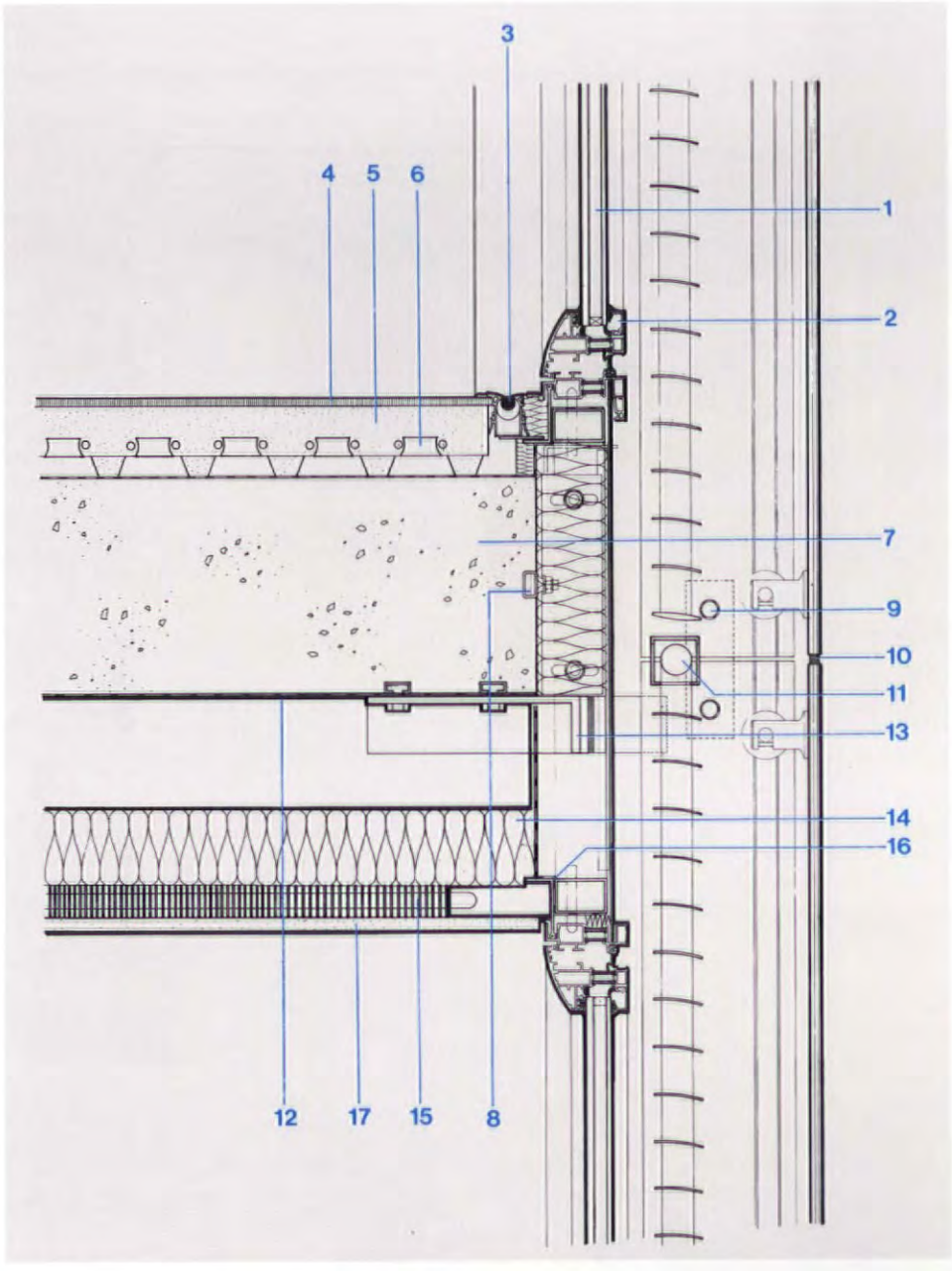
20. CONCRETE COLUMN - 360 mm diameter poured by *Hoch Tief (tel: 0201 8240 fax: 0201 824 2777).*

21. SUSPENDED EXTERNAL GLAZING.

22. INTERNAL GLASS FACADE.

23. SECONDARY STEEL BEAMS with metal decking.





JUNCTION OF SLAB WITH CLADDING

1. INTERNAL GLAZING.

2. INTERNAL DOOR FRAMES - thermally broken aluminium profiles, tooled by *Schuco (tel: 02103 5750 fax: 02103 57547)*, drawn by *F A Steinmetz (tel: 0604 38593 fax: 0604 4201)*, installed by *Anders (tel: 05622 98960 fax: 05622 920010)*.

3. LINEAR AIR DIFFUSERS (30 mm wide) - supply fresh air only (Quelluftung) - special aluminium extrusions - *EHT (tel: 02224 8990 fax: 02224 89980)*.

4. CARPET - by *Vorwerk (tel: 05151 1030 fax: 05151 103333)*.

5. SCREED - 80 mm.

6. PVC VACUUM - FORMED EGG CRATE SHELLS used as lost shuttering to create cavity in screed for fresh air supply - installed by *Anders (tel: 05622 98960 fax: 05622 920010)*.

7. CONCRETE SLAB - 220 mm - poured by *Hoch Tief (tel: 0201 8240 fax: 0201 824 2777)*.

8. HALFEN CHANNEL - *Hoch Tief (tel: 0201 8240 fax: 0201 824 2777)*.

9. MULLION CONNECTION BOLTS - designed and delivered by *Pilkington (tel: 0744 692 998 fax: 0744 451 326)*, installed by *Anders (tel: 05622 98960 fax: 05622 920010)*.

10. SILICON SEAL - Dow Corning 797 (black) - applied by *Anders (tel: 05622 98960 fax: 05622 920010)*.

11. FIXING BRACKET (160 mm x 50 mm) for aluminium blinds - supported by ring beam and fastened back to slab at each floor level.

12. DPC.

13. FIXING BRACKETS - form connection with dovetail shaped mullions. Secure mullions to floor flabs - designed by *Pilkington (tel: 0744 692 998 fax: 0744 451 326)*.

14. THERMAL INSULATION - Fermacell plates installed by *Muller Trockenbau (tel: 0216137062 fax: 02161 34557)*.

15. CHILLED CEILING HEAT EXCHANGER - honeycomb cardboard panels - designed by *Kaiser Bautechnik (tel: 0203 30 62 900 fax: 0203 30 62 997)* and manufactured in Israel.

16. STEEL ANGLE - "special" to fixed aluminium door frame profile to underside of floor slab.

17. CEILING - installed as a prefabricated sandwich by *Muller Trockenbau (tel: 0216137062 fax: 02161 34557)*.

Dennis Gilbert

SECTION THROUGH CLADDING FOOT

1. EXTERNAL GLAZING - Pilkington 12 mm clear armour plate toughened to 120 Nm². Each glass plate is 3.05 m x 1.05 m.

2. PERFORATED ALUMINIUM VENETIAN BLINDS - supplied by *Merlin Blinds (tel: 0181 993 0499 fax: 0181 992 4801)*. They are linked to light and temperature sensors and their movement is centrally controlled by microprocessors.

3. INTERNAL GLAZING - Pilkington 6 mm K glass hard coated, low emissivity. 12 mm air gap Argon filled. 6 mm Kappa float soft coated, low emissivity.

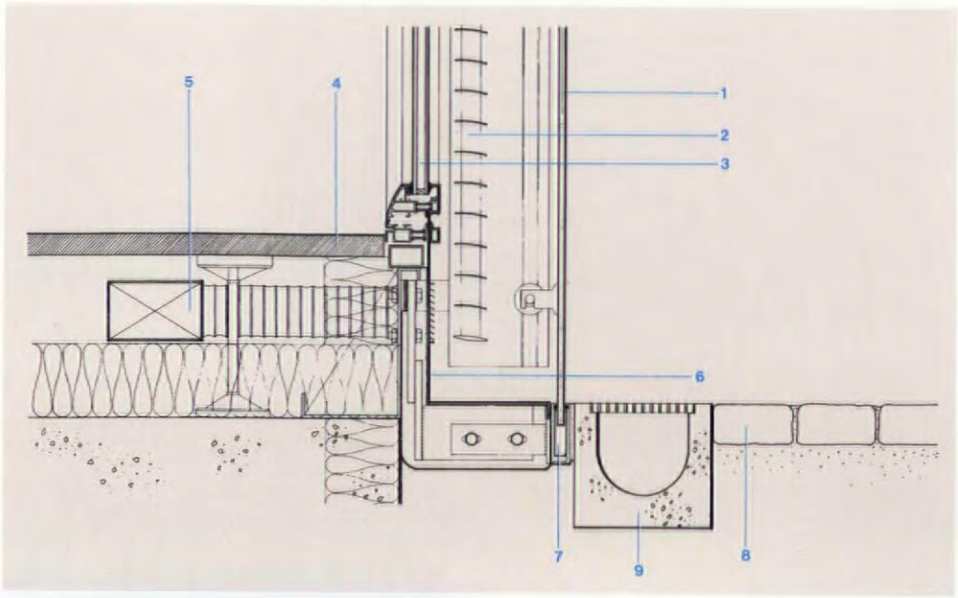
5. AIR DUCT - by *Gyro (tel: 0201 350040 fax: 0201 369705)*.

6. ALUMINIUM FACIA PANEL - installed by *Anders (tel: 05622 98960 fax: 05622 920010)*.

7. BOTTOM CHANNEL - by *Market Metals Ltd (tel: 0462 683673 fax: 0462 675876)* for Pilkington - special extrusion using windscreen wiper detail, the external glass can move vertically up to 60mm throughout the year to absorb thermal expansion.

8. PAVING - City of Duisburg.

9. DRAINAGE - supplied and installed by *Schneider (tel: 0203 770263 fax: 0203 771604)*.



Jens Willebrand

ACUTE CLADDING JUNCTION AT PROW

1. TIP - highly polished stainless steel tip with special black neoprene extrusion. Designed by Bob Marsh for *Pilkington (tel: 0744 692 998 fax: 0744 451 326)*. Angle of tip is 68 degrees.

2. EXTERNAL GLAZING - 12 mm armour plate.

3. Difficult connection detail at corner where glass facade has to be tied to the main structure. The sharpness of the tip made it impossible to bring the mullions (connecting facade to main structure) right into the corner.

To allow for an overall 60 mm movement of the facade and transfer loads back to the structure, Bob Marsh designed an ingenious system of stainless steel brackets, ties and a high tension aluminium rod at the corners of the building.

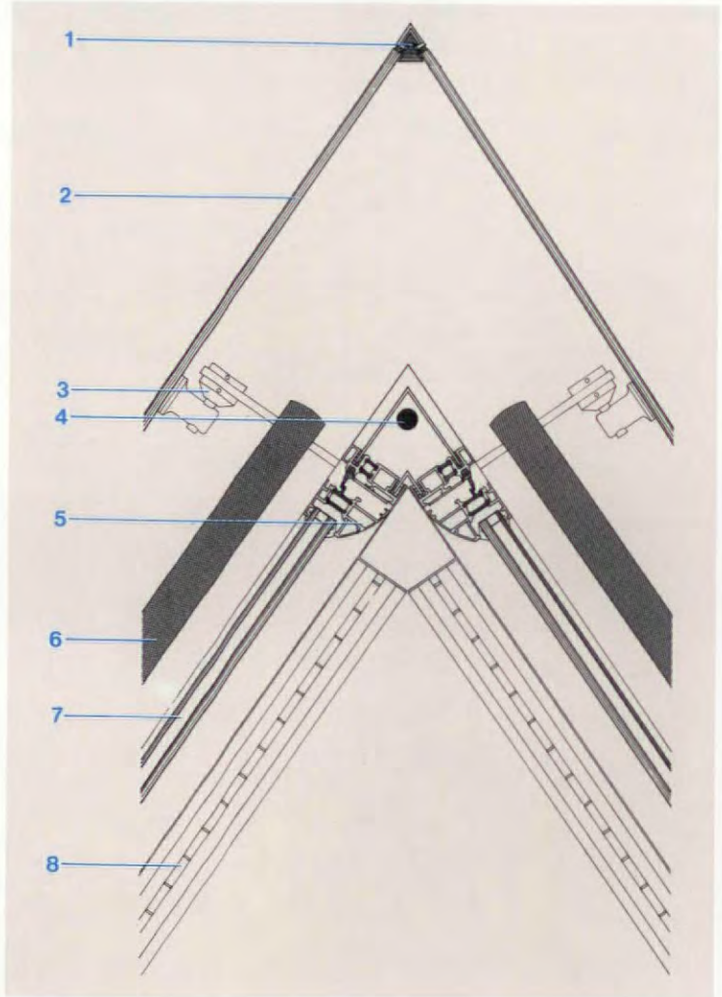
4. HIGH TENSION ALUMINIUM ROD - carries the load of approximately 50m x 2.5m of 12 mm glass - special design by Bob Marsh.

5. INNER FACADE FRAMING.

6. PERFORATED ALUMINIUM BLINDS - *Merlin Blinds (tel: 0181 993 0499 fax: 0181 992 4801)*.

7. INNER FACADE - double glazed, Argon filled, low emissivity unit.

8. FRESH AIR SLOT - set into floor flush with carpet.



Jens Willebrand

Companies and Consultants


Jens Willebrand

Anders Metallbau
Geismarstr. 28a
34560 Fritzlar
Postfach 1123
Germany

Tel: 05622 98960
Fax: 05622 920010
Contact: Oskar Anders

Dow Corning Ltd
19 Wintersells Road
Byfleet
Surrey KT14 7LH

Tel: 0932 351911
Fax: 0932 340624

EHT Siegmund GmbH
Heideweg 13
53604 Bad Honnef
Germany

Tel: 02224 8990
Fax: 02224 89980
Contact: Jorg Mazanec

Fels-Werke GmbH
Postfach 90 00
D-38637 Goslar
Germany

Tel: 05321 7030
Fax: 05321 703321
Supplied Fermacell Insulation

Gyro Bautechnik GmbH
Luftungs und Klimaanlagen
Karl-Leglen-Str 13
4300 Essen 11
Germany

Tel: 0201 350040
Fax: 0201 369705
Contact: H Ryschka

Heinz Platzeck
Urdingerstr. 421
4150 Krefeld
Germany

Tel: 02151 590213
Fax: 02151 590214
Electro-installation
Contact: Heinz Platzeck

Hoch Tief
Rollinghauser Str. 53
45128 Essen 1
Germany

Tel: 0201 8240
Fax: 0201 824 2777
Contact: Helmut Kolzer

Hoogovens Aluminium
87A Stocletlaan
2570 Duffel
Belgium

Tel: 015 302111
Fax: 015 317771

Industriedesign Muller GmbH
Trockenbau/Akustikbau
Immelmann Str. 67-71
41069 Monchengladbach
Germany

Tel: 02161 37062
Fax: 02161 34557
Contact: Karl-Heinz Muller

Kaiser Bautechnik
Ingenieurgesellschaft GmbH
Mulheimer Strasse 100
47057 Duisburg
Germany

Tel: 0203 30 62 900
Fax: 0203 30 62 997
Contact: Norbert Kaiser

Keypro Metal
Streseman Str. 37
47051 Duisburg
Germany

Tel: 0203 340000
Fax: 0203 343533

Market Metals Ltd
Jubilee Trading Estate
Letchworth
Herts SG6 1SP
Great Britain

Tel: 0462 683673
Fax: 0462 675876
Contact: Roy Stringer

Merlin Blinds Ltd
163 Dukes Road
London W3 0SL
Great Britain

Tel: 0181 993 0499
Fax: 0181 992 4801
Contact: Andres & Nigel Haughton

Pilkington Glass Ltd
Alexandra Works
Borough Road
St Helens
Merseyside WA10 3TT
Great Britain

Tel: 0744 692 998
Fax: 0744 451 326
Designer: Bob Marsh

Reynolds Aluminium (Holland) Ltd
Postbus 30
3840 AA
Harderwijk
Netherlands

Tel: 3410 64411
Fax: 3410 18380
Contact: E R de Vries

Rockwool Ltd
Pencoed
Bridgend
Mid Glamorgan
South Wales CF35 6NY

Tel: 0656 864696
Fax: 0656 864549

Ruberoid AG
Sigsfeldstr. 1
45141 Essen
Germany

Tel: 0201 831150
Fax: 0201 8311550

Schuco International GmbH & Co
Heinrich-Hertz-Str. 5
4010 Hilden
Germany

Tel: 02103 5750
Fax: 02103 57547

Schuco International GmbH & Co
Whitehall Avenue
Kingston
Milton Keynes
MK10 0AL
Great Britain

Tel: 0908 282111
Fax: 0908 282124

Schneider-Nocker
Im Schlenk 2
47055 Duisburg
Germany

Tel: 0203 770263
Fax: 0203 771604
Contact: Mr Schneider

F A Steinmetz GmbH
Metallbautechnik
Ober-Schmitten
Frankfurter Str. 34
63667 Nidda
Germany

Tel: 0604 38593
Fax: 0604 4201
Contact: Horst Steinmetz

Vorwerk & Co Teppichwerke GmbH
Kuhlmann Str. 11
31785 Hameln
Germany

Tel: 05151 1030
Fax: 05151 103333

Zumtobel GmbH & Co
Achtzehmorgenweg 2
61250 Usingen
Germany

Tel: 06081 10260
Fax: 06081 1026121
Contact: Helmer Zangerl

Architects

Sir Norman Foster and Partners
Riverside Three
22 Hester Road
London SW11 4AN
Great Britain

Tel: 0171 738 0455
Fax: 0171 738 1107

Partner: David Nelson
Project Architect: Stefam Behling

Team:
Sandy Bailey
Serina Hijas
Georg Gewers
André Poitier

Structural Engineers

Ingenieurburo Dr.-Ing Meyer
Heckerstr. 32
34121 Kassel
Germany

Tel: 0561 928780
Fax: 0561 9287839
Contact: Dr Meyer

M&E Consultants

Kaiser Bautechnik
Ingenieurgesellschaft GmbH
Mulheimer Strasse 100
47-57 Duisburg
Germany

Tel: 0203 3062 900
Fax: 0203 3062 997
Contact: Norbert Kaiser

J Roger Preston and Partners
Consulting Mechanical and Electrical Engineers
29 Broadway
Maienhead
Berkshire SL6 1LY
Great Britain

Tel: 0628 23423
Fax: 0628 39860
Contact: Klaus Bode

Surveyors

Lothar Schwarz Dipl-Ing
Sonnenwall 64
47051 Duisburg
Germany

Tel: 0203 21146
Fax: 0203 23012

Acoustic Consultants

ITA GmbH
Max-Plank-Ring 49
65205 Wiesbaden
Germany

Tel: 06122 95610
Fax: 06122 956161

Lighting Consultants

Claude A. Engle
1000 Potomal Street N.W.
Washington DC 20007
USA

Tel: 202 3370702
Fax: 202 3377317

Absorption Cooling Machine development

Dr Ofer Novick
Tel Aviv
Israel

Fax: 3 6479127

SMART CARS VERSUS SMART FACADES

From corrugated iron to photochromic glass the world of cladding has made enormous strides into the twentieth century. Now, as Tim Ostler reports, the cladding industry is poised to attain the precision and sophistication once only found in the laboratory.

It is taken for granted that a car will not express its structure or flaunt its neoprene gaskets. Instead, in its initial form it will appear gleamingly integrated, as if it had materialised spontaneously in the air. Its first scratch arouses fear and loathing because the car consists not just of its physical substance but also its ideal image. A scratched car is for the first time grounded in reality and the tension between our ideal image and the reality is unbearable until we get used to it.

In this world, "build quality" is highly prized – the sort of thing that seasoned sales representatives will happily discuss in a pub. So is "panel fit". How jealous must architects be of car designers, who seem to deal in a currency that is actually valued by the public!

The ideal building material, then, as well as being cheap, lightweight, waterproof, insulating and snapped together like Lego would also be available in a high-gloss finish and a range of metallic shades borrowed from the BMW colour card. Then, at last, people other than architects and property developers might come to find an industrialised building attractive.

Although the performance requirements of a real building are more demanding than a set of toy bricks (has anyone ever measured the U-value of a Lego brick?) the nearest we have got to this goal is the metal-skinned composite panel.

Systems from Formawall or Luxalon allow panels simply to be slotted into each other with concealed fixings; while EDM Spanwall, which uses an aluminium subframe, is claimed by its manufacturers to be exceptionally precise in setting out over long distances. Superplastic aluminium by Superform can be sucked into shapes as sinuous as the wings of a Bugatti (and, for that matter, actually is). Rainscreen modules are referred to by the consumer-friendly term of "cassette". Fully integrated and with narrow, recessed joints, cladding has taken on many of the qualities of a consumer item. As Walter Gropius might have said "Take facing, liner and insulation on to site? Not me! I just clad and go!"

Composite panels at last allow buildings to begin to be judged on the same terms as luxury cars – for which they often provide the backdrop for glossy advertisements. Is the build quality of a Scott Brownrigg & Turner generally better than that of a Fitzroy Robinson? What about the panel fit on that Taylor Woodrow across the road? Is it a match for the Higgs & Hill we're sitting in? That 'sixties Poulson, meanwhile, with its cover strips, is like nothing so much as the coachwork of a Morris Traveller Estate. It's all right if you go for "classic buildings".

The choice of Formawall for Porsche's British headquarters in Reading is therefore supremely appropriate. Fortunately, the interests of glamour coincide with those of preventing delamination due to heat build-up: with panels in gleaming silver finish, even the most tawdry concept can (at first) give the impres-

Cladding details as precise as a Porsche at Alcatel (left and opposite page). Spanwall at Sheffield (bottom left) and Leatherhead (bottom right)

sion of having been designed by Richard Meier – or Giugaro. This is no mean achievement, given that, per square metre, the typical car sells for ten times the cost of a building.

Alternatively, composite panels also allow clients to make their buildings like giant versions of corporate packaging. Composite panels finished in company colours provide the perfect backdrop for a corporate logo. Thus by means of a few well-placed trim-panels in pastel colours, a large and very grown-up warehouse for Mothercare can be made to look like a giant packet of disposable nappies without anyone batting an eyelid.

The consumerisation of cladding procurement is surely a trend that will continue. While the level of finish available from mass-produced products has increased, for reasons of liability and programming architects have become steadily more inclined to leave the detailing to the subcontractor. The movement begun by Wachsmann in 1943 when he and Walter Gropius set up the first fully-automated factory to make prefabricated building components has culminated in what might be called "design by shopping". Not everyone sees this as a positive development.

"The innovation has rapidly been taken out of the industry," says cladding consultant Sean Billings. "We're going to see a lot of buildings with the same details: every building you go by will have the same optimum panel size.

"Forget the one-offs like Waterloo: the architect designing the normal buildings – the next layer down – is virtually forced to use standard bits: he's stuck with a catalogue of parts. They all look the same and they all have the same detail. There's a huge tendency towards blandness: I call them shop-front buildings."

Billings was one of the team that developed the neoprene cladding gasket system at the Sainsbury Centre, itself a landmark in the development of composite panels (even here automotive design was influential: the ribs on the cladding panels were inspired by a Citroën van). He believes that the idea of a standardised solution for every purpose is a chimera.

"It never fails to amaze me how different every building is... What they try to do to avoid looking like next door is bending something that was not designed to be bent."
What of the apparent precision of composite panels? Referring to one market leader, he

Cladding aesthetics (above and left). Cadbury distribution centre near Birmingham; Proudfoot Warehouse Consultants; Formawall at Mothercare, Wellingborough; and Ward Building component curves at a new Crittall building.
Ove Arup and Partners trace their involvement with precision facades back to the Sydney Opera House (right). Later developments include Ian Ritchie's Reina Sofia gallery (right top) and the forthcoming Raimund Abraham Austrian Cultural Centre in New York

says, "It isn't beautiful: it's just a big plank. It's as crude as be-jaysus: you hack the back off to bend it."

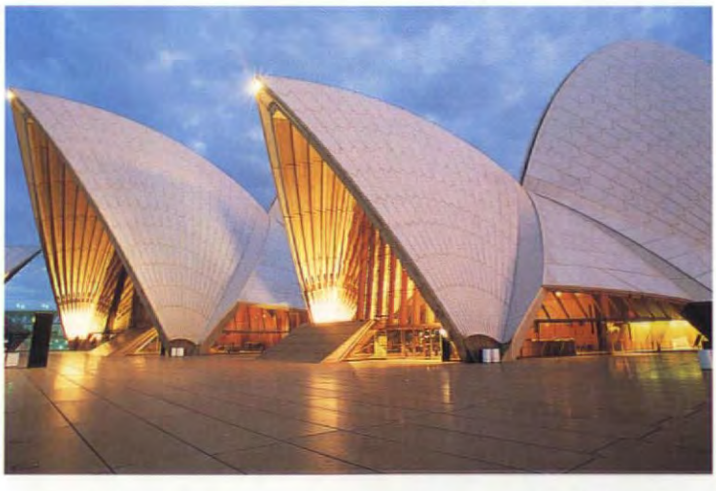
Billings now works with Arup Facade Engineering (AFE). If Formawall or Luxalon can be called the fleet car end of the market, this is the equivalent of an executive express. Arup, who founded it in 1992, trace their involvement with high-specification facades back to the ceramic cladding on Sydney Opera House. Today, with specialists not only in curtain wall design but also in glass technology, materials technology, and engineering geology in its offices in London, Johannesburg and Sydney, AFE claims to be one of the largest teams of cladding consultants in the world.

The British arm was prompted by a consultancy on Lee House, Terry Farrell's office block over a junction on London Wall that looks like two towers crashing into one another. As an air rights building it had to accommodate an unusually large amount of movement within the facade – hence the architect's recommendation to employ specialist consultants. Recent work ranges from Will Alsop's Hôtel du Département in Marseille to Raimund Abraham's extraordinary Austrian Cultural Center in New York, to be clad in mill-finish aluminium.

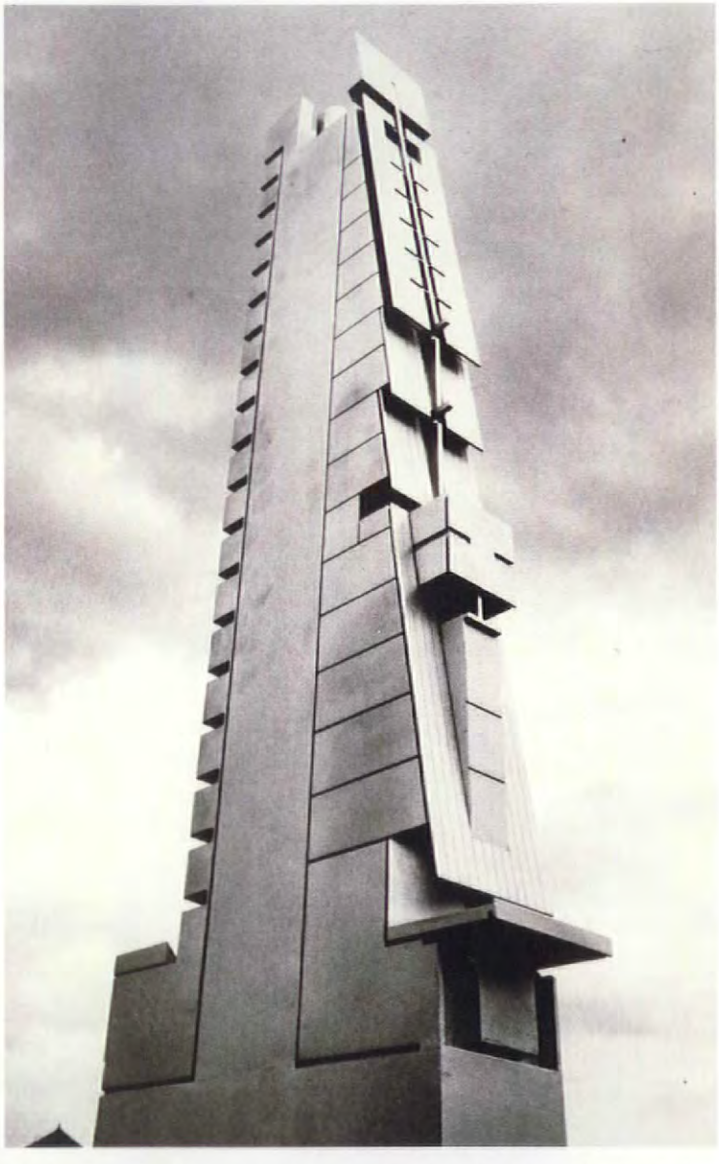
The preoccupations of facade engineers such as AFE contrast sharply with those of the jobbing warehouse designer. So far from bending it to make it fit, facade detailing is where British architects' famous obsession with detail can most easily be justified. It is where inside meets outside, envelope meets structure and – as at Lee House – quite large amounts of movement may have to be accommodated. Not least, it is the element that defines how the building will be seen by the observer or exposed to the judgement of the designer's peers in architectural magazines.

As technological demands have increased, and under the influence of fashionable forms of lightweight engineering such as aerospace components or racing bicycle design, architects and engineers at this end of the market have been moved to apply the aesthetics of delicacy and precision to the building facade – most often dramatising the interaction of glazing with the structure needed to counter gravi-

J van den Bossche



Paul Simcock



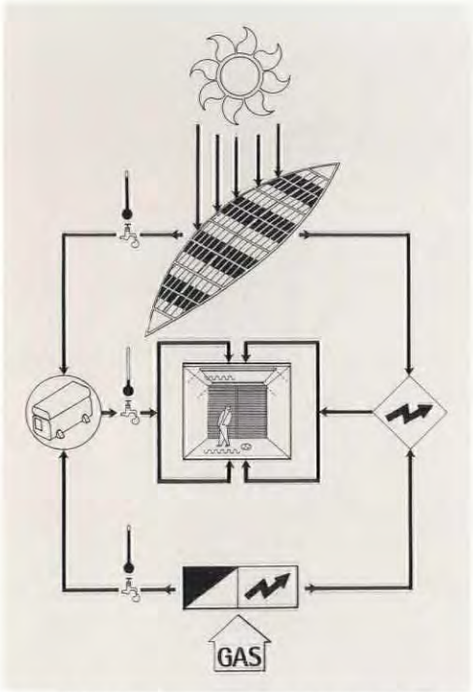
ty and wind loads, as at the walls designed by Ian Ritchie and Ove Arup & Partners for the Centro de Arte Reina Sofia in Madrid. The effect is to present the facade as a machine – extending over thousands of square metres – whose function is to control the transmission of air, radiation and humidity between one zone and another.

This approach sees the facade not as a passive barrier between inside and outside – and certainly not as the mere background for a trademark – but as an active system that responds to the forces that act upon it. In some cases (as at Madrid) by means of visible hinges, pulleys and springs the facade may take on the appearance of a heaving framework of glass and metal, a machine to resolve differential movement or – as at Jean Nouvel's Arab Cultural Centre – to control the admission of daylight.

But the kinds of "adaptive facades" currently under development at AFE tend to be less overtly mechanical. Instead, they rely either on a judicious disposition of layers that allows air to move within the facade zone, or in other cases on the use of specialised materials with specific molecular qualities.

The furthest advanced of these is the photovoltaic facade, which generates electricity from ambient light. Photovoltaics have traditionally been used to provide electrical supplies for remote, sun-drenched sites, whether on satellites in orbit or telegraph poles in the Australian desert. The problem (apart from cost) has always been the large area needed – especially in temperate climates – to produce respectable amounts of electricity.

Then someone noticed that building facades have large areas of space lying idle. Why not put it to productive use? The most prominent such application has been Norman Foster's Business Development Centre for Kaisertechnik in Duisburg, with a shape like a concept car and photovoltaic cells covering its almond-shaped roof. The electricity produced when the sun comes out is intended to power the blinds that cut solar gain through the triple-glazed facade. AFE's answer, in collaboration with Northern Electric, is a project to overclad the Northumberland Building, a building for the University



Energy facade. Diagrammatic operation of solar heating and cooling (above) at Sir Norman Foster & Partners' Duisburg Business development building (right)

of Northumbria in Newcastle and the most northerly application yet.

The cost of photovoltaic cladding is now comparable with the use of granite; while currently under development (not by AFE) is a 4µm coating on glass that does the same job as the existing 0.4mm silicon wafers. Since the pre-recession boom in refurbishing obsolete office blocks, there has been a recognition that different parts of a building can have different life-expectancies: it is likely that in future, as newer and more efficient technologies such as these come on to the market, cladding will be upgraded as a matter of course.

As the science of "smart materials" continues to progress, we can expect forms of cladding that evoke spacecraft or jet fighters rather than mere cars. One of the most promising sources of technology transfer is so-called "stealth" technology: ferro-electric and polymer-based chiral compounds built into aircraft skin can absorb radar waves and thus make aircraft effectively transparent.

AFE associate Jonathan Sakula explains: "There are various materials within the skin which respond to radar and which because of their response can generate signals which are equal and opposite to the incoming signal – so it's 180° out of phase. The way that works, therefore, is that instead of reflecting the signal, it cancels it out. So, if you like, it's the skin of a plane which is actively monitoring radar waves upon it, and it can cancel out those waves."

Figuratively speaking, it amounts to a kind of active suspension for electromagnetic waves, and if it can be done with radar, it could in theory be done with light or any other electromagnetic radiation. Applied to cladding it could offer many advantages to the client who was prepared to foot the bill.

The same principle can work for sound too. Piezoelectic materials on submarine hulls have been developed that detect incoming sonar waves and cancel them out with signals that are out of phase. It is similar to a system developed by Lotus that uses a car's loudspeakers to counteract engine or road noise, or moderate background noise for the benefit of hands-free car-phones.

"Traditionally we have always thought that mass is the only thing that gives acoustic insulation," says Sakula. "Well, maybe you can get it

Kingspan panels at Stansted (top left), Formawall (centre left) and Superform Aluminium (left). Bristol Development Corporation Visitor and Marketing Centre (above) features Kingspan Monotrex

without mass by having an active surface that counteracts incoming sound."

"How much these ideas will influence the science of the future I don't know," says Sakula. "But the thing is, at the moment you look at these sort of things, and you think they'll be extraordinarily expensive: you couldn't possibly have mass consumption. But then, people said that about computers."

Two defence contractors have approached AFE with a view to developing cladding systems. But however advanced their technological base, the intensity and timescale of attack is quite different from that obtaining on the battlefield.

"Funnily enough" says Sakula, "in the early days we were slightly in awe of them and we thought, 'Oh, they're the defence industry and they're so sophisticated.' But the reality was they became slightly in awe of us, because when they put a piece of defence equipment on the battlefield, if it lasts a week without a breakdown they're quite happy. They were dead scared by the idea of putting a piece of cladding up on a building a hundred feet up in the air, and it's got to last 50 years. That frightened them off!"

We can presumably not expect to see composite cladding panels made of Chobham tank armour. Yet ironically, it might be welcome. Thanks to the recent bombs in the City, blast-resistance has become a growth area in facade engineering. More relevant is the use of crumple zones in car design.

"It's been interesting," says Sakula, "just seeing how things are affected quite far away from the epicentre.... The key issue is, should you design buildings that have glass windows that shatter easily, thereby releasing the pressure on the frame; or should you have glass windows which don't shatter, and thereby increase pressure on the frame? In the second case you can get much more damage than in the first case, but the occupants are better protected."

The new science of intelligent materials is making it possible to imagine a future facade that will respond actively to the forces acting upon it. Many architects have had their imagination fired by the possibilities of electrochromic glass, which may one day allow a window to be turned on or off like a light.

In the business parks of the future, however, whether acoustically, thermally or even visually, the facade itself could begin to dissolve into the background. In this minimal world, only a cluster of company logos will remain visible to guide visiting reps, floating ethereally in the air like so many branded flying-saucers. □

Editor: Georgi Stanishev

Paul Warchol

STOREFRONT
CHANGING FACES

Above: New facade for Storefront by Vito Acconci and Steven Holl, 1993. Opposite page: Unprojected Habits. Installation of Five Portable Toilets on the facade of Storefront by James Cathcart, Frank Fantauzzi and Terrence van Elslander, 1992

The old wooden facade of Storefront, visually plain and physically worn, housed some of the most ambitious ideas on art and architecture. One could never have guessed that anything unique lay behind such an anonymous front, yet through its unincorporated appearance, it projected architectural anarchy in a reaction against the hyper-textured capitalism of the last decade. The unincorporated look of Storefront is a story of an alternative forum that resisted conventionally incorporated architecture. And while mainstream architecture was being coerced, profitably I may add, by the neo-Disneyesque renditions of Robert Venturi's decorated sheds, which ranged from the glossy headquarters of post industrial corporations to rarefied post-Modern theme parks, Storefront instead continued working on a series of ideas concerning the future of the environment, heavily investing in new thoughts on technology and ecology. But ever since the world-wide economic depression coincided with the demise of political supremacy, the world is awaking to new ideas and individuals. Change, rather than

"The place is shaped like a slice of pizza, and it's not much bigger, but there's nothing small about the visions on view at Storefront for Art and Architecture", wrote the New Yorker *in 1989 about this small New York gallery. But today, besides being the place for exhibitions of the most innovative and radical research at the border line between architecture and other artistic fields, the Storefront became itself a permanent experiment allowing avant-garde artists and architects to convert the gallery's facade into a temporary "Art Object" installation. Here, presenting its last three conversions into conceptual sculpture by James Cathcart, Frank Fantauzzi and Terrence van Elslander, (1992); Mark West ("Formworks & Blackouts", 1993); and, finally, Vito Acconci & Seven Holl ("A Collaborative Building Project, 1993"), Kyong Park, founder and director of the gallery, argues that only inter-disciplinary endeavours could respond to the present day social, cultural and environmental issues.*

control, rules current social dynamics, and political and aesthetic boundaries are becoming increasingly porous. The fragmentation of political and economic orders reverberate in all other frameworks of society and the validity of dominant aesthetics is being questioned as well. Within the condition where transition pervades all human thought, no-one can afford to keep any experimental and theoretical works aside. The ideas that were previously considered marginal can no longer remain functionally academic or theoretical. They must now be

forcefully funnelled toward application so that a new destiny can be forged.

But gallery as the central agent for experimental ideas is a privileged space. Its primary goals are to nurture and criticise the evolution of aesthetics, but it is unwilling and ill-equipped to socialise their theories on environment. Equally, the facade of Storefront, which previously sheltered a much needed discourse on alternatives, now acts as a barrier separating theory from practice. Severing the links between the ideas and their potential sites, the facade estranges the aesthetic from the public consequences. An obvious solution to this dilemma is to fragment this barrier and, therefore, Storefront began a series of built projects that pushed the inside out.

First was a project by James Keyden Cathcart, Frank Fantauzzi and Terrence Van Elslander (February 8 - March 14, 1992) who inserted five portable toilets through the facade. Normally used in construction sites and fair grounds, these prefabricated metal units were placed to face the street, while their body, together with the fragments of removed facade, were placed within the exhibition space. Open for public use, these inconvenient "conveniences" evoke the draining of our civility within the banality of post-Modern culture - the transformation of our social structure into the compost of consumption. The inability to accommodate basic human needs is no less important than the carnage of urbanity in physical violence or the usurpation of the nation/state by ethnic separatism. These embrace social and urban functionality.

But the toilets also have a message for Storefront. By turning the space of the higher aesthetic into public service, the project usurps the exclusivity of cultural space. The role of the gallery is inverted, and the general public becomes the user/viewer while the traditional gallery visitors are given the rear ends of toilets. Public space is injected into the gallery space, while cultural space is emptied out to the street. The facade that divides the high aesthetic from the popular is cut open, conceptually measuring the environment, but without sacrificing the civility of its social realism.

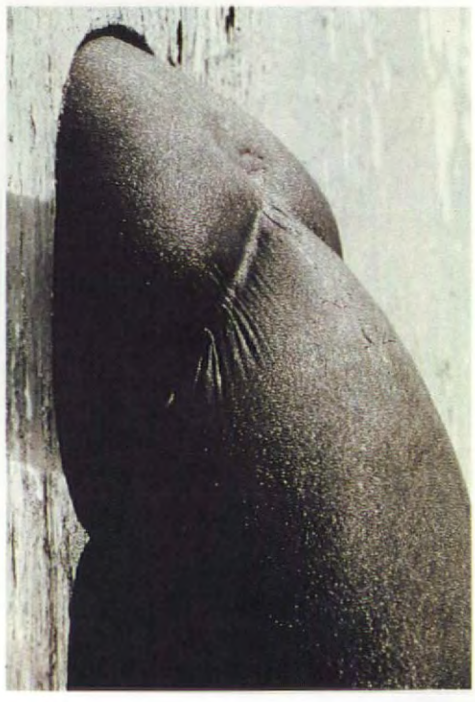
Then followed the installation of "Formworks" by Mark West (September 26 - October 31, 1992). A series of sacs, made of high strength industrial fabrics, were attached to the exterior of facade. Then, through holes made in the facade, concrete was poured into them from inside. The key to this method is that liquid is most efficiently contained by a tension membranes, as opposed to the wooden boxes used in traditional formwork. In fabrics the weight of concrete deflects in accordance with gravity, to naturally create the exact tensile for a highly efficient and resilient structure - very similar to Antoni Gaudí's structural work. Fabrics let gravity shape concrete, more specifically, the dead load of the material itself, and allows the liquid nature of "wet" concrete to be retained in its final form. It is also worth noting that the structure in traditional rigid wooden formwork serves solely to inhibit the deflection of these forms under the hydrostatic pressure of the wet concrete, thus forcing the concrete's liquidity into the planar geometry of these wooden containers. With fabric membrane being water and air permeable, the water-cement ratio of the placed concrete is greatly reduced, thus producing a stronger member than that produced using wooden forms - which tends to retain more water than is desirable. The fabric also ensures a very fine finish to the concrete surface, because the small air bubbles that usually appear on the surface of the concrete structure, together with the excess water, are forced out.

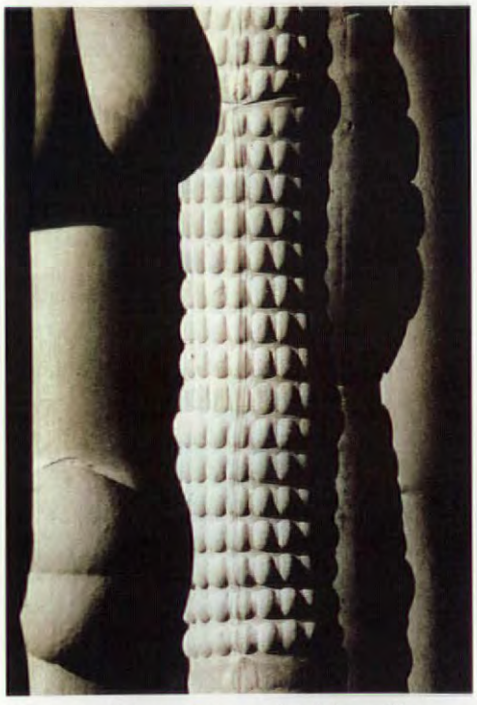
Projecting out from Storefront into the sidewalk, these amoeba-like forms freely invited those passing to touch. Virtually sexual, they are antithetical to the built environment that has increasingly hardened, either through institutional reasoning or simply in the defence of the one's habitat from urban violence - a phenomena of fortification taking

"Formworks and Blackouts" by Mark West in Storefront, 1992.
Right and bottom right: Fabric forms filled with concrete, and attached to the old facade of Storefront.
Opposite page, above and bottom far right: Fragments of the installation. Details of concrete after the fabric was removed

place in contemporary ghettos in the USA which is well documented by photo-journalist Camilo Vergara. The caressing way in which people handled them reminded us of the impoverishment of tactile experience in the built environment. And with the textures and materials of the city still being dictated by our visual appetite, as opposed to other human sensors, the re-emergence of tactility seems implausible until all artists and architects become blind. As building technique that can potentially "soften" the rigidity of the constructed environment, this experiment by Mark West foresees an architecture whose geometric determinants include forms dictated by random events and by so-called chaotic forms of geometry. This project, which shows the possibility of Storefront working as a laboratory to facilitate research and development of building technology, again externalises disciplinary aesthetic into public spaces.

Following these rather spontaneous





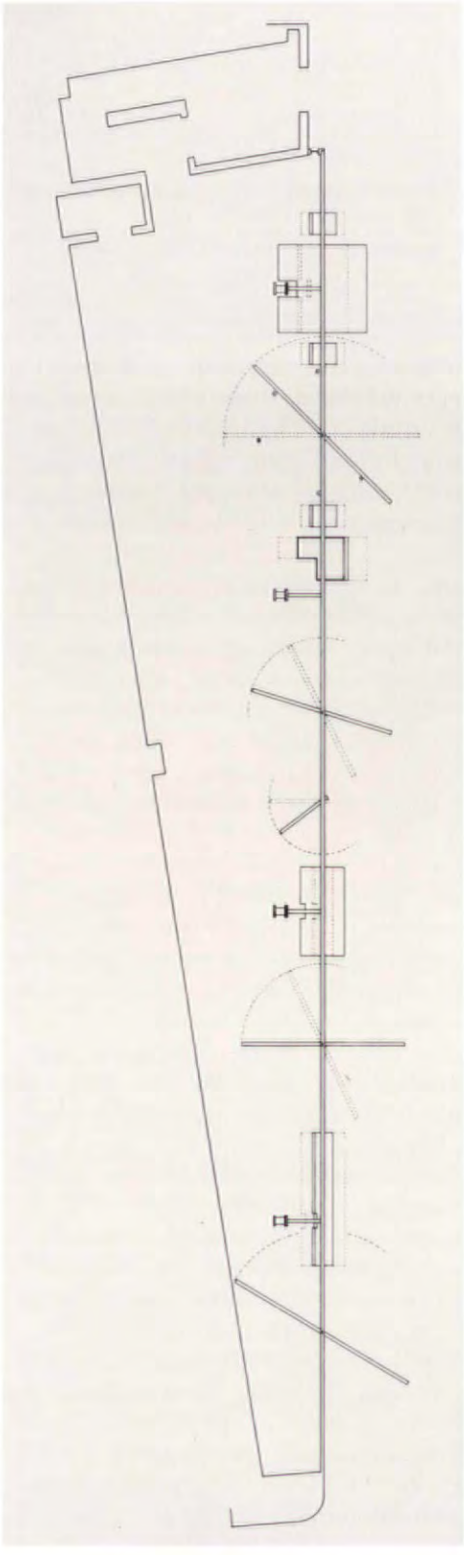
"Concrete Columns" designed and formed by Mark West before his project in Storefront

projects, it became obvious that Storefront should consciously take on something even more physical and ambitious. With this in mind, we invited Vito Acconci and Steven Holl to form an artist/architect team to redesign the entire public configuration of the space.

The project, completed on November 13, 1993, has modified Storefront's own reality of what is inside and outside: the private and the public. Made of oversized pivoting doors linked by smaller openings that vertically rotate into tables and chairs, the new facade brings the interior space out onto the sidewalk, while simultaneously bringing the outside to the inside. The long triangular space that earmarks Storefront is now subdivided into five parts, each changeable to the degrees of rotation commanded by the four large, horizontally pivoting doors. Interspersed between these large openings are horizontally rotating segments that open into transoms, tables and chairs. When fully closed and without any window the facade becomes quite brutal and menacing - a fortress. When all open it reflects the desire to break free from the bonds that structure our cities hierarchically. It is about dissolving the public and the private, and their contradictions, and about the conversion of public spaces into private - and vice versa. This distinction becomes either invisible or amorphous. In space considered public, such as parks, corporate plazas and new riversides, surveillance and security underlie their private function. Race, age and attire lead to exclusion or inclusion. At the same time private spaces are becoming public spectacles. The spaces of housing projects are places of underground commerce, and stray bullets instantly turn private space into public grounds. Talk shows, like Oprah Winfrey and Phill Donahue, channel the intimacy of private lives into public consumption and - as the violence half-tones the gloss of our cities - windows, doors, and walls become smaller and thicker, to make private spaces more defensible. The reduction of building fenestration updates Paul Virilios' interpretation of architecture as a defence, but this time it is urban not military. Building material or articulation is no longer about decoration, but about the materialisation of our spatial violence or image posturing based on the language of defence. Spaces, physical or otherwise, are now both private and public, open and closed simultaneously. The project is also about the hostile yet coalescent relationship between art and architecture, whose mutuality lies in their dominance of the visualisation of the word. Aided by history, one could evince that they were once indistinguishable and that therefore the recurrence of their alloy is unavoidable. Others, following the great industrialisation of human labour and thought, consent to the classification in aesthetics which, they believe, could define and even nurture the essence of any discipline. Yet, within the contemporary condition of their autonomy, the proximity of art and architecture endures, constantly keeping the issue of their separation and synersis immediate. The recent ascent of inter-disciplinary collaborative projects continues to question the legitimacy of disciplinary distinction. The collaboration that hopes for the merging of disciplines can also raise questions about their distinctions, hierarchy and territoriality. An ideological union of the disciplines could easily erode their specificity, thereby diminishing the value of collaborative works based on their differences.

Problems in collaborative projects between artists and architects should not however rule out other forms of inter-disciplinary projects. The rationale for multi-disciplinary engagements is not yet fully exhausted, and the complexity of contemporary social and environmental issues are beyond the capacity of a single idea or an individual. Any significant thought on the future of a city now requires an equally complex forum, and specialised initiatives can only procure a temporary plug within today's multi-dimensional and globally extended issues. Only inter-disciplinary endeavours could compliment the culture, economy and politics of the multi-nationalised globe.

Therefore the construction of a sustainable relationship between disciplines is the current challenge in the management of intellectual and environmental resources, including aesthetics. In the strictest sense, disciplinary division is a categorically infrastructural problem, and the systematic fragmentation of human knowledge reflects the shortage of broader directives to meet our fundamental needs. The solution to this dilemma may



New facade for Storefront by Vito Acconci and Steven Holl, 1993, plan and interior view

Paul Warchol

depend on the construction of an ecologically modelled mix and relationship of disciplines and, like a corporation comprised of many departments and interests, a system integration based on its knowledge is the solution that can work. Infrastructuring of different disciplines into a cohesive and affective forum simulates the integration of disparate social issues into large yet manageable social contracts, and the accumulation of application of our knowledge in the future, may depend on what exists between the fields rather than within them - like the facade of Storefront. The fortuity of this project rests on the absence of territoriality and roles. The neutrality of its form is a reflection of a collaboration that reduced individuality, and the facade, being neither all Acconci or all Holl, neutralised their authority.

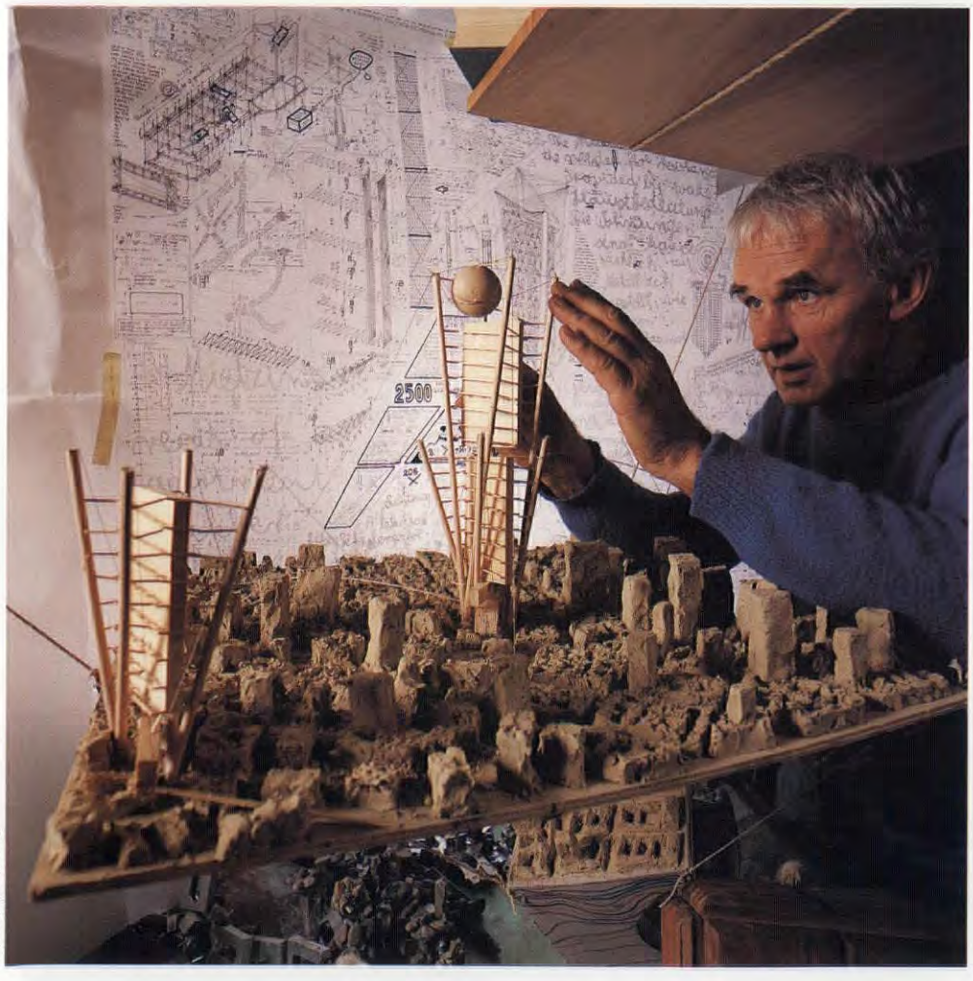
Although the result may disappoint those who look for "who did what", the ambiguity of their command undermines the singularity of an artist or an architect. In the end you have a facade that says "No Wall, No Barrier, No Inside, No Outside, No Space, No Building, No Place, No Institution, No Art, No Architecture, No Acconci, No Holl, No Storefront." Definitions and post-war urban tendencies are removed. Storefront will commission artists or architects, sometimes together, for an experimental building project on its space. □

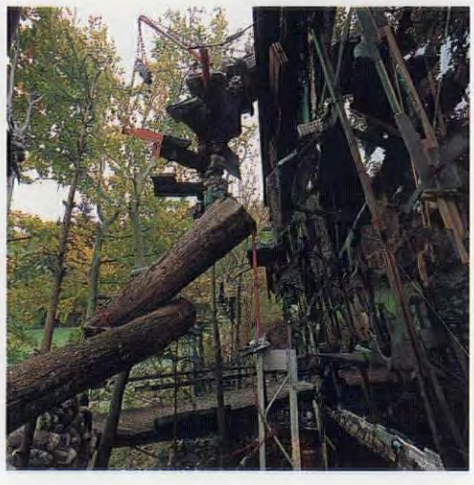
ZIEGELRIED'S STOIC MISSIONARY

Elemer Zalotay is an enigma among architectural theorists. A refugee from the Cold War who has attracted a serious following in Switzerland with his curious mixture of organic and monumental dwelling projects. Peter Wislocki discusses the Zalotay phenomenon, and why it might just work.

The spell check function on my computer proposed that "Zalotay" should be substituted by "Zealot". Arguably apt advice. Certainly Elemer Zalotay realises that zealots and prophets are never heeded in their own time. Being unheeded - indeed positively reviled and punished - is something this 62-year old Hungarian has experienced for decades. Ever since taking part in counter-revolutionary gatherings as a schoolboy, Zalotay had numerous and painful confrontations with Communist officialdom, resulting in several terms of imprisonment. Whilst qualified to practice as both an architect and a structural engineer, the first ten years of his professional life were difficult; the subsequent seven intolerable, with all meaningful work denied him. The explicit influence of Le Corbusier and Frank Lloyd Wright in his early projects - and his theoretical publications supporting these western architects' approaches to wider issues concerning the production of the built environment - proved unpalatable to the authorities. After numerous earlier applications to leave the country, Zalotay was finally permitted to emigrate to Switzerland in 1973.

On his arrival in Bern, Zalotay found employment in a commercial practice. His continuing interest in theoretical debates, hardly explored in the office's bread-and-butter work, provoked him to publish some polemical projects and writings, attracting considerable attention. This was unacceptable to his employers, with whom Zalotay parted company to pursue an independent career. His dual professional training made it possible for him to offer a complete service to clients on small commissions. But as the





All photographs by Willig

Zalotay tinkering with a model and a view of the entrance to his house(opposite page). An overall view of the house (below) with exterior and interior details (bottom)

Zalotay's theory of "trees in the air" at 170-storey skyscraper scale

months went on, the workload evaporated.

Zalotay's life since has been devoted to two primary activities: the creation of his own house in the hamlet of Ziegelried, north of Bern, and the evolution of his technologically inventive and socially radical proposals for urban redevelopment. The great problem which Zalotay has sought to address is that of housing.

The Zalotay residence illustrates the purely artistic side of its creator's personality. Over the decade it has stood in this provincial backwater, it has provoked strong reactions. Where his neighbours have thrown stones through the sloping glazing, Zalotay sets the missiles in cement, as minor monuments to his continuing struggle against the bigoted and unenlightened, and repairs his windows leaving the point of breakage visible. The house is quite literally growing in harmony with its surroundings. Zalotay's concern for the vegetation around his home is obsessive, and his enterprise in evolving his personal habitat incessant. Constructed from a variety of standard industrial components and scavenged fragments of unwanted building materials, the house is a collage of considerable charm and beauty. Here we find the elevation of a species of shanty-town design into something altogether more sophisticated, through the exercise of technical skills and aesthetic sensibility. The impression created is of unrestrained eccentricity, yet there is a far more serious - and analytical - side to Zalotay's psyche.

One hardly needs to list the more or less utopian solutions to the world's housing needs which have been proposed by dozens of the century's most distinguished architects and inventors. We all know about Le Corbusier's Radiant City, and its problematic legacy. Buckminster Fuller is respected, but no city has yet been enclosed by one of his domed envelopes. Archigram's work has resurfaced in Viennese and Parisian exhibitions, but cities still don't walk, and few building elements plug in. So why should Zalotay succeed where distinguished predecessors have failed?

Superficially, Zalotay's proposals resemble their well-known precedents. "We should live like the birds", he explains, showing sketches of vast horizons filled with beautiful structures scattered amidst parkland. In existing, overpopulated urban contexts - whether Manhattan or Sao Paulo - Zalotay argues that only by reducing land costs can apartments be provided at minimal cost. High-rise is the rational response. However, whereas conventional tall buildings tend to utilise relatively sophisticated technology, Zalotay's dream is of "castles in the air" built of materials costing no more than the scavenged sheet metal used by third world slum dwellers.

Where Le Corbusier proposed tall buildings emerging from a tabula rasa, Zalotay accepts that his towers will grow from existing cityscapes. The urban parkland is therefore part of the tower itself - a 600 metre high vertical garden, prefigured in some recent designs by Sir Norman Foster and others, but on a much larger scale. Accepting that such a proposal would be costly, threatening the economic advantages of his building system, Zalotay argues that as each of his "trees in the air" could be shared by several dwellings, the overall cost would be modest given that no land is required for the park. Zalotay's own residence provides an illustration of the way fragmented steel and glass can combine with greenery to produce a magical environment.

Zalotay insists, above all, that his forms are not arbitrary, or the product of aesthetic prejudice or preconception. In the absence of paying commissions, he has spent decades refining his ideas, producing hundreds of detailed drawings and calculations. The architect-engineer accepts that the onus is on him to quantitatively demonstrate the technical and economic viability of his proposal.

The technical explanation begins. A simple sheet metal enclosure, giving 50 square metres of floor space, would weigh about a metric ton, allowing all the material to be delivered by a small truck or large van.

Whilst this would permit large volumes to be enclosed cheaply and quickly, with minimal skill or equipment required for assembly on site, all lightweight steel or aluminium systems require much heavier and generally expensive insulating materials to produce a safe and habitable dwelling. Zalotay solves this problem by proposing hollow panels. Stainless steel components, once secured in position, are filled with circulating water; aluminium components with a special, non-corrosive coolant. In either case, the liquid guarantees structural integrity in the case of fire, and provides acoustic and thermal insulation. The building infrastructure is designed to minimise the water pressure in individual elements. A water-filled aluminium component system, Zalotay calculates, would provide a 10 square metre apartment using under 2,000 kg of metal. The cost of the aluminium would be competitive with that of shanty-town dwellings; the cost of water - as a raw material, ignoring pumping plant - would be negligible.

Zalotay compares his figures with those for conventional constructional systems. Even allowing for the primary structure to which the hollow panels might be attached, the Hungarian estimates that a twenty-fold saving in the weight of structural steel and aluminium components could be achieved over traditional techniques. One hundred and seventy-storey skyscrapers could be built within budgets normally associated with buildings of 10 to 30 storeys.

Other components in Zalotay's system would remain more conventional and costly. Kitchen and bathroom equipment, and curtain walling (a small proportion of wall surfaces), for example, would add considerably to overall costs, but huge savings would remain.

Zalotay's system would be aimed at low-income householders hitherto driven into areas of downtown decay or out of town isolation. Components would be purchased in DIY superstores, and simply bolted together by the user, within a larger steel and concrete structure containing lifts, service risers and basement car parking. This would leave the (public- or private-sector) infrastructure organisation to connect the coolant supply, and simultaneously certify the dwelling's safety and habitability.

Naturally, the user would have great freedom in determining the form of their dwelling within the high-rise vertical-park megastructure. Throughout his career, Zalotay has been profoundly concerned not only with the participation of users in determining the form of their buildings, but in mankind's innate creativity. His own house - a project which despite its listing as an official monument is constantly growing and metamorphosing as a result of Zalotay's own creative impulses - testifies to the opportunities which traditional dwellings have afforded, which are denied urban populations today. Zalotay does not believe that everyone would want to build their own house or flat; but the mere option of doing so would be liberating.

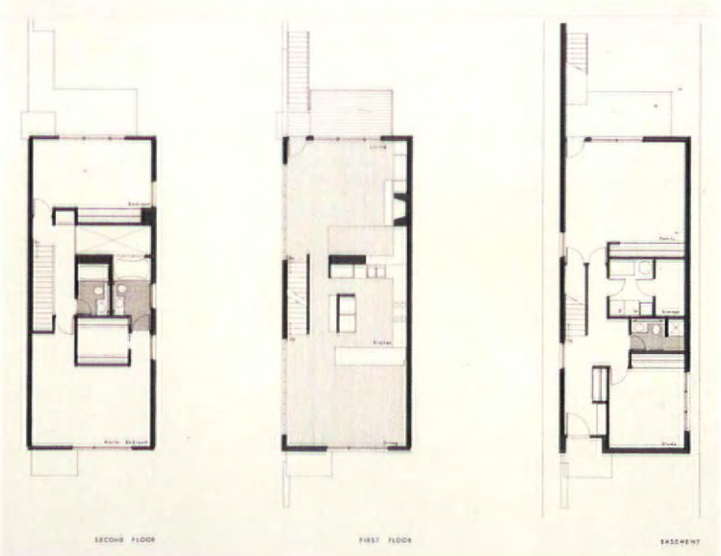
Like most inventors, Zalotay is desperate to gain the ear of an industrialist, a private developer or a public-sector housing organisation to help develop his ideas. Hundreds of pages of diagrams, details, graphs and calculations are available for scrutiny by anyone willing to engage in his excited conversation. As Zalotay notes, in recent times developments in other fields - notably information technology - have been so rapid that few laymen dare to dismiss anything as fantasy any longer. The vision has been conceived. We are all invited to explore it. □

Thompson House, Chicago, Illinois 1994

Architects: Brininstool + Lynch
Photographer: Jamie Padgett

The exterior of this single family residence is reflected in the interior through the use of two skinned concrete block wall construction. The choice of material was a response to the severity of the social conditions in the neighbourhood, the modest construction budget, and a desire to express the clear identity of a manufactured building material in its most basic form. Thus both skins of the walls become elements in the creation of the volumes that define the spaces and functions of the house.

The austere appearance of the exterior of the residence gives way to an abundant richness of natural materials and light in the interior. Birch plywood is used throughout for cabinets and panels. The atrium skylight, together with the translucent panels on the south side of the house, create a light source that remains constant day and night by means of incandescent backlighting. This effect will not be destroyed even if another building is sited on the vacant lot next door. □


SECOND FLOOR
FIRST FLOOR
BASEMENT

COMPUTING

VIRTUAL OFFICE

ARCHITECTURE ON LINE

NOT SO MODEST CAD

FRENCH EXHIBITIONISM

ARCHITECTURAL VR

➲ "Come here, Mr Jones, I have something to show you."

Alexander Graham Bell's reputed first words down his new telephone can perhaps be parallelled by the recent remark at a London presentation of Engineering Technologies new Virtual Office software, "Mike, I want you to take the two end chairs away from the table." What Tim Aitkin of Engineering Technologies was asking a colleague 50 miles away to do was move the chairs in question on his computer display of a projected office interior, a move that would be duplicated on the screen in London.

The demonstration was intended to show how architects, engineers and construction companies could hold virtual planning or even site meetings through a telephone/screen interface, using Reflex software. The design, plans and specifications, created under Reflex, can be consulted and adapted on the workstations in each office, linked by conventional and ISDN phone lines. If changes are needed, for example, to the air conditioning plant, then the implications and consequences of the proposed changes can be investigated by all the parties involved at once, points of conflict (for example in rerouted ducting) resolved and amendments made. On site, problems during construction can be handled without the expense and delay of a site meeting. The changes agreed are automatically updated on all the participating systems, while a series of "locks" is available to restrict access to required parts of the design to designated users. Designs can be presented either as plans or perspective, with different degrees of rendering. Because the updating of screen images is immediate, the risk of confusion and error is eliminated, and the immediacy of the system also contributes to rapid solutions. Indeed, problems can be anticipated at the planning stage, rather than solved as they arise. This shortens the preparation time before construction starts, as well as improving the workflow on site, and reducing the risk of subsequent and expensive complications - one estimate of the percentage of time lost on site resolving such problems is as high as forty per cent.

Reflex software has been developed as an extension of Sonata (see previous issues of *WA*). It is an object-based system, rather than a purely graphical one. In other words, the on-screen image is the graphical representation of a set of linked databases of information, so that not only the visual appearance of part of a design can be examined, but other aspects as well, such as cost, structural data, supplier or whatever. The user can create and specify the database to their own requirements. Using the example of air conditioning again, changing the position or size of ducts or louvres could be run back to see what changes would be needed in the capacity of the main plant, or how the overall climate control of the building would be affected. This interactive aspect of the programme makes it a valuable modelling tool. The construction time schedules can also be entered into the database, allowing the construction sequence to be devised and planned efficiently, as well as presented graphically, either as a series of stills or as an animation. Thus the reach of the programme extends into project management as well as architecture, engineering and construction.

A further feature of Reflex is that it can accept input not only from the major architectural CAD programmes but also from the programmes regularly used by structural and systems engineers: designs and plans can also be fed back into parallel systems for specific use by the partners in the project. Recently, Engineering Technologies were asked to advise on a potential construction problem on the new Heathrow Link, a project to join London's main airport to Paddington Station by rail. The different data from the architects, consulting engineers in different areas and the construction company were used to build a complete model of the system on screen, a process that only took three days. Using the model, the various parties were able to preview the potential problem, and devise a satisfactory solution. In the words of George Stephenson, managing director of Engineering Technologies, "bringing all the data together in a single model can help identify mis-matches or problems, even in the most carefully planned and audited designs. Beyond that, it provides a way of working that meets the complexities of the contemporary architectural and construction industry."

For further information contact Engineering Technologies on 0332 799777, fax 0332 79256

Showing off VR

Virtual Reality, once the arcadian resort of game-players and the military, is now finding wider and wider applications. There are two reasons for this. One is the growing appreciation that simulation (whether via a screen or in a fully immersive way, with helmet and glove) can be a useful method of presentation, or training, or of evaluating a design before it is constructed or manufactured. The other is the availability of PCs , such as fast 486 machines or the new Pentium ones, sufficiently powerful to run on-screen VR programmes without additional hardware back-up.

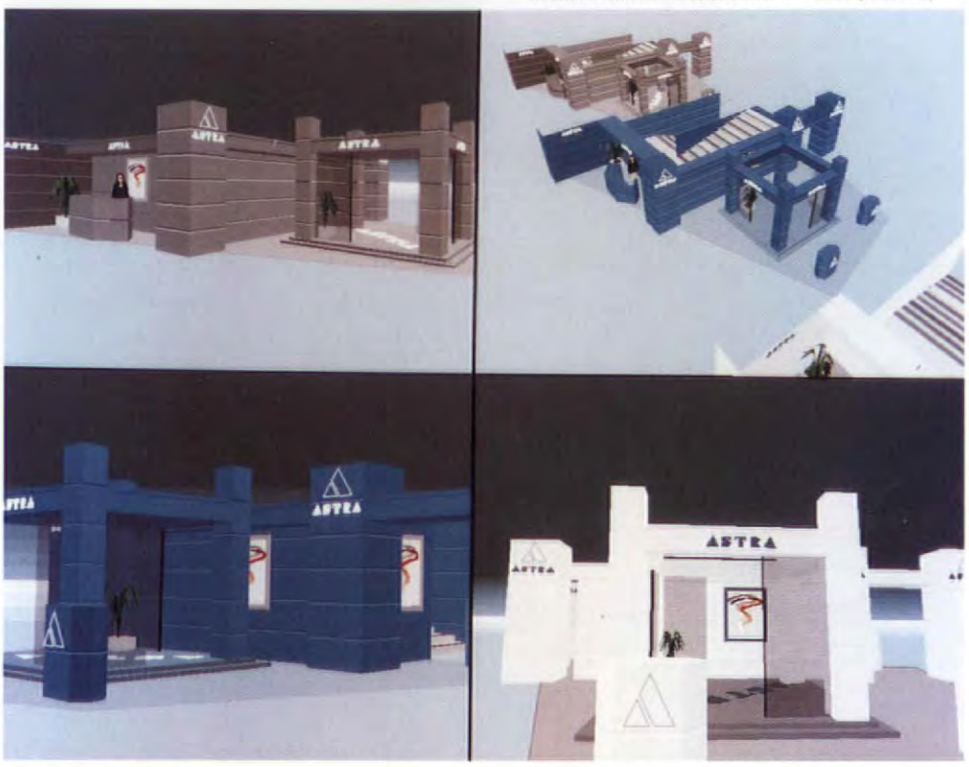
Superscape, a leading developer of VR applications in the UK, have just announced the launch of their Superscape VRT software in a 486 format. The programme can be used with a screen and mouse, though other more complex peripherals are also supported. This puts the possibility of acquiring a VR facility within the reach of a much wider market.

One application already in use on PC is for designing stands and installations for trade exhibitions and fairs. The Dragon Group have installed a Superscape Virtual World Organiser on a Dell PC - the system can also be downloaded onto a portable. Using the programme, Dragon can present both individual designs for stands to clients, and allow the client to "walk through" the space on screen. The effect of changes to the design, to stand colours, or to features such as exits and entrances can be rapidly entered and assessed. A further use of the system is in laying out the whole of an exhibition space, to allot and plan stand positions, and this design can also be explored in three dimensions on screen. The movement of people through an exhibition can also be simulated, whether to check safety aspects or to evaluate visitor patterns.

Superscape, as *WA* readers know, has already been working closely with Real Time Design on developing a complete virtual design of the new Clydeside development on Tyneside, and are aware of the requirements of architects and engineers looking at VR as an addition to existing CAD or design systems.

For further information contact Superscape, Zephyr One, Calleva Park, Aldermaston, Berkshire RG7 4QZ, telephone 0734 810077, fax 0734 816940

Superscape at work (below) and the "cover" of modem linked Architecture on Line *(bottom)*

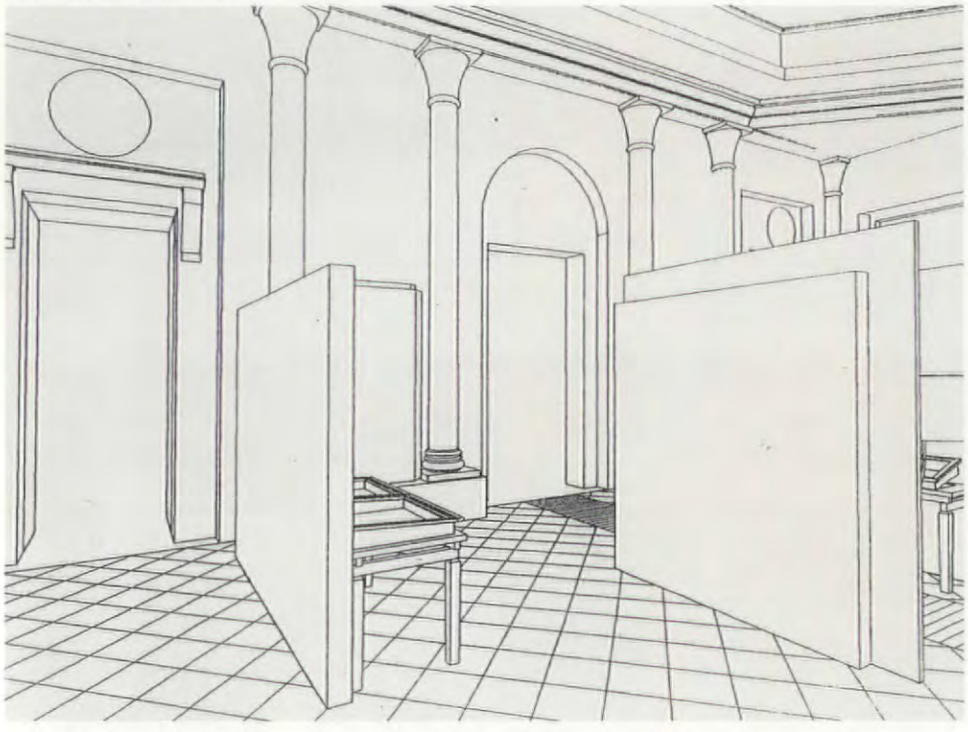


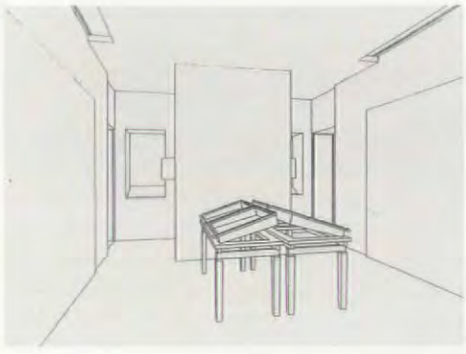
Line Up for On Line

One of the main problems faced by architectural magazines and journals is the press processing time between delivery by the author and publication: where editorial space is limited, a delay of several weeks can extend even further, to months or more. "Book reviews of some of our titles have come out in journals after the books themselves were out of print", comments Kevin Lippert, publisher of Princeton Architectural Press in New York. His solution is to break the log-jam with a new electronic journal *Architecture On Line*, which will process material and release it onto the journal's server within 48 hours of receipt. Authors send articles, interviews, or information (both text and images, whether still or video) for publication to the journal's server, which readers also access the magazine via their modems, and can download articles and images at will.

The editorial content is grouped around several categories: criticism, education, history, practice, projects and research, reviews and theory. There are plans for active on-line "public meetings" with leading architects, as well as an information board for job offers, prizes and competitions. The main innovation, apart from the rapid editorial turn-round, is the role of Moderator. This Orwellian-sounding title has been chosen, according to Lippert, because it is not an editorial job. Material is read for defamation, and edited for house style, but otherwise no editorial control or policy is imposed. This bold move effaces the distinction between reader and writer, making both participants in a communal venture. It accepts the logic of an information network, and takes it to its proper conclusion. Architects, academics, students and all with an interest in architecture are welcome to join in, at whatever level.

Bodin's Intergraph exhibition drawings. Le Triomphe (below) and showcases for Voltaire's life in Germany and England (below right)





Princeton Architectural Press is a relatively new company, which has already rapidly built a strong reputation for the editorial and design quality of its list: if the same quality informs their new venture, *Architecture On Line* should rapidly become the main electronic journal for architecture: "something between an architectural library and a club", in Lippert's words.

To access *Architecture On Line* the user needs a Windows PC or Macintosh, and a modem. The $30 starter kit includes the necessary point and click software to access and download the journal, and a year's subscription (the proposed subscription is also $30 per year).

More information from Princeton Architectural Press, 37 East 7th St, New York NY 10003, telephone 212 - 995 9620, fax 212 995 9454, e-mail @pap.designsys.com.

➲ Pour encourager les autres...

The historic part of Paris, on the north of the Seine, is the Marais (home to the National Archives and the Picasso Museum). Here the architect Jean-François Bodin, who was born in the Marais, has his office. His portfolio is particularly strong in work for French museums, both interiors and exteriors, including also exhibition work.

With the reduction in private and commercial clients in the last few years, he opted to develop the CAD facility, based on Intergraph machines, so as to retain a core staff. The office now works entirely on CAD, employing five people. "The professional constraints on architects are considerable in France," he points out, "not only in terms of employment law and heavy social security costs, but also in the highly structured and regulated fee system. There is no freedom for an architect to develop parallel activities, or to make commercial links with other companies. I realised that all an architect could sell was his design, and therefore decided to maximise the design output by using high-level CAD equipment. We were already using Intergraph, and so developed along that line."

The office's typical use of CAD can be seen in these drawings, created for planning a major exhibition on Voltaire and Europe, at the Hôtel de la Monnaie in Paris. The exhibition required a temporary framing structure within the historic rooms of the Hôtel, as well as display cabinets and free-standing panels. The constraints of exhibition designing are considerable, in conveying the spirit of the exhibition to the visitor and in protecting and presenting the works of art displayed (in this case both paintings and historic documents, mainly lent by the Bibliothéque Nationale). The tight time schedules and risk of last-minute changes to the content of exhibitions also pose problems. Here the flexibility of a CAD system can prove its worth, in allowing rapid amendments without extensive re-drawing. "CAD", according to Bodin, "is now the central tool of our business, allowing us to maximise our creative activity."

➲ CAD in practice

Michael Gold is a London based architect whose interest in computer graphics stemmed at first from his work in hand drawing and rendering. "I had a long wait for CAD systems to be good enough for me," he laughs. "It was only when spline based systems became available that 3D CAD began to mature. Before that, modelling anything but simple shapes was very difficult, and rendering quality was beneath contempt." His work in CAD has earned prizes such as the UK Computer Graphic Art Award. Now he welcomes the advent of lower cost, powerful PCs, especially the Macintosh Power PC, which makes high

Michael Gold projects – Halliwick Home, London (below), Southwest Essex Reform Synagogue (bottom left) and Crouch Hill apartments, London (bottom right)

quality architectural rendering and animation, previously very costly in terms of computer time, a practical possibility.

Following the CAD path has helped his practice survive the recession. With a wide range of software, powerful hardware, and large format colour printing installed, output remained high during the darkest months. Now his office, like may others, is seeing an increase in client activity, just when the price of processing power has fallen – a good moment to expand and update hardware. Current projects include a block of flats in London's famed Crouch Hill district (illustrated here) and three competitions.

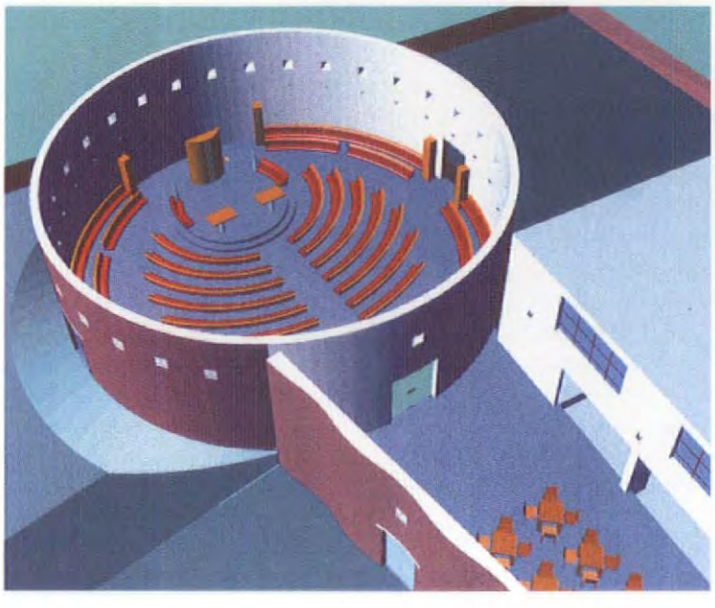
For 3D effects Gold mainly uses Presenter Professional, a tool developed in the USA with NASA and the Walt Disney Corporation in mind. Not many architects use high quality 3D CAD since the shapes they deal with are relatively simple. With it one can draw freehand across three concurrent views in different planes on-screen, with a fourth window showing a continuously updated 3D view. Another valuable tool is animation, allowing the architect to move through and around the design space or building, and to present projects to clients in a very effective manner.

Gold is firmly convinced of the value of 3D CAD for architects. "With current programs and the newer PCs, the architect can start working almost immediately, and effectively, in 3D," he enthuses. "I can see it creating the same opportunities and changes in architecture as word processing and desk top publishing have brought about in other areas, with architects at an individual workstation fitted out with a whole range of software."

For further information contact Michael Gold, 4 Campden House Terrace, London W8 4BQ, fax: 0171 229 6548.

➲ Endnote

This is the first of a regular feature on computer-aided design, information technology, and virtual reality for architects. Future issues will contain product and literature reviews and evaluations, news on projects and awards, and interviews with leading software developers and architects on the use and value of these new technologies to the profession. You are welcome to contact me with comments, questions and ideas. Conway Lloyd Morgan's direct fax line is *0181 675 8861*.



PHILOSOPHY SHMILOSOPHY

The Philosophy of Symbiosis. *By Kisho Kurokawa. Academy Editions. 293pp. £9.95*

Reviewed by Ronald Green

It is unusual these days to come across an architecture book that will fit into a cabin trunk, let alone a jacket pocket, but this one will. Endorsed by Post-Modern guru Charles Jencks as "one of the most essential statements of post-Modern culture to date" – in itself a thoroughly post-Modern statement, with all those qualifications and the door held open for future contributions that might be even more essential – this looks as though it is a book for reading, not for staggering to the coffee table with. Alas, appearances can be tragically deceptive. Anyone attempting to read this book from cover to cover will find it naive, repetitive, self-satisfied and, yes, unreadable too. It is in fact a slightly modified version of a fragmentary and telegraphic 1987 text originally entitled *Intercultural Architecture – the Philosophy of Symbiosis.* Under its original title it aroused some concern in Western circles because its barely disguised oriental triumphalism seemed to herald the long-expected end of occidental hegemony in the arts and technology. But that was before the recession struck symbiotically and the Japanese economy went down like everybody else's. Now "Intercultural Architecture" is gone and symbiosis – springing from the same source or – reading between the lines – "We're all in this together" – has taken over.

What Kurokawa has to say here is intensely consoling only for people who believe that the course of human destiny really is charted by International Conferences like Aspen 1979, which "left an enormous impact on more than two thousand American professionals and students"; the 1992 "Earth Summit" in Brazil, that left behind the the "Biodiversity Treaty", and occasional leading articles in *Newsweek.* These, our author assures us on page 44, mark the end of the Darwinian phase of human development and the beginning of the "Life", or "sharing" phase, in which things will just go on getting better and better and more and more localised and varied.

The capacity of admired artists and writers all over the world to believe consoling theories of this kind is equalled only by the gullibility of the students and, dare we say it, the gurus, who support them in their delusions. The sort of people who will not raise an eyebrow when they read that Jacques Attali, extravagant former president of the European Bank of Reconstruction, "attempted to deconstruct orthodox economic theory into new paradigms" and "transcended the traditional boundaries of economics through his research into semantics"... For which read; "Spent a lot of money".

Which brings us to architecture. Here Kurokawa has surprisingly little to say. Perhaps the most characteristic passage, and an ideal upbeat note on which to end this review, is the following:

"Without a doubt, the architecture of the information society will shift from the paradigm of symmetry to one of asymmetry, from being self-enclosed to being open-ended, from the whole to the part, from structuring to deconstruction and from centrality to non-centrality. It will aim for freedom and uniqueness of all human beings, for the symbiosis of different cultures, and for a spiritually rich pluralistic society."

Great news! When do we start?

ARCHITECTURE: AN OLD FRIEND REMEMBERS

What is Architecture? An essay on Landscapes, Buildings and Machines. *By Paul Shepheard. MIT Press. 131 pp. £7.95 (paper)*

Reviewed by Niels Ter Braak

Nothing so becomes this book as its cover, a beautiful photograph of nine jets in formation over the pyramids, courtesy of British Aerospace Military Aircraft Division. It tells you immediately that Paul Shepheard isn't a Prince of Wales parrot, or even an onward and upward Modernist (if any still exist). No, he is something else. A spinner of tall tales. The first 20 pages of his laid back but muscular prose confirms it, he is one of those magnificent machines in a flying man like Lloyd Grossman or Godfrey Smith, a humanoid blissfully at ease while others squirm in agonies of embarrassment. Through the episodic passages of this book – how wise of Shepheard to eschew entrees in favour of endless hors d'oeuvres, sweet as the gourmet menu at Le Manoir – his readers must follow him like a camera crew trailing a TV personality. Not that Shepheard is an explorer in the outback. His territory is the city and its groves of academe, wherein he segues endlessly from quadrangle to street cafe to small flat to lecture hall to the great overarching hills to the North, talking all the while about pictures of nuclear submarines, memories of the AA school, flamenco, cathedrals, Isaac Newton and so on until he meets his match in the 625-line TV image of Sir Richard Rogers holding forth on the necessity of having the lifts on the outside of the Lloyd's building instead of the inside, so that they can be replaced without disturbing the underwriters' gloomy contemplations within. "What about the escalators?" Shouts Shepheard at the unblinking screen. "They are inside, don't they have to be replaced too?"

The emotions generated by Shepheard's electronic encounter with Sir Richard Rogers quickly dissipate. The reader soon forgets them, borne on the bosom of the author's seductive prose in constant expectation that the title question will be answered somewhere among his good-tempered ramblings about the significance of London buses, the colour of sauce bottles, the faulty construction of tower blocks, the lie of the land, the importance of the Wright brothers, the fate of a monk condemned to dwell in a sphere, the attraction of this or that exquisite plaza and campo and, above all, somewhere in the wit and wisdom of his old friends "Conrad", "Sally" and "Bob". Somehow this impression of impending revelation, albeit increasingly tenuous, survives right up to page 95 when, right on cue, a different kind of old friend accosts Shepheard at his table in the restaurant at the end of the universe.

"Well, you old fucker!" cries "Terry", with refreshing candour, "still solvent after all these years?" The shock is palpable. Like a bolt of lightning it reveals that the only question we any longer want Shepheard to answer is exactly that. How is it that he is still solvent after all these years?

Alas, Shepheard is not to be caught out. Quick as Lloyd Grossman he bamboozles the insightful Terry into telling his own story instead. Terry, it turns out, has spent the last two years in prison, voraciously consuming books on architecture. Hope flickers briefly

into life. How brilliant! It is Terry, fresh from the great university of life, who is going to reveal what architecture is. No such luck. Despite his brilliant opener, Terry has only been written in to ask a couple of put-up questions about whether the great Cathedrals are architecture or not. Turns out they are not. Pity. To find out what architecture is we have to resort to the Shorter Oxford English Dictionary.

WRIGHT CAN'T BE WRONG

Details of Frank Lloyd Wright: the California work 1919-1974. *By Judith Dunham. Thames & Hudson. 144 pp. £18.95*

Reviewed by Gerd Degenkolb

Is there no end to our curiosity about Frank Lloyd Wright? There must have been at least a hundred books about him published in the last decade and this one, although it promises detail, in the end produces only photographs, much like all the others. Perhaps its only unique features consist in the collaboration of Eric Lloyd Wright, the patriarch's grandson, and the claim on the cover that Wright's California detailing extends up to 1974 – although the master himself died in 1959. The contribution of Eric Lloyd Wright consists of an introduction recalling the impromptu lectures given by his grandfather to the assembled apprentices at Taliesin during the last years of his life. The claim that Wright detailing persisted into the 1970s turns out to be based on only one posthumous project, the tiny Lewis N. Bell residence, a Usonian house on a hexagonal planning grid designed by Wright for a hilltop site in Los Angeles in 1940, whose construction was postponed because of the war and subsequently abandoned. In 1974 Hillary and Joe Feldman bought the plans for this house and erected it on a hill in Berkeley instead. Its detailing is sparse but comfortable in the Usonian manner, but it affords no new insight into Wright's tremendous varietal range.

How to produce a book about detailing without a single drawing in it is a trick known only to the author and publishers of this volume. No one could create inviting interiors from such unpromising materials as Wright, but his mastery of concrete blocks, fretsawn timber and plywood and stained concrete is nowhere expounded as a technical problem. Instead we are presented with intriguing details like the stepped, cantilevered glazing of the 1948 Walker residence, overlooking Monterey Bay, Wright's only coastal California house, which is heavily illustrated but explained only by the cryptic comment that the windows open downwards. Anyone who wants to find out how, will have pursue other methods.

REARGUARD ACTION

The Classical Vernacular: Architectural Principles in an Age of Nihilism. *By Roger Scruton. Carcanet Press. 158 pp. £19.95*

Reviewed by Tracy McKeown

Reading this selection of essays, virtually all of them dating from the 1970s and the early 1980s, and virtually all of them (as a brief sentence in the Acknowledgments advises us) tampered with before republication, is an experience akin to eating bubble and squeak excavated buried air raid shelter. It is, in short, the experience of a scavenger. Nothing emerges from them so clearly as the idea that Roger Scruton had his day. Unlike Larkin's discovery of sex, it came after the Beatles first LP but, this volume notwithstanding, it ended before the fall of Margaret Thatcher. To be more precise, it occupied the decade between 1974, the year of the energy crisis and the disappearance of the big public sector budgets that sustained Modern architecture, and the arrival of that expert in savaging dead sheep, the Prince of Wales.

Apart from fitting together like consecutive links in a chain, Scruton and Windsor have little in common. Where Scruton affected a tone of effortless superiority and disdain; his successor affects a bemused blokishness that has more recently disintegrated into whingeing self-pity. "Why, oh why?" Wails the populist Prince of Wales of the excesses of today's architecture. "What else could one expect of such people?" Said the elitist Roger Scruton of the architects of a decade and more ago. For both of them the evil was and is Modernism. A fit subject for a flogging, especially because it will remain forever chained in the stocks of public opinion.

Once professor of Aesthetics at Birkbeck College, London, Scruton now leads a comfortable life as a professor at Boston University in the United States. Nonetheless the scapegoat of his investigations into who is to blame for Modern Architecture, is the academic system which, in his view, turned it from "a harmless eccentricity" into "a doctrine". Part of "an educational programme linked to international socialism and other ill-considered projects for the moral regeneration of mankind." Rowe too has his view of architectural education, and he too expresses it memorably. In a recent issue of the magazine *Architecture New York* he described it as, "After the Russian Revolution, the two world wars, the Holocaust and Modern architecture itself, one of the greatest catastrophes of the twentieth century."

With opinions like that, who needs reasons? Scruton the professor, as marinated in "educational programmes" as Rowe was until very recently, finds no great difficulty in dismissing Modern theorists occupying other chairs in other academies. In an essay written in 1980 the now dead Manfredo Tafuri, then professor of architectural history in Venice is taken to task for failing to understand that the impact of architecture is a pre-reflexive phenomenon "which we do not go around thinking analytically about." Yet within a page the Professor of Aesthetics and Birkbeck is himself up to his waist in the question of whether the discipline of art history requires aesthetic judgment or not. Eventually he calls upon the X-ray photography of great pictures to bear witness; "It has bearing on its significance as a work of art only in so far as our way of seeing the painting is changed by a revised opinion of its age." In an earlier essay he quotes the Classical revivalist Quinlan Terry on the evils of other Modern inventions: the electric lift "destroys the last opportunity for exercise"; "artificial light corrodes the eyes and artificial air the lungs..."

It is the same with all his Modern villains; Walter Gropius, Le Corbusier, Mies van der Rohe, Richard Buckminster Fuller ("now retired to a Professorial sinecure", sneers Scruton in 1977, his own sinecure no doubt not even a twinkle in his eye). No victim replies, not even Fuller, who survived till 1986, long enough for someone to have pointed out that the geodesic dome at Scroope Terrace in Cambridge was not alone but one of some 160,000 built under licence worldwide. □

ENGINEERING THE IDEAL OFFICE

We are all desk workers now. The desktop has become the universal metaphor used to humanise computer interfaces. On this surface (oddly enough, vertical and not horizontal as per tradition) we create documents, copy them, modify them and send them away. Any number of professions can now be plied on this desktop – publishing, accounting, law, journalism – even CAD. Before long this two-dimensional metaphor will be superseded by one that is three or even four dimensional, where we can pass from room to room, to access "walls" or "trees" of information. All this will not take Teknion by surprise, as Tim Ostler reports.

The appeal of the desktop lies in its combination of flexibility and automatic organisation, which translates into immense power to process information as quickly and as easily as possible. The changes to our thought patterns and expectations that this has brought are both widespread and profound. After a day spent manipulating words or symbols effortlessly around on a screen, we tend to ask, "Why can't we do this in real life?"

Naturally, no filing or office system can hope to match the sort of flexibility offered by computer interfaces. But rich pickings await those who manage to get closest to this ideal. Small wonder, then, that Teknion has been so successful. Launched in mid 1983 at a time when none of its competitors was less than ten years old, it caught the wave as the revolution in information processing gathered speed during the eighties.

Monty Brown, Chairman of Teknion Furniture Systems and the man behind the development of the system, is proud of its robustness and flexibility.

"You have total flexibility," says Brown, "You're not set with what you've got. An early term that we used to describe this was 'reverse decision-making.' We found that when people planned an office they'd never get it right the first time. If you bought more conventional panels, you're stuck with them. With ours, you have the opportunity to change the height, and change the facing."

In other words, like a draft on a word-processor users can throw together a first draft, then add to it or modify it until it's just right. It's probably pushing it to say that with Teknion, you can build your own real-life cyberspace (or perhaps "real virtuality") but the point is clear enough: the Teknion system allows you to define and service an office workstation using intelligent building blocks: components that can take any one of a number of forms, go "off module" if necessary and allow for expansion in power and telecommunications cables.

Teknion's introduction just over ten years ago was not without hiccups. When in 1980 Saul Feldberg, owner and president of the Global group of companies, decided to enter the office furniture system market, he engaged

The Transit Furniture System by Teknion. Three years in development, Transit is an entirely new generation of furniture systems, one that is not a single system in the conventional sense but a combination of panel, wall mounted and freestanding systems

Detroit industrial designers Ford and Earl. Over the next two years, they developed a product with a number of features that were new to the market. But progress was slow, and in January 1983 Feldberg called in Brown, a mechanical engineer who was a specialist in developing products for manufacture.

"I didn't realise until I got there at what a poor state of development the product really was," says Brown. "The concepts were good, but no-one had done any proper engineering. The product couldn't be made; it wasn't stable; it wouldn't stand up by itself. In my judgement it wasn't a complete system. It was something of a shock to me, quite frankly!"

Despite its incompleteness, Brown was immediately impressed with the design. "When I first saw it, I was sure that it was way ahead of anything else that existed. All the major systems furniture on the market at that time had been designed ten or fifteen years earlier, and there had really been a revolution in office procedures in that period. That's the period when computers changed from being an obscure huge piece of machinery somewhere with a few terminals run by specialists, to something that sat on everybody's desk.

"So there was a huge transition in office needs and requirements – particularly as they related to power and communications. Our product came to the market newly developed to take care of those situations. So we literally found a market there that was ready and waiting for us.

"The interesting thing is that to this day, there is no other project that does the job as effectively as the original Teknion office system.

Teknion offered three distinct advantages over conventional office systems. The first was that, by means of the hinged wire access duct at the desktop height, it made power and communications cables instantly accessible at point of use.

"That was major," says Brown. "I had seen telephone wire installations before where they'd lay the telephone lines on the

Transit's panel system builds on an uninterrupted fixed utility spine that creates the ideal location for all power and communication needs, and provides the basis for easy reconfiguration

floor because it was too hard to get them into the systems. The systems had no provision for them."

Teknion's convenience was such that in the early days they received a letter from the Bell telephone company saying how much they liked working with the new system.

The second advantage was vertical height change. "You could start with a 36 inch high panel, and take it up in 15 inch increments, up to 81 inches. So you could make these transitions upwards and downwards."

The ability to stack additional modules on top of one another lends the system an agreeably monumental, quasi-architectural feel. Because modules can be added right up to ceiling height, designers can vary the height of different workstations according to need, giving the impression of what Teknion call "city-scaped" work environments.

The third advantage was the capacity to go "off module". Being hung on horizontal rails, components such as shelves and desktops were not limited by vertical planning module.

The advantages this presented were more than just aesthetic. "It gave the user an incredible amount of freedom," says Brown. "When you do the original installation, everybody plans everything reasonably exactly. But the first time you reconfigure, you've got a problem: with most conventional systems the large users have always got a warehouse in the basement somewhere of the bits they can't use.

"With Teknion, however, you can pretty well use components over and over again, because you don't have to have an exact situation: you've got freedom of choice."

Spurred by his enthusiasm for the concept, by the end of April Brown had developed the product to what he considered to be a saleable condition, and he flew out to Tarzana, California, to make the first sale – in person.

"We shipped it in May, and then I went back and supervised the installation of it. That was the start of it all."

This comment touches on a characteristic

As a wall -mounted system Transit allows for the maximization of existing space. It provides a design consistency throughout the entire office by minimizing planning constraints and the cost of inventory

feature of Teknion. Crucially, although it is a system, it is not an 'off the peg' product – more a 'standard special'. This means that Teknion design and make every installation to order – including special components if necessary – with a guarantee to deliver within 4 to 5 weeks."

"The industry standard (then) was 20 to 26 weeks, and mostly they were always late," says Brown. "We said 'We will do four to five weeks, and we'll be complete and we'll be on time. So we gave the service, and we gave a unique product.... You order a $1 million project from us today, and we'll deliver it in four to five weeks' time."

In particular, Teknion has always done well with companies where the decision-making is in the hands of technical people – preferably engineers. It might be said that this is because the system, having been designed in detail by an engineer, is a robust and thoroughly worked-out product. But as anyone who has had to negotiate with a supplier to procure a complicated product will testify, the qualities that lead you to have confidence in the supplier are often more important than any intrinsic qualities the product itself may possess.

Teknion's biggest-ever order, a contract signed with Boeing in 1991 for 7,000 workstations, was a case in point.

"Boeing," says Brown, "is obviously an engineering-run company and had some very specific requirements. They were using the most advanced technology – such as virtual reality – for design. And they had huge wiring problems because they were using fibre-optics."

During the negotiations period, Teknion staff flew out to Seattle on average once a month, costing the company hundreds of thousands of dollars in air fares. Staff worked ceaselessly to meet Boeing's aims, repeatedly coming back with new prototypes.

But their approach paid off. "They told us that, in the end, it was that attitude that won the contract.... We never told them, as our competitors did, that this can't be done, or that you shouldn't do it this way. We listened

Transit's freestanding system allows for flexible product decisions. It can function as furniture within a panel-enclosed work station, furniture connecting to the panel environment or as freestanding desks

and tried to do it." What Teknion had been demonstrating, perhaps, was that engineering is an attitude of mind as much as a profession.

Recently this attitude has been formalised by commitment to the international quality management standards of ISO 9001 and 9002.

In 1993, after talking to a range of facilities managers and major users about their business needs, Teknion went a step beyond their original system with the release of Transit, a product designed to bridge the gap between panel systems and free-standing furniture.

The survey had told them that what users wanted above all was flexibility to change furniture layouts.

"We found out that in order to make the furniture more flexible," says Brown, "the method of attachment of the panel had to be more flexible. Previously we'd always attached on the slots for work surfaces. We developed a method where we attached on two horizontal bands. It's a matter of seconds to change it: turn a couple of cams – no tools – release it and move it around."

Linked by a continuous spine running at knee height throughout panel and work surface supports, Transit allows co-ordinated layouts between free-standing, panel-based and wall-mounted furniture systems. Not only work surfaces and other accessories can go "off-module" buy also the screens themselves, with continuity maintained between power spines by special jumper leads.

As an international company, Teknion is familiar enough with differences in national culture when it comes to office systems. Transit marks a new recognition of this factor in a very specific way. In the past, so-called "desking systems" had not figured in their repertoire, as they have never been a feature of North American office culture. In Europe, however, they are. Transit allows effortless integration between the two traditions.

According to Teknion's president Murray Archer, Europe is quite unique as an office furniture market:

"We find that people will be receptive

Transit's unique design allows dividing work station panels to be connected perpendicularly to a spine at any given point. Transit is not governed by module confinements and thus provides complete planning freedom

almost anywhere in the world with integrated panel-hung modular systems, while when you come to Europe, the acceptance of these systems in Europe is less than it is in any other market that we operate in. You have to adjust to that reality.... In Europe in particular, the desking system has been established for decades and it's a totally different market. The open plan approach has been less of a factor than it has been in modern buildings in North America, where you have larger floor plates, or less limitations to work around."

This difference in history and consequently, in culture, is no mere matter of fashion: it is profound and ingrained. It recurs at every scale of human enclosure, from smaller European rooms to more compact European buildings. Even at the national scale, the world map shows Europe to be an island of cellular organisation in an otherwise open-plan world.

As Teknion's international stature has grown, it has become increasingly necessary to take a view about the future. Opinions differ within the company about how to address this fundamental question. Monty Brown tends to the opinion that it is impossible to predict the future, and that systems should therefore be made as open as possible to accommodate any eventuality. Murray Archer argues that it is desirable to make projections about the office of the future, and to this end Teknion have recently engaged the services of a respected futurologist to help them get their predictions right.

Most of the emerging trends seem to imply an increasing demand for networking and cabling of one kind or another, with the exception of wireless networking, which will no doubt have its own implications for workspace design.

Equally, as office architecture itself becomes more systematic and component-based, there must be scope for more explicit integration between what are, after all, only two different scales of space-division. Architects have much to learn from Teknion.

THE DESERT WELCOMES A NEW LOOK

Architects in Las Vegas do not all labour under the strictures of Robert Venturi. The new offices of Tate and Snyder show a refreshing openness to the memory of Frank Lloyd Wright and a touch of Jean Nouvel, as Lori Stocker reports.

The cool green of sagebrush and succulents; the taupe of cracked earth; and rock-studded mountains ribboned in shades of chocolate, mauve and goldenrod. These are the colours of the Mojave Desert. Beautiful hues not seen by many. Few animals live here, even fewer persons. Yet after rounding the last curve in the highway, a city stretches beneath and beckons. There is life in the desert after all.

And what life! This city teems with visitors 24 hours a day, every day of the year. Year in year out. Several years ago some thought that this city's halcyon days were over - ah, but that was several years ago. Thousands of people are moving into the valley each month. New housing developments are expanding the city's services to the maximum. Schools are popping up out of the dusty ground. The sleepy gambling town that Bugsy Siegel and Howard Hughes built, Las Vegas, soon will record a year-round population of one million.

In the midst of the coloured, mirrored glass and neon that typifies much of Las Vegas, there is an architectural firm shying away from that glitter. Tate & Snyder Architects focuses their work on projects for the residents of the city of Las Vegas. Schools, hospitals and religious bodies have used their services to design buildings that will suit their purposes. Tate & Snyder took some time in recent years to design one that would suit their own purposes - a showpiece of architectural design.

J. Windom Kimsey, project designer, talked about the importance of utilising the site's characteristics to their fullest in the design of the building's interior. "When designing our projects we like to use large expanses of glass. And in our own building we felt it was important to use daylight as a means of interior lighting. Many architects in the city are afraid of using lots of glass because we're subject to high temperatures (sometimes over 120° Fahrenheit); all that's needed is to keep the heat outside. We also wanted to take advantage of being on a hill overlooking the city of Henderson."

Kimsey accomplished these goals by incorporating two-storey tall windows along the

Fins and roof overhang for solar shade (above left). The "wedge" inserted into the main building houses the second floor entrance (left), which overlooks the "desert garden" (far left). Interior shows surprising height (opposite page)

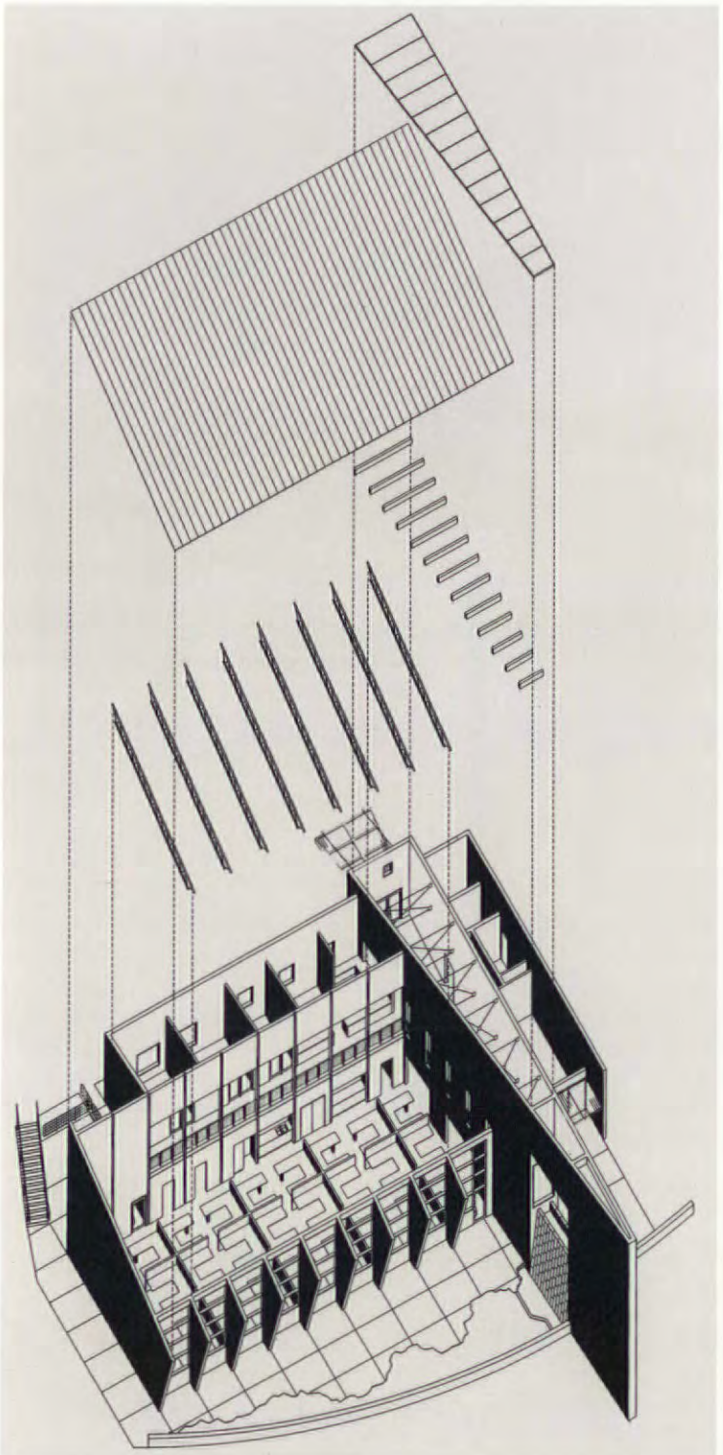
All photos by Peter Malinowski/InSite

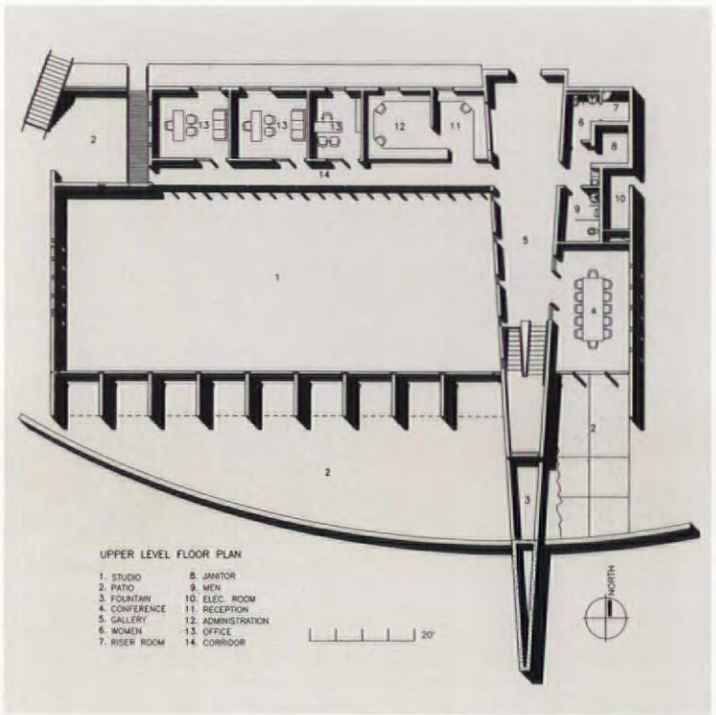
west side of the building interspersed with a wedge-shaped fin. The fins break up the hot desert sun yet allow for the reflected rays to bounce off the surrounding ground and enter the windows. These large windows allow for all employees to view the valley as well as a waterfall and reflecting pool directly outside the backdoor. Clerestorey windows on the eastern wall of the main floor allow for morning light to enter the design studio below.

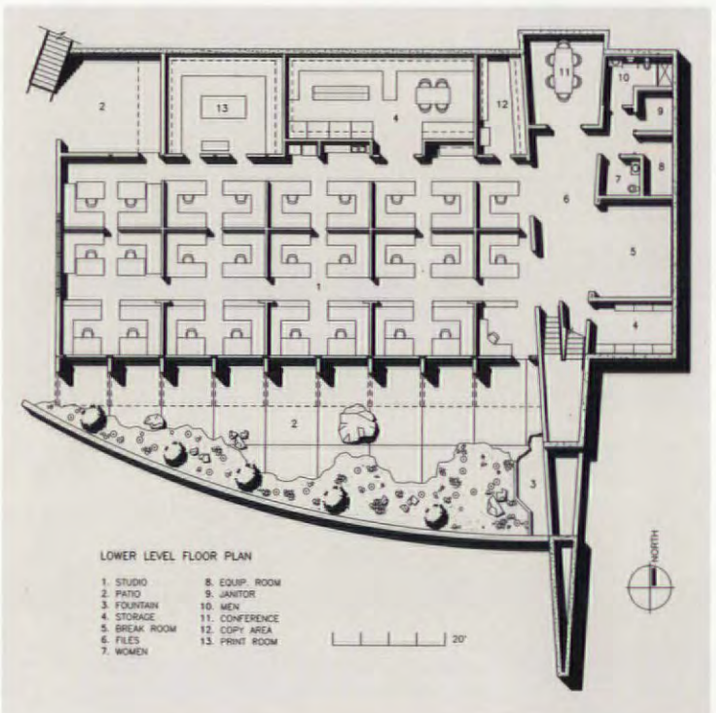
Another site characteristic, one which helped to determine the building's footprint, was the steep slope of the hillside location. Access is gained through a front entry on the second floor. This doorway leads to a gallery exhibiting framed photographs of Tate & Snyder's award-winning projects.

The gallery itself is part of a wedge dissecting the rectangle which is the remainder of the building. Doors are located at the wedge's base. The gallery ends with a stairway to the lower floor before the wedge's apex but the latter's continuation is visible through a large window. The exterior apex is open at the top, allowing light to fall on the reflecting pool and waterfall. Deep blue skies complement the ochre of the building's exterior, a colour which will reappear on the design studio side of the interior wedge wall.

The gallery is also a visitor's first indication of the thought and care that went into this plan. Dark-stained tulipwood floors offset the cream walls and serve as a basic element







of the colour scheme. Shades of the desert-ochre, tan, sage and gold appear throughout the building as accents to the neutrals black and birch. Desert colours are used as accents, primarily in small spaces such as the linoleum in a conference room floor and ceramic tiles in kitchenette and bathroom areas. Yet the wedge wall painted in ochre introduces the colour of the exterior, visible through the large windows. And sage-coloured air ducts, which hang exposed from the white corrugated metal ceiling, add another dimension to the angled roof.

These warm colours and textured walls soften the frequent use of galvanised steel, a dominant design feature in the building. Polished steel is used for the reception desk and the gallery's coffee tables and above in the lighting fixtures. A much needed structural element, trussing in the form of cables and a stylised burnished steel centre, becomes an architectural feature.

Kimsey wanted the studio to reflect the innovations of architecture and open up the community's ideas of what constitutes good design. "Las Vegas is a backwater of design, especially offices. They're all strip centres with standard 8 or 9 foot ceilings."

Steel recurs, in a perforated form, as the backdrop for a recessed neon tube in the reception desk and in corrugated form in the main conference room. Here three sheets of the unpainted corrugated steel form half-barrel vaults in the ceiling. Two steel I-beams have been bolted together, sandwiching a 3/4" sheet of birch, to form the base of a rectangular table. A semi-polished sheet of black granite tops the table. Conference chairs echo the black and birch theme as do the doors and sidelights.

An open hallway at a right angle to the gallery leads beyond the receptionist's desk and work area to three executive offices. These lie along the east wall and open on the west to a bird's eye view of the design studio. Above

Axonometric and floorplans (opposite page) show arrangement of workstations. Tapered lobby (left) and barrel-vaulted boardroom, with exposed metal decking (below) are removed from airspace above drafting office (below left)

these offices are the clerestorey windows. The office doors recall the conference room with their birch-framed glass with black trim. The balcony railing is steel, the handrail painted sage to match the air ducts and the slats black to reflect the floor's hue. Steel support beams are exposed from main floor to ceiling and painted deep blue/grey, a colour chosen to reflect the inherent coldness of the element.

A second meeting room, located on the design floor, is smaller than the main conference room, yet has not been neglected in its design. The eastern wall, a foundation wall, has been sealed but not covered. The large aggregate wall, has been sealed but not covered. The large aggregate concrete is visible as are the tiles. This wall is home to an aerial model of the building and its location. Adjacent walls display framed architectural renderings of the project. The floor, designed by Troy Bettridge, is a geometric blend of the desert hues in linoleum.

The design floor of the studio is home to a number of architects, interior designers, specification writers and all their computers. The use of indirect lighting - clerestorey windows, wedges along western windows and bounced fluorescents - brightens the work space yet eliminate glare on the computer screens. In fact when the fluorescents are turned on the effect is that of soft daylight.

Small touches, such as healthy spider plants potted in holders reflecting the building's use of steel and desk chairs chosen for their colour and textile design, work to unify the architectural plan.

"We wanted to show our clients they can have good design using items they wouldn't think of usually," said Kimsey. "The clients we've invited to tour our studio have all liked it."

In a city where bright lights and colours used in larger-than-life projects dominate the skyline, another kind of glitter is beginning to grow. The glitter of good taste. □

Interior of the Carré Theatre

LINOLEUM: ANY COLOUR YOU LIKE BUT STILL GREEN

Linoleum (Linum - linseed, Oleum - oil) was patented in 1863 by a Scotsman who got the idea from the skin that formed on an open tin of paint. Thirty years later the Kaars-Sijpesteyn family, who owned a sailmaking business, began manufacturing linoleum flooring under licence at Krommenie just outside Amsterdam. That was the beginning of what is now Forbo-Krommenie flooring, as Colin Davies reports.

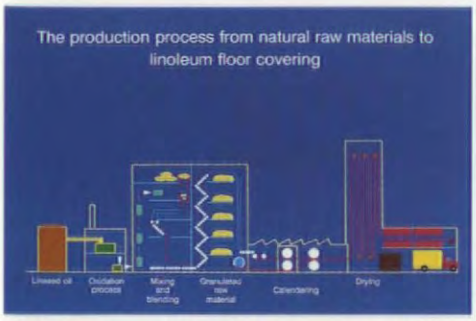
Twenty years ago linoleum looked like an obsolete material. Most manufacturers were going over to the relatively new technology of synthetic vinyl. Superficially the two products are similar and indeed are often confused in the public mind, but there is one fundamental difference. Vinyl is a plastic made from oil, a finite mineral resource, whereas true linoleum is made from natural, renewable materials. Its principal component is linseed oil, which is extracted from the seeds of the flax plant, a plant which also provides the raw material for linen. The oil is oxidised and mixed with a variety of powders and resins, most of which are also vegetable in origin, in particular wood flower from the forests of Northern Europe and cork flour from the cork oaks of Portugal. The backing material is an open weave fabric made form jute, a plant grown mainly in India and Bangladesh. The only mineral components are limestone, which is found all over the world in inexhaustible quantities, and certain non-toxic pigments.

In the early 1980's the management of Forbo-Krommenie was taken over by a new, dynamic team led by the present managing director, Willem ("Pim") Verzijl. It was a time of expansion and rejuvenation, a time for making strategic decisions. Following the general trend in the industry, the company had already begun to move into vinyl and to run down its linoleum plant. It might easily have become just another vinyl manufacturer, competing with similar operations all over the world. But Verzijl and his team had a better idea. Linoleum is not an easy product to make. It demands a complex supply network, a specialised manufacturing plant and, above all, years of experience dealing with the variable characteristics of the natural raw materials. Setting up a linoleum manufacturing business from scratch would be a very risky business indeed. But Forbo-Krommenie were already set up and had experience in abundance. This was their greatest asset. Instead of writing it off, the management decided to build upon it, abandoning vinyl and concentrating solely on the manufacture of linoleum. They calculated that, with improved manufacturing, marketing and distribution, they would soon be in a position to dominate what they were convinced would be a growth market. And time has proved them right. Throughout the 1980's European architects and designers

Firma Nova Door Design showroom

Commercial Bank, Grenoble

Forbo-Krommenie's offices (below), the Architecture Centre (below centre) and garden (below right)



Skyline factory (right) with diagrammatic production process (above)

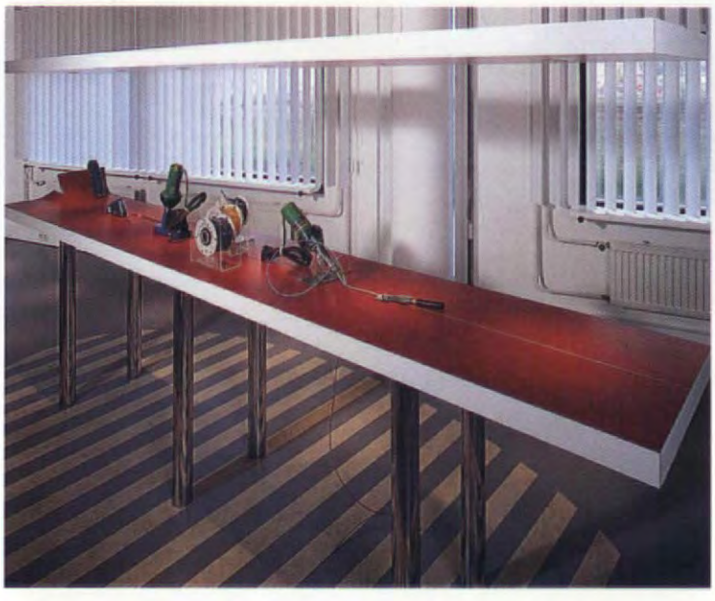
Collection designers at work

became increasingly aware of the environmental impact of the materials they specified. Issues like pollution, energy conservation and "sick building syndrome" began to dominate the building industry's technical agenda. In this climate, synthetic flooring materials like vinyl sheet and foam backed carpet began to fall from favour. Gradually linoleum came back into its own as the natural, ecologically sound alternative. Despite the recession, sales of linoleum have achieved what the group's 1993 annual report describes as "extraordinary increases". The material that was thought practically obsolete in the 1970's has become the natural choice for specifiers.

The new environmental awareness among designers has been matched by a perceptible shift of taste among consumers and end users. The days are gone when fitted carpet was the standard specification for houses, offices and institutional buildings alike. Natural flooring, including wood, ceramics, stone and terrazzo, have enjoyed a revival and Forbo-Krommenie has campaigned hard to make sure that linoleum is included on the list.

Verzijl and his team did more than simply predict a change in the climate of opinion. They made sure that they were geared up to take advantage of it by modernising every aspect of the company, especially its marketing strategy. Their current literature lays great emphasis on the "green" qualities of the product with slogans such as: "As long as the sun shines and the rain falls, we can make linoleum". But the company does not have to rely on its own publicity to extol the environmental virtues of linoleum. An environmental life cycle analysis of four different floor coverings (linoleum, cushion vinyl, woollen tufted carpet and polyamide tufted carpet) carried out at Utrecht University last year concluded that linoleum was "the most environmentally desirable floor covering". One reason for this was that the life of the product was estimated to be 15 years, as compared to eight years for the other floor coverings. But linoleum still came out on top even if its life was also assumed to be eight years.

As well as conventional brochures and advertisements, the company produces a very professional looking biannual magazine called *ArchIdea*. It features straight, non commercial interviews with well known architects and designers (Alvaro Siza, Gae Aulenti and Juan Navarro Baldeweg are among the recent subjects) as well as details of buildings in which Forbo-Krommenie's



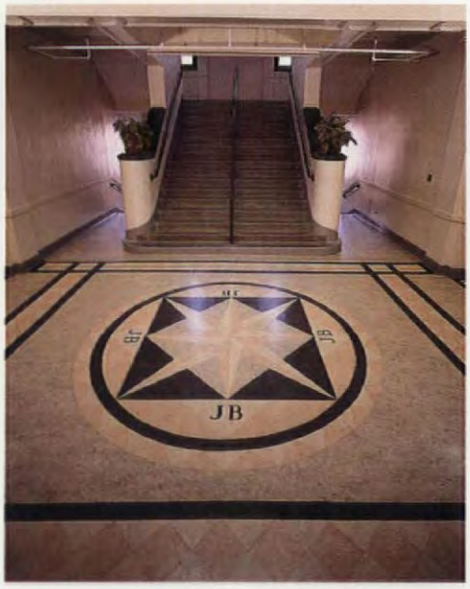
Two views of the showroom (above left and right) with sample floor design (left). View of the floor of the Salle Polyvalente, Pusignan (right)

products have been used. For more direct marketing, a new "Architect Centre" has been built on the factory site. Here potential specifiers can inspect large scale samples, including complete floors, and watch slick slide/tape presentations about the history of linoleum and the latest developments in the manufacturing process.

The building of the Architect Centre is part of a general policy to welcome visitors of all kinds to the factory, including groups from the local community. Making linoleum can be a messy and smelly process, but the 24 hectare site is clean and tidy, with neat, straight avenues between the various production buildings, and well maintained landscaped areas. The smell of linseed oil is barely perceptible, largely because of a recently installed "afterburner" that cleans the gases emitted by the factory flues. The management have realised that the factory must be as green as the product it makes if the marketing message is to remain credible. Besides, there seems to be genuine desire to be a good neighbour to the community and to provide the good conditions for the workforce of 850. Staff turnover is low, long service is the norm and there is no class distinction between factory and office workers. All new management staff spend a period working time in the factory as part of their training and everyone uses the same canteen and sports facilities. For many employers the factory is also a social centre. The company tennis club alone has a membership of 300.

Forbo-Krommenie is a supplier, not a contractor, but to ensure that their products are properly installed and their reputation safeguarded the management has set up a training school on the factory site. The company's distribution strategy has also been overhauled in order to take advantage of the growing DIY and domestic markets.

But the most important innovations in recent years have been in the products themselves. The standard floor covering products, known as "Marmoleum", comes in a bewildering variety of plain and marbled colours. Bear in mind that the colours are integral to the material not printed on like their vinyl equivalents. They therefore wear better and are easier to maintain. There are also many different grades and thicknesses available to suit special applications such as desk tops and pin boards. But the range of available patterns is no longer limited to what can be produced in the normal manufacturing process. Modern



Entrance hall in the Department of Literature, Mukogawa University (above left), Burroughs High School interior (above centre). Artoleum flooring used in a school entrance hall (above right) and a bar (left)

computer-controlled cutting equipment makes possible a kind of linoleum marquetry, combining any number of different colours to produce anything from a simple classical border to an elaborate coat of arms. Although linoleum, from a technical point of view, does not need to be welded like a vinyl does (no shrinkage problems), the success of welded vinyl sheet, creating a continuous waterproof membrane, prompted Forbo-Krommenie to develop an equivalent for linoleum. So-called "welding rods", available in a wide range of colours, are applied using tools specially designed in-house, of which several were patented. This technique, together with a range of accessories such as preformed nosings and skirtings, ensures that linoleum can compete with vinyl in any application.

Forbo-Krommenie is especially proud of its latest innovation, a range of patterns known collectively as Artoleum. This is a linoleum in which the colours, instead of being mixed together to create a marbled effect, remain distinct in small scale random wavy patterns. In close up, the effect is vivid and striking, though it is much more subtle in larger applications. The manufacturing process remains top secret. This is one reason why, despite the openness policy, the company's large research and development workshops are always closed to visitors. Secrecy did not, however, stop the marketing department inviting several thousand people to a spectacular product launch at the factory last year.

About 70% of Forbo-Krommenie's output is exported, mainly within the European Union, but also to growing markets further afield. A subsidiary company was recently established in Japan. There are signs that other companies are beginning to wake up to the commercial possibilities of linoleum production. There is competition from Germany and from new plants in Italy and India. But Forbo-Krommenie is still the largest linoleum manufacturer in the world and enlightened management combined with almost a century of experience should ensure that it maintains its dominance for the foreseeable future. □

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1. THE WORLD OF *BMK STODDARD*

From it's headquarters in Kilmarnock, Scotland, BMK Stoddard has been 'Covering the Globe' with quality carpets since 1908.

Three carpet mills co-ordinate with the design teams in London, Runcorn and Kilmarnock to produce woven tufted carpets and underfelt to BS 5750 standards. these carpets are sought after by prestige hotel groups, shipping lines, offices, banks, breweries, department stores, hospitals and leisure centres, in fact everyone who demands the best, BMK Stoddard meets that demand with the world's finest carpets: Axminster, Wilton and Tufted. The famous 'lamb' on every consignment is the customer's assurance of quality. BMK Stoddard's standards match the contract needs of architects, interior designers and specifiers worldwide and the company's location - only 8 miles from Glasgow and closer still to its airports - put BMK Stoddard in an ideal position for both access and delivery.

2. REALISING YOUR *IDEAS*

Creating a carpet that translates the imagination of architects or interior designer into solid, living fact requires both flair, and considerable practical consideration.

Different and often complex skills must be combined to ensure that the weaving of a carpet matches the design brief as accurately as possible, meeting both the technical specifications and fully capturing the ideas of the designer.

Every stage from concept to completion is equally crucial. To ensure success, BMK Stoddard's workforce is unrivalled in its balance of traditional skills, creative talents and command of the latest developments in technology. The result is a service whose strength lies in its flexibility, the quality that is at the heart of all aspects of BMK Stoddard Contract operations.

3. FITNESS FOR *PURPOSE*

Sometimes the most striking feature of a carpet is its appearance, but in fact every aspect of a BMK Stoddard carpet is designed to suit its location. on achieving the right result, the earlier Stoddard design staff are involved in discussion with you, the greater the advantage. (BMK Stoddard's studios are located in London, Runcorn and at Kilmarnock headquarters.)

The majority of large contracts require special designs which you, the customer, will originate. A BMK Stoddard designer will then reconcile your concept with the technical disciplines of weaving. Alternatively, you can draw on the skills of the BMK Stoddard design team to create a carpet exclusive to yourself.

With years of experience, BMK Stoddard will advise you on the correct quality of carpet for the location you have in mind. Generally speaking, all BMK Stoddard carpets are graded for 'extra heavy', 'very heavy' or simply 'heavy wear'; whatever you require, there is a carpet that's right for every contract installation.

4. QUALITY IN *DEPTH*

In the weaving of both Axminster and Wilton carpets, a craft in which UK manufacturers exel, BMK Stoddard has a history of quality second to none.

The spool Axminster loom is particularly well suited to the weaving of carpets where the number and variety of colours used is fundamental to the design. The loom offers an unlimited variation of colours by the use of pre-arranged spools loaded with yam which rotate in a continuous chain to form a pattern. The jaquard gripper loom is normally limited to a range between 8 and 12 colours, but more can be added by 'planting' at different warp positions. The pattern mechanism itself is a punchcard jaquard system, similar to that used on the wilton loom. In both types of Axminster, the pile and backing are woven simultaneously, the pile tufts being inserted between the warp threads and secured by the weft.

5. SETTING THE *STANDARDS*

Because of their construction, carpets woven on Wilton looms are of the highest possible quality, with superior handling, stability and durability combined with patterns of great beauty and complexity.

The Wilton loom pattern mechanism by which this is achieved is a jaquard punchcard system modified to produce patterns of great intricacy. The system offers the capability of selectively controlling the feeding of different coloured yarns onto the surface and burying the others, giving the Wilton characteristics of improved handling and stability. Several further colours can be added to the basic weave by 'planting' individual frames to extend the design and colour potential. the quality is determined by pile density.

Interesting textural effects are also available, produced by the use of cut and loop pile as well as velvet and high twist yarns.

6. TRADITION MEETS *TECHNOLOGY*

The manufacture of Tufted carpets is a relatively new technology compared with traditional weaving, which is 16th century in origin. Quicker and easier than traditional weaving, tufted is also becoming increasingly flexible and can produce either plain or pattered carpets very rapidly.

The tufting process is simple. The pile yarn is needled into a prewoven backing cloth, similar to the action of a domestic sewing machine. The tufts are then sealed in with adhesive and a secondary backing added. The efficient production methods can result in an economically priced carpet, particularly suited for the lower budgets such as hotel bedrooms.

The intricate designs which are the hallmark of a woven carpet are not possible on tufting machines. However, the latest machinery and technology used by BMK Stoddard results in sophisticated patterning, achieving texture and giving extra interest and enhanced visual appeal.

7. ONLY THE BEST *MATERIALS*

For the highest quality finished results, BMK Stoddard will only use yarn of the optimum quality for contract purposes: 80% wool with 20% nylon for added strength, often with an anti-static finish. Wool has a natural composition which enables dye to penetrate right to the heart of each fibre. Pale pastels, vibrant primaries, and rich shades are all absorbed equally and evenly.

Equal in importance with design in the creation of a carpet is colour. Every designer knows about metamerism - the effects of lighting on colour - and the subtle changes that can take place where the same colours are viewing in different lights, say, daylight and tungsten. BMK Stoddard match all colour under calibrated daylight fluorescent tubes.

The company has a library of every colour ever produced, and maintains a large range of stock colours for immediate availability.

8. INSPIRATION AT *WORK*

Flexibility and creativity characterises the BMK Stoddard studio teams. Each designer must be able to create a wide range of different types of pattern, responding to the clients brief, the context in which the carpet will be seen, its purpose and surroundings. These factors can be anything from the intricacies of a Robert Adam classic ceiling mould, to a Renaissance work of art or the Art Deco look of the thirties, yet all can be translated into a practical and aesthetically pleasing carpet. For a carpet designer, a visit to a historic building or art gallery is often a most valuable source of inspiration, as are client meetings at the location for which the carpet is intended. Fashion, fabric design, paintings and the natural elements all contribute to the creative stimuli behind the colouring and concept of even the smallest trellis or pindot.

At BMK Stoddard, Scotland's heritage and international inspiration are equally influential in the ultimate selection of colour.

9. TURNING IDEAS INTO *REALITY*

Aesthetics always play a major part in the designer's brief, but in design studio like BMK Stoddard, technical know-how is equally important. It is vital that the designer know both the limitations and the capabilities of the available technologies in order to create designs which can be translated into finished carpets with compromise.

Consultation between the project designer and the design studio in the formative stages is doubly beneficial, even if the basic ideas are only rough sketches, At this stage, BMK Stoddard designer- can apply a wide variety of specialist skills to advise on and interpret the technicalities. Early and close consultation ensures that ideas can be translated to meet the practicalities and the constraints of rereats and carpet widths, whether the design is anything from Islamic to Art Deco.

10. BEAUTY MADE TO *LAST*

All BMK Stoddard carpets are permanently moth-proofed and treated for anti-static to specified standards. All carpets pass the most stringent colour fastness tests and meet international flammability standards. The use of 80/20 wool/nylon pile yam ensures that BMK Stoddard carpets not only conform to these standards but also retain their good appearance through many years of wear. However, even the best carpets last better with the foundation of good quality underfelt. BMK Stoddard have their own felt factory which produces several different grades, all of which will enhance the appearance and -durability of your carpet. The final part of the equation - good professional fitting - is essential to ensure the successful completion of all carpet contracts large and small.

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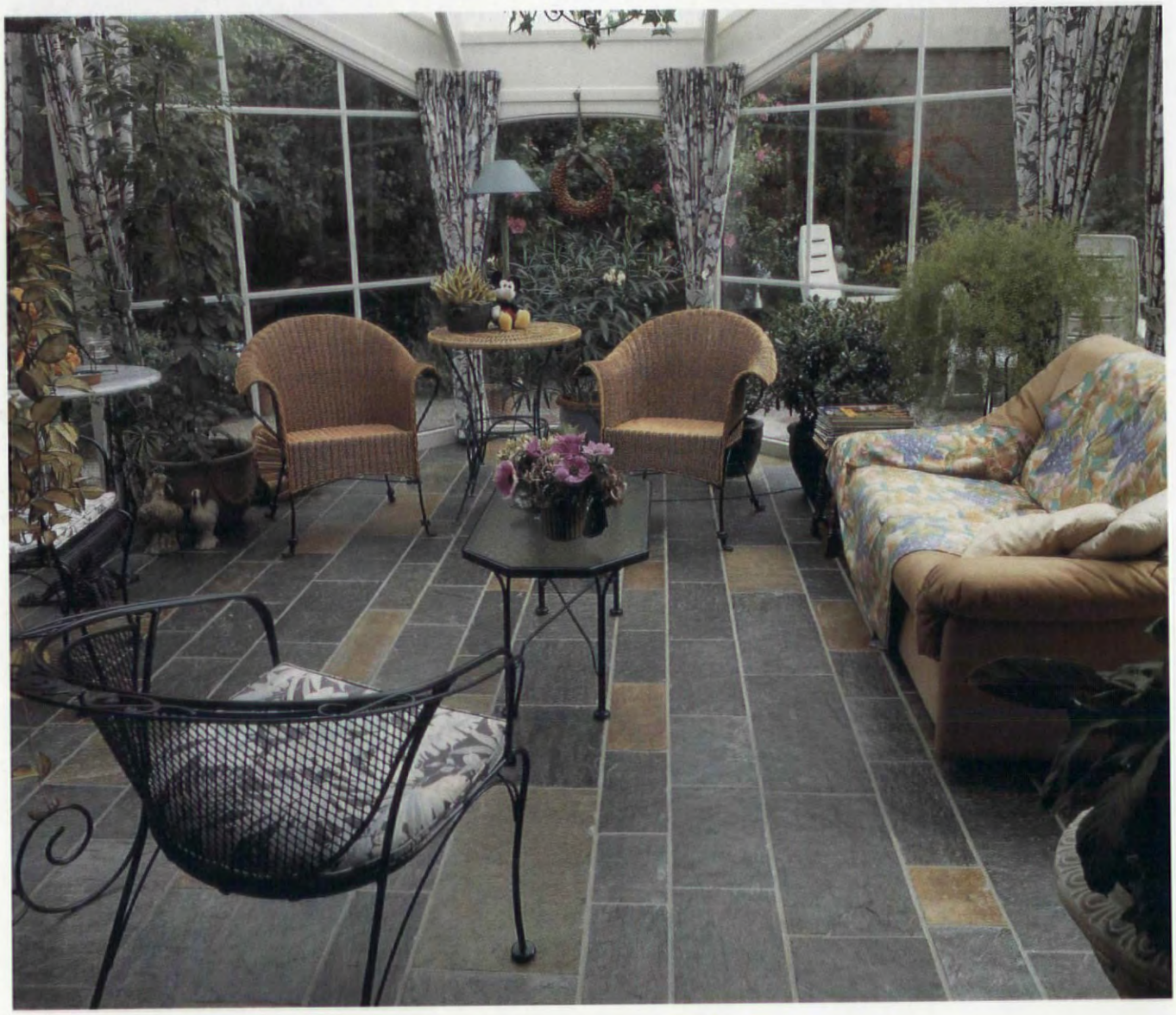

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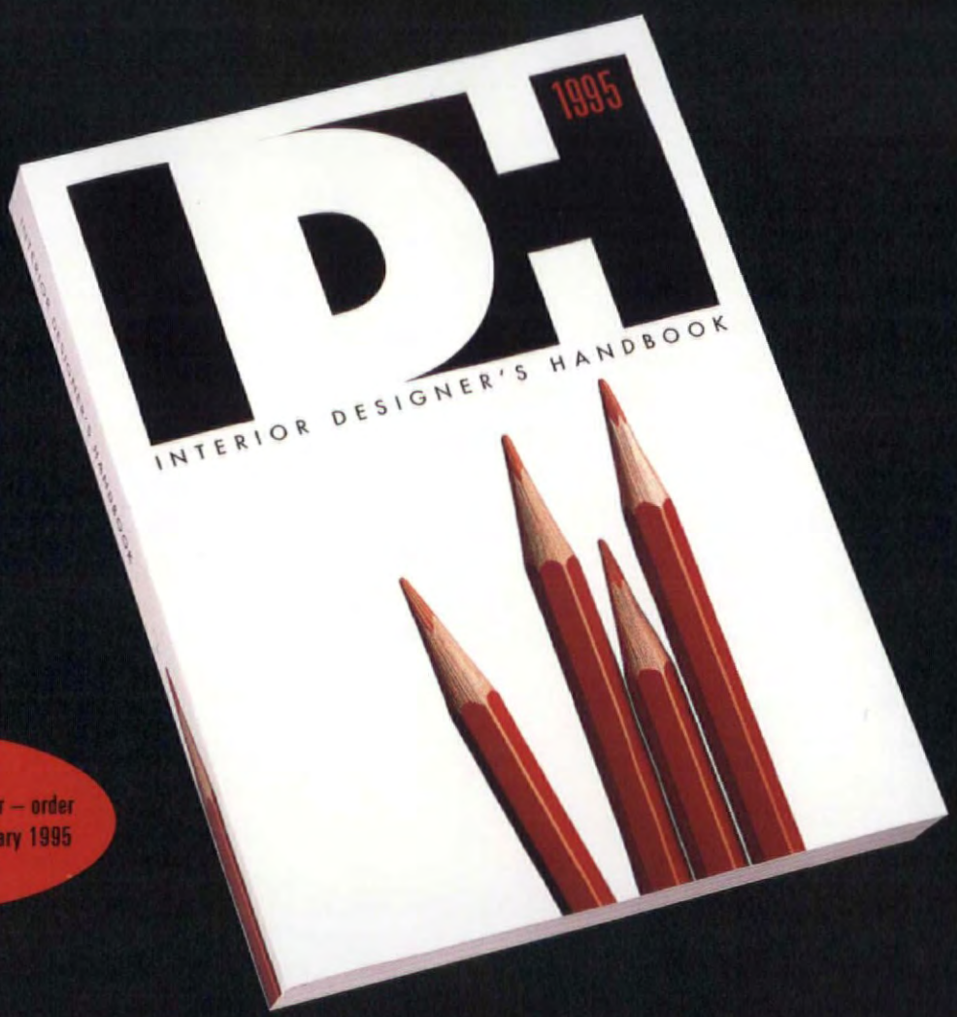

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ADVERTISERS INDEX

READER REPLY		PAGE
1	Alliance Europe	12
2	Alico	9
3	AME Euro	22
4	BMK Ltd.	138 & 139
5	Bridgefield	26
6	db architekturbild	20
7	EDM Spanwall Ltd.	10
8	Focchi Services srl	4 & 5
9	Forbo Krommenie bv	132-137
10	Glaverbel sa	23
11	Glen Raven Mills Inc.	7
12	C.P.Hart	6
13	Hawa Ag	24
14	Hovair Systems	15
15	IDH	IFC & 143
16	IEZ Ag.	13
17	Jaymart Rubber & Plastic Ltd.	141
18	Junckers Industries a/s	11
19	Kewill Systems	OBC
20	MBM Metallbau	19
21	MIPIM '95	14
22	Newstyle Furniture	140
23	PPG	8
24	Rautaruukki	17
25	Reed Exhibitions	18
26	Reynolds Systems Holland	25
27	Rieber & Son bv	142
28	Saie Due	16
29	Teknion	122-127
30	Unifor SpA	2 & 3
31	Wicona Bausysteme	21

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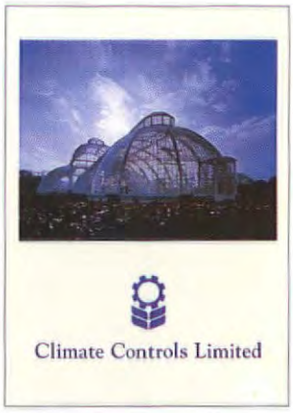

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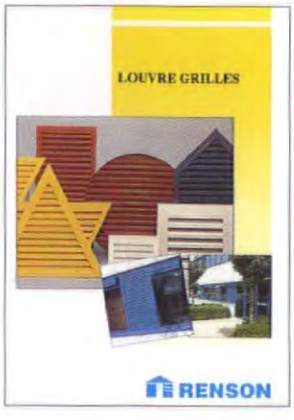

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