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PROFILE

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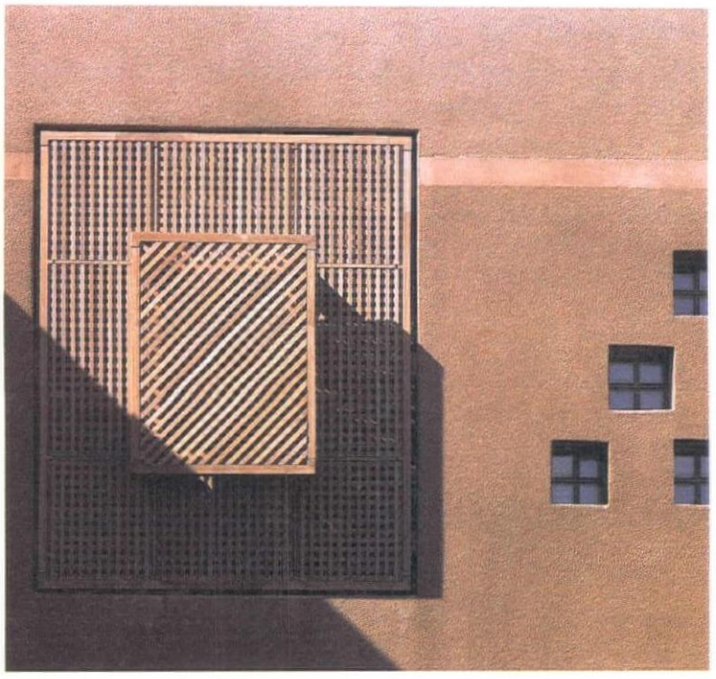

Desert Diplomat: exterior detail of Daryl Jackson building in Riyadh

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Cover photograph: Stadelhofen Railway Station, Zurich, 1990, designed by Santiago Calatrava, the subject of a major profile in this issue.

Client: Prudential Portfolio Managers Ltd Architect: GMW Partnership Management Contractor: Bovis Construction Ltd Scope of Works: Internal Atrium Cladding Building 2

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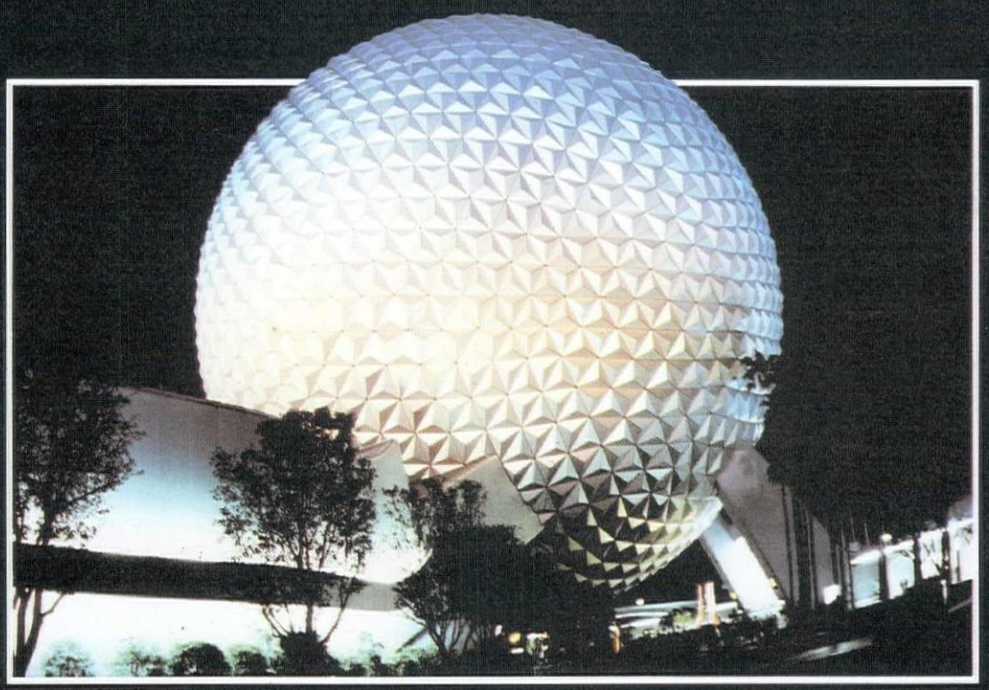
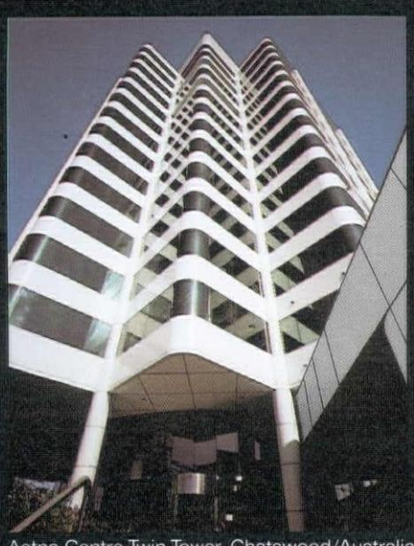


Epcot Centre, Disneyworld/USA



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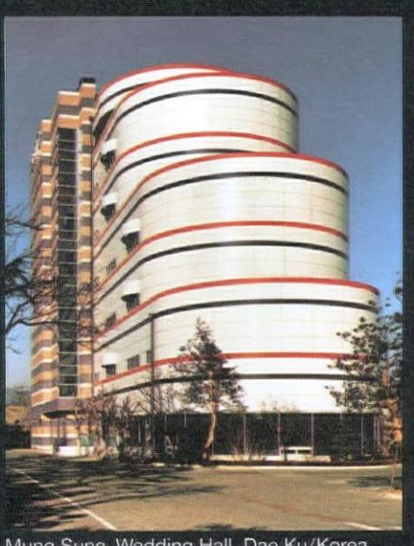

Mung Sung, Wedding Hall, Dae Ku/Korea

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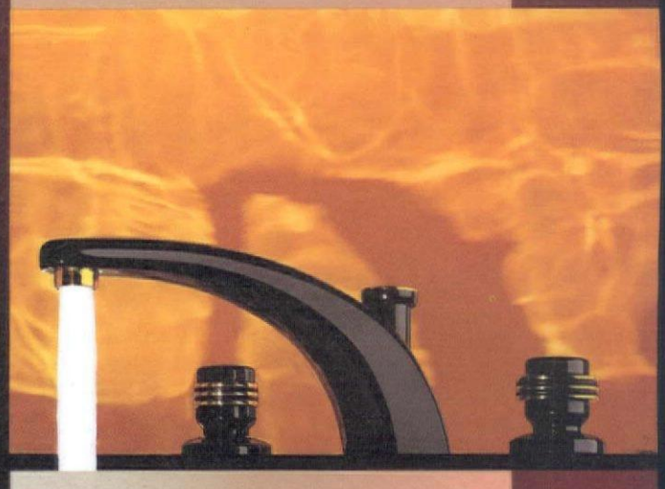

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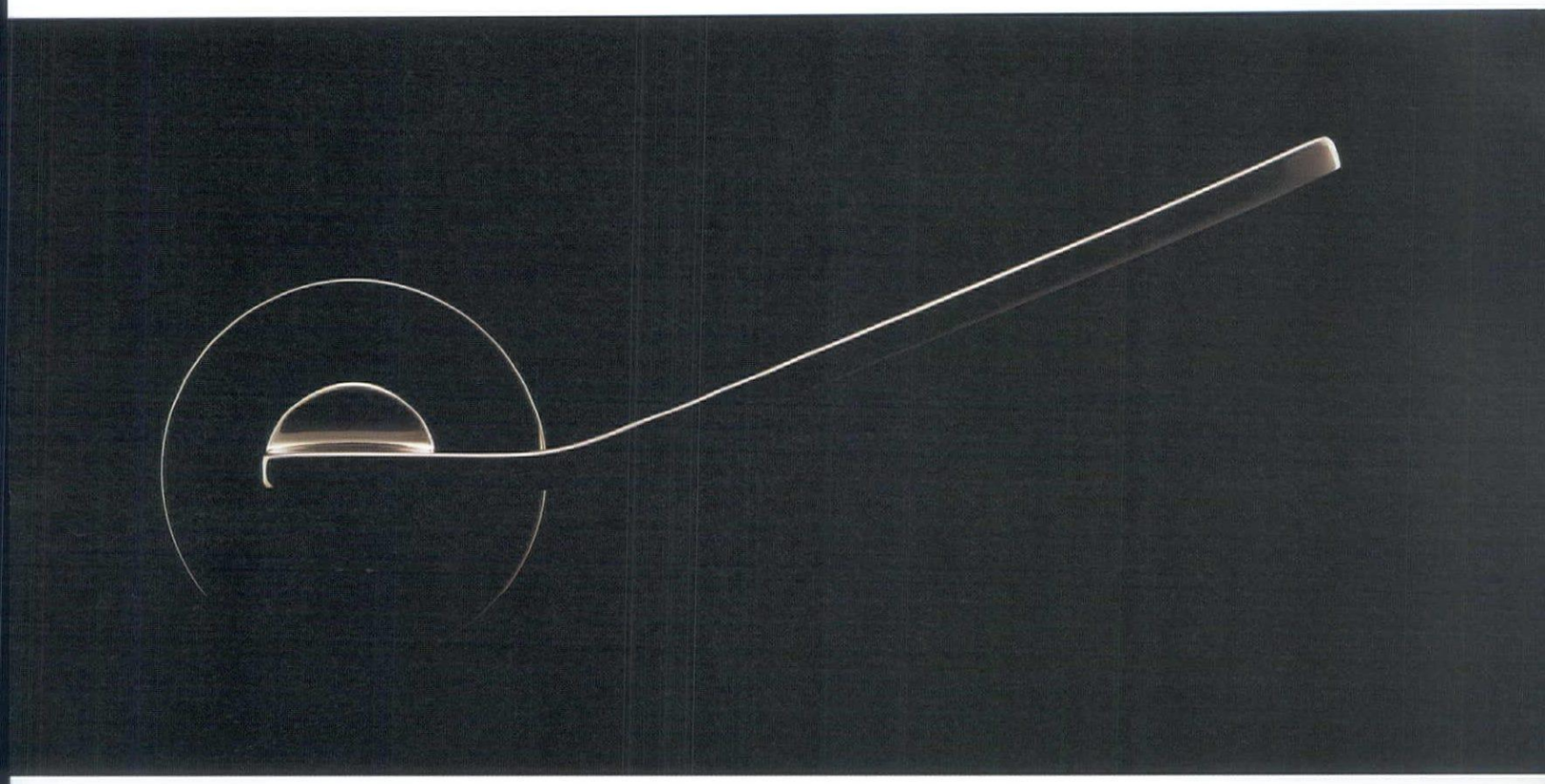

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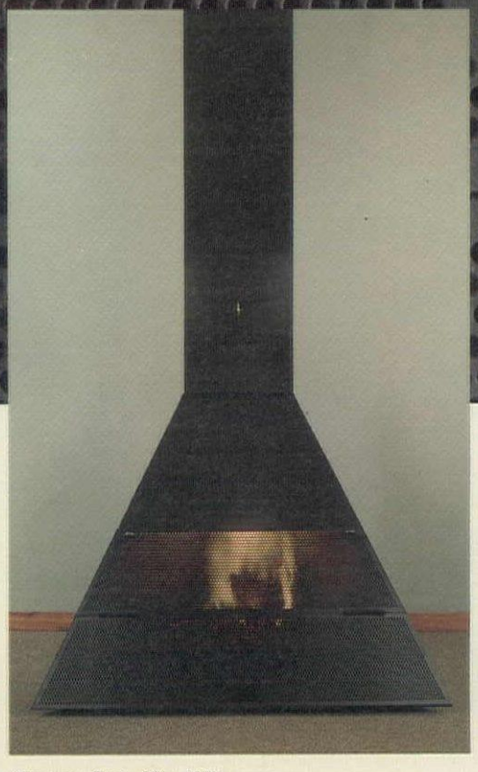

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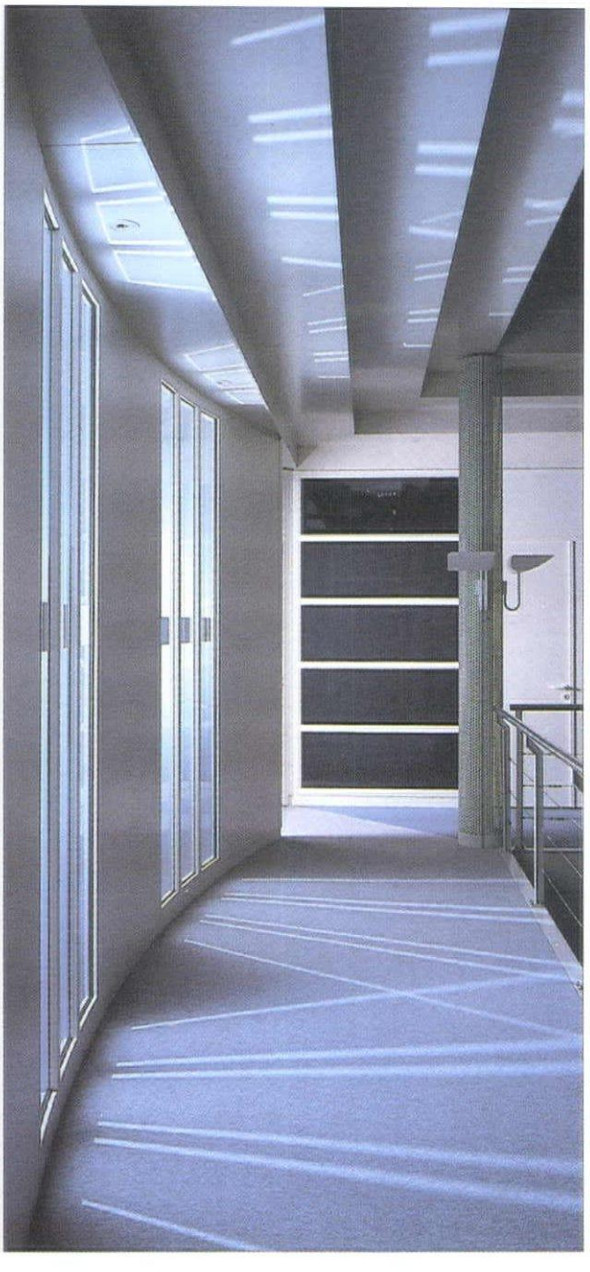

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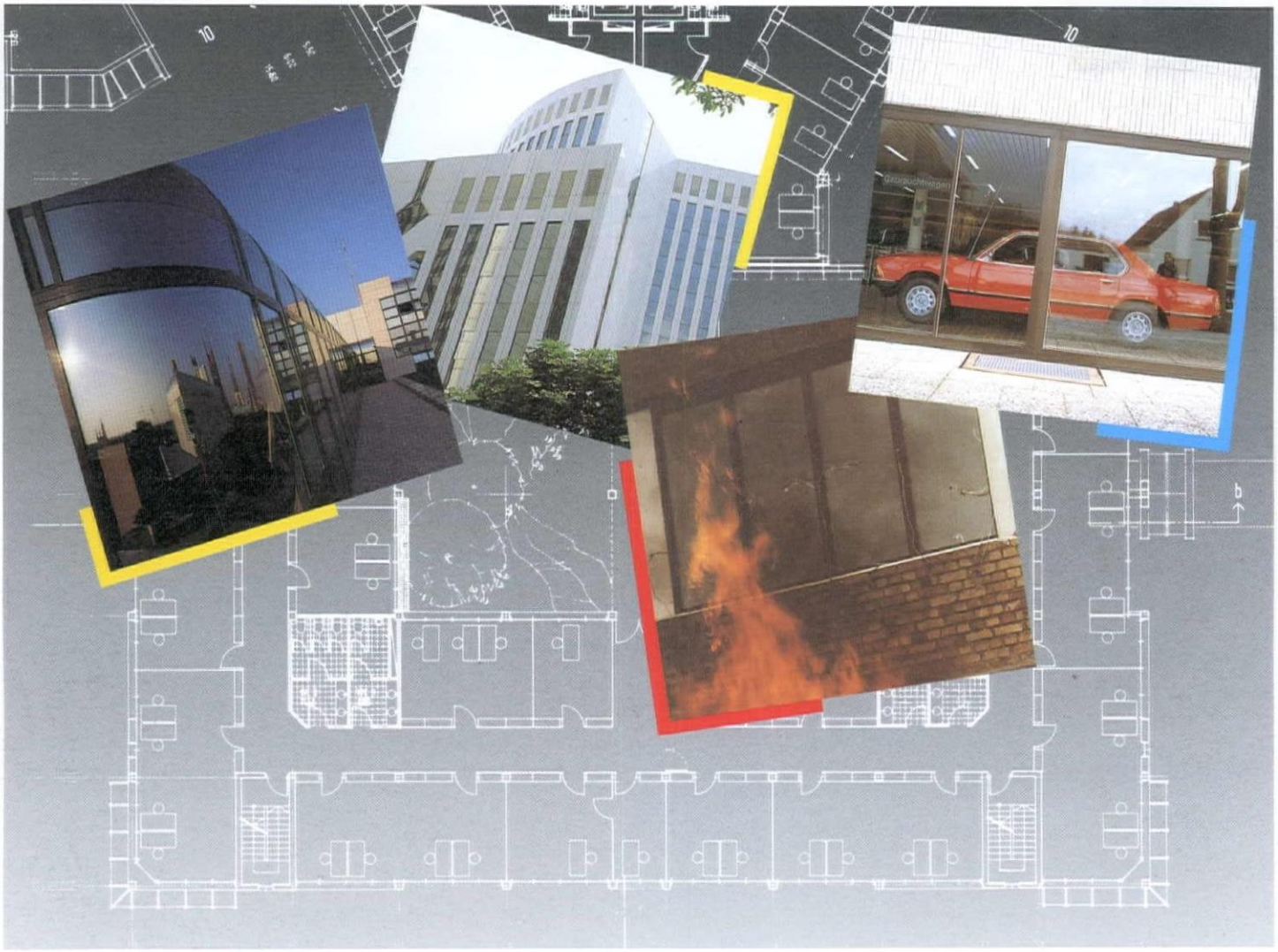

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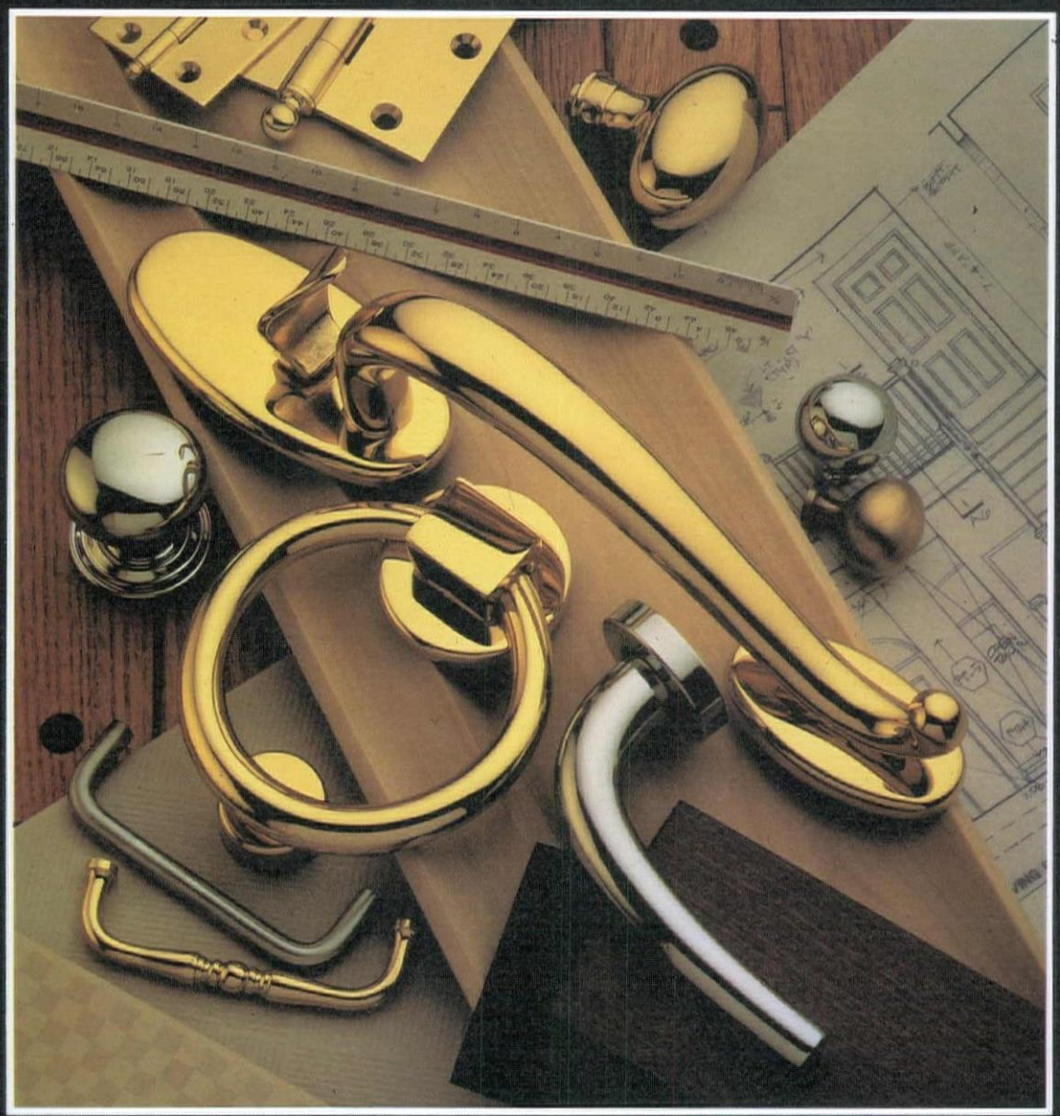

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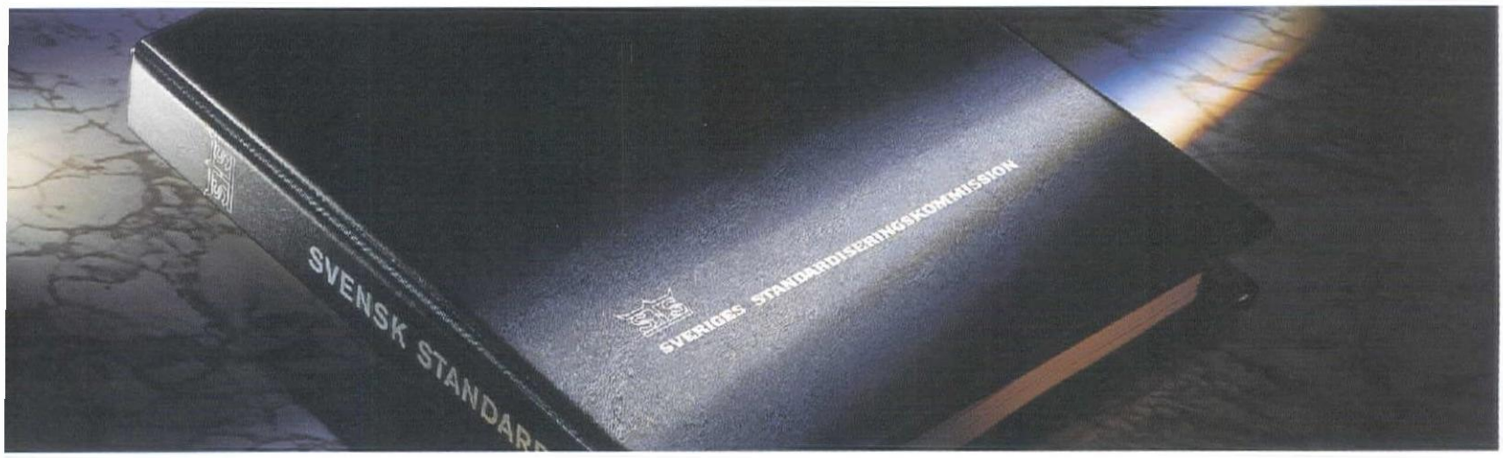

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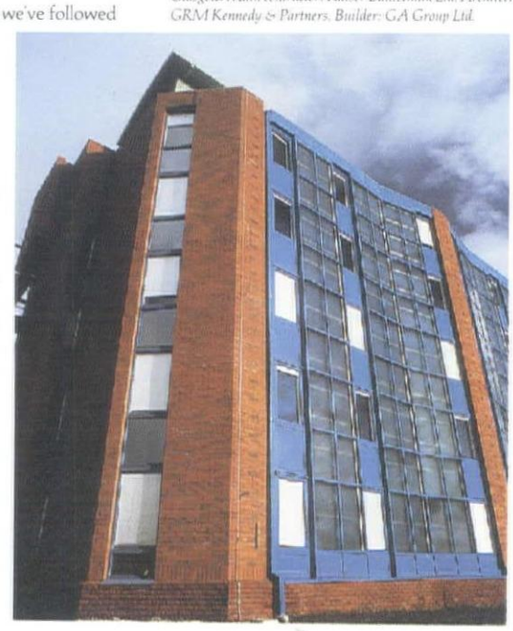

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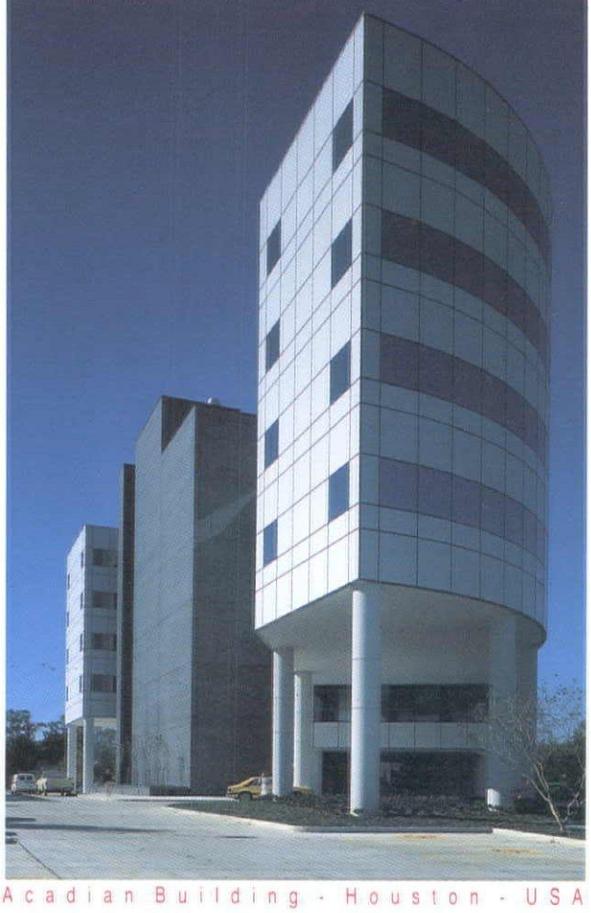

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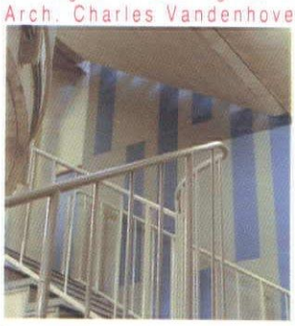

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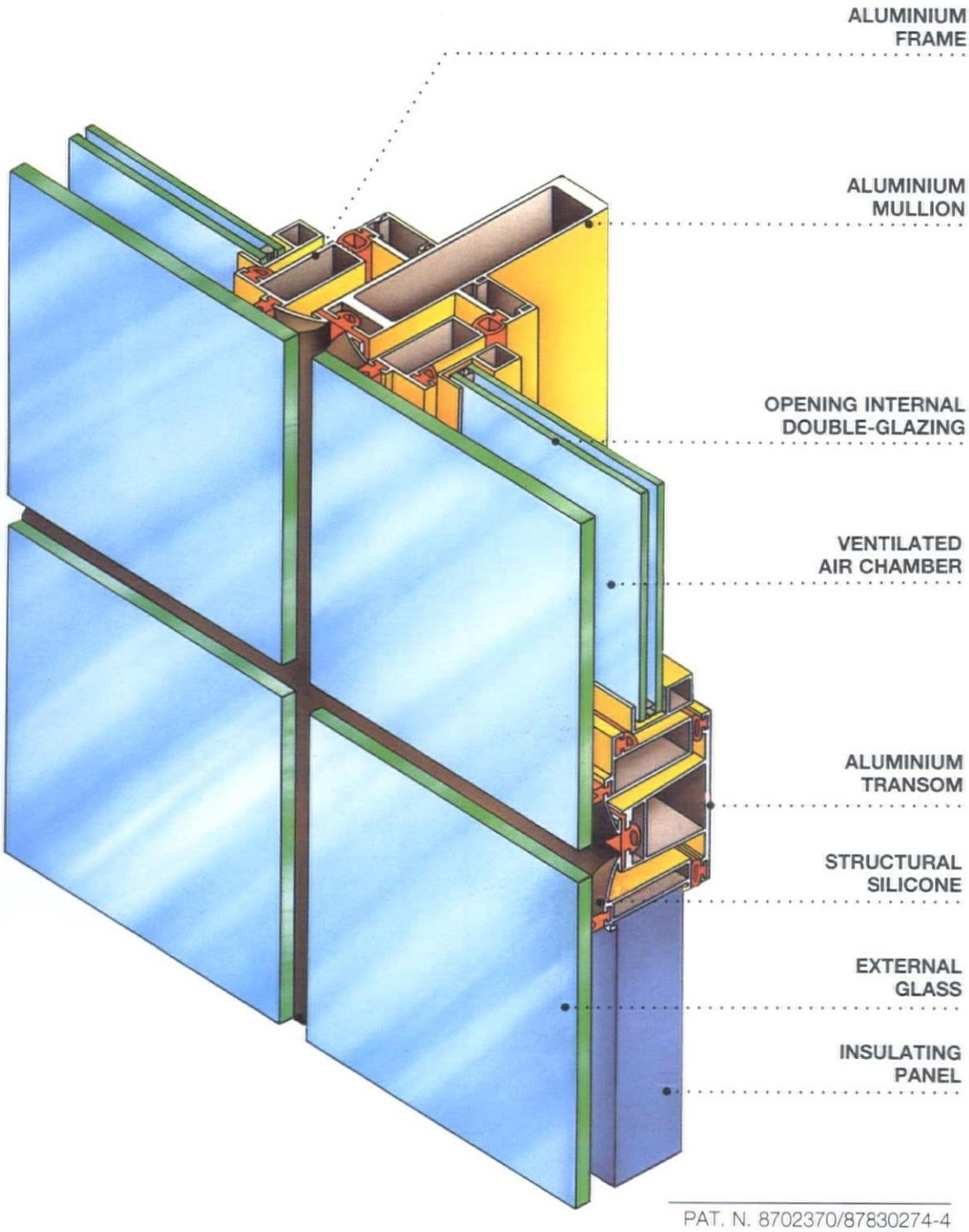

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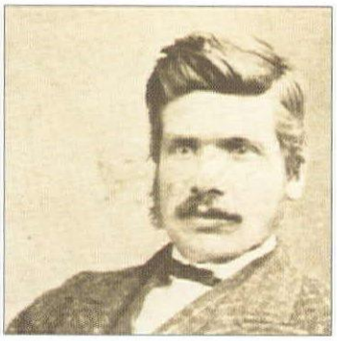

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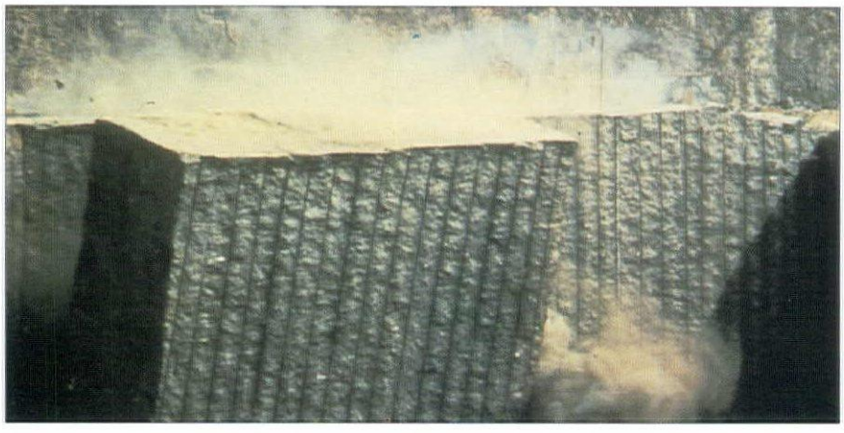

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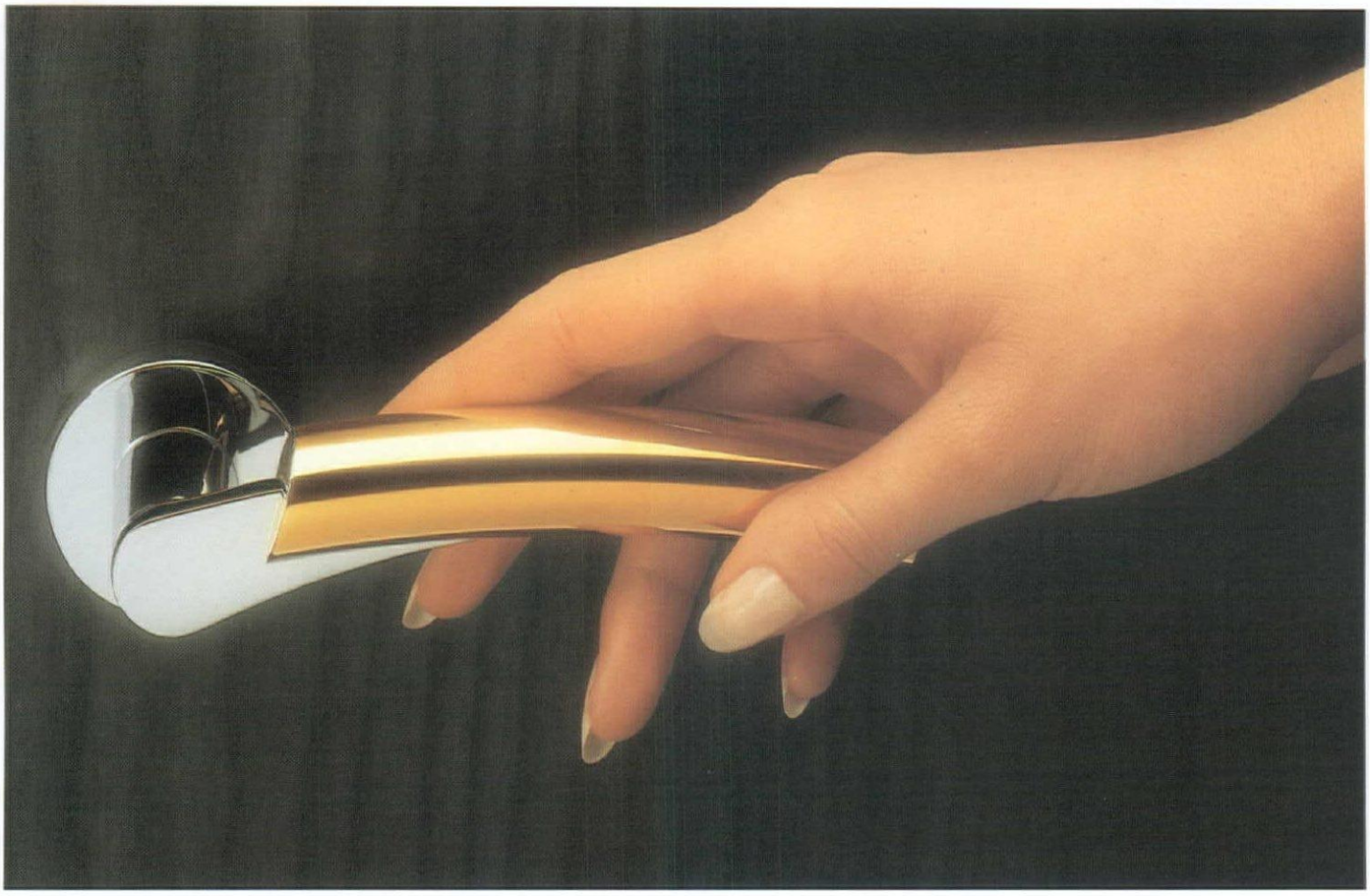

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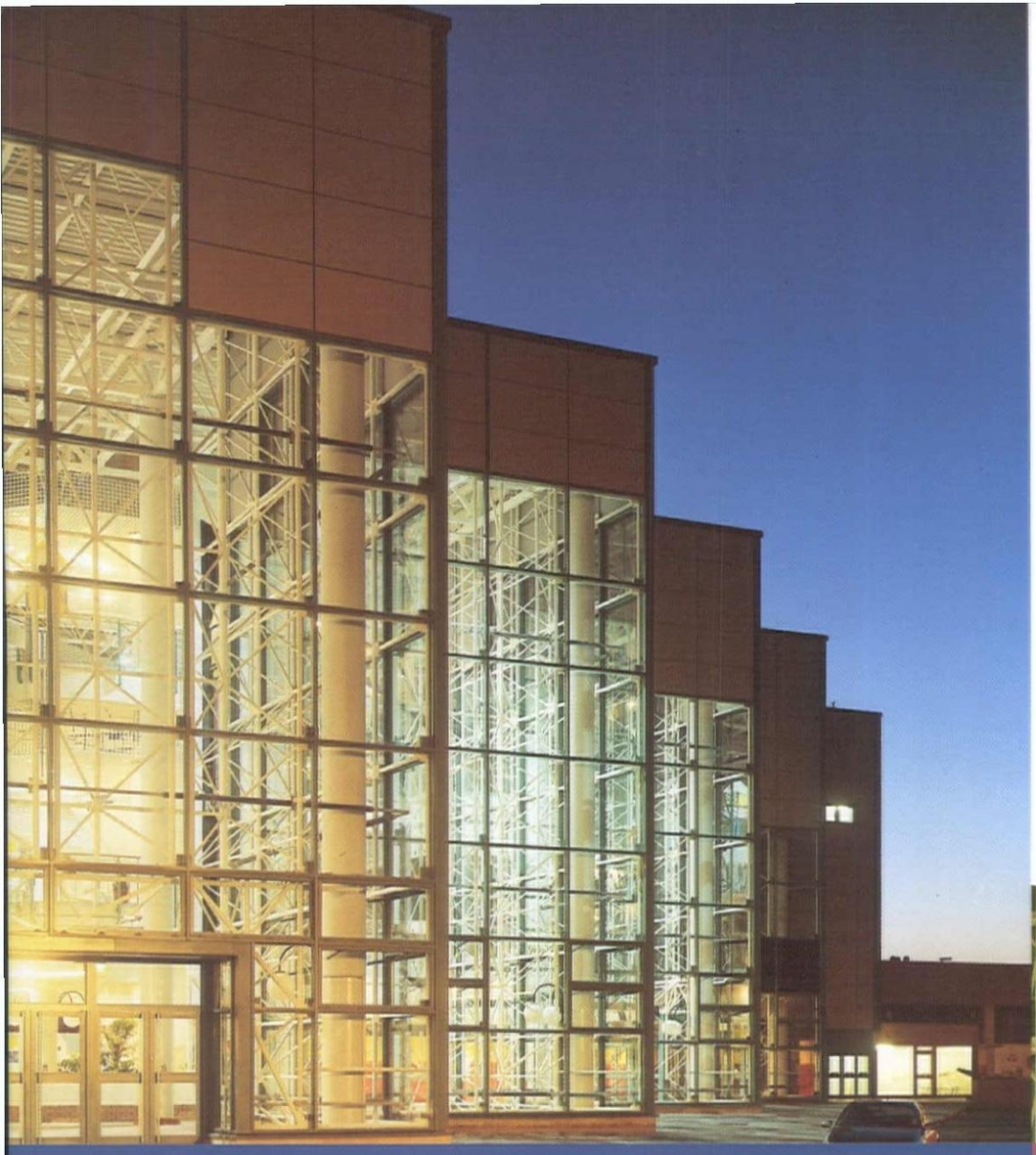

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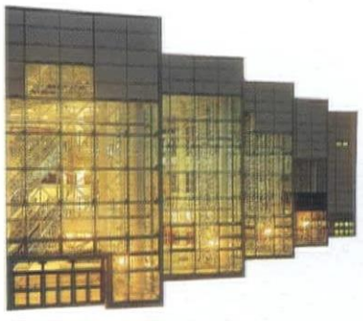

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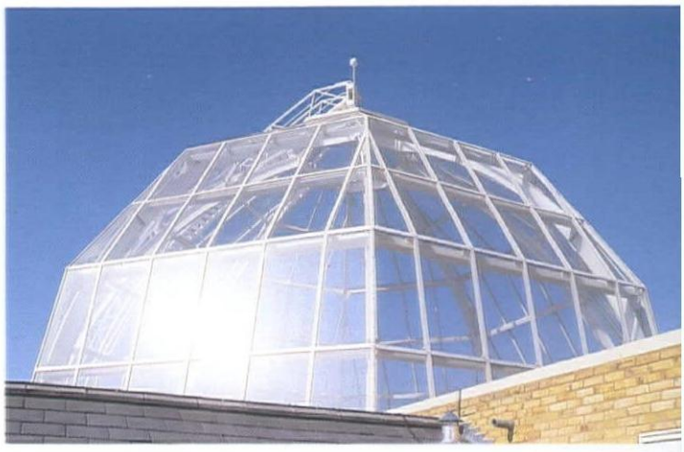

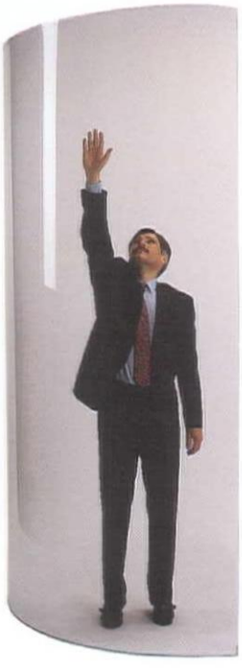

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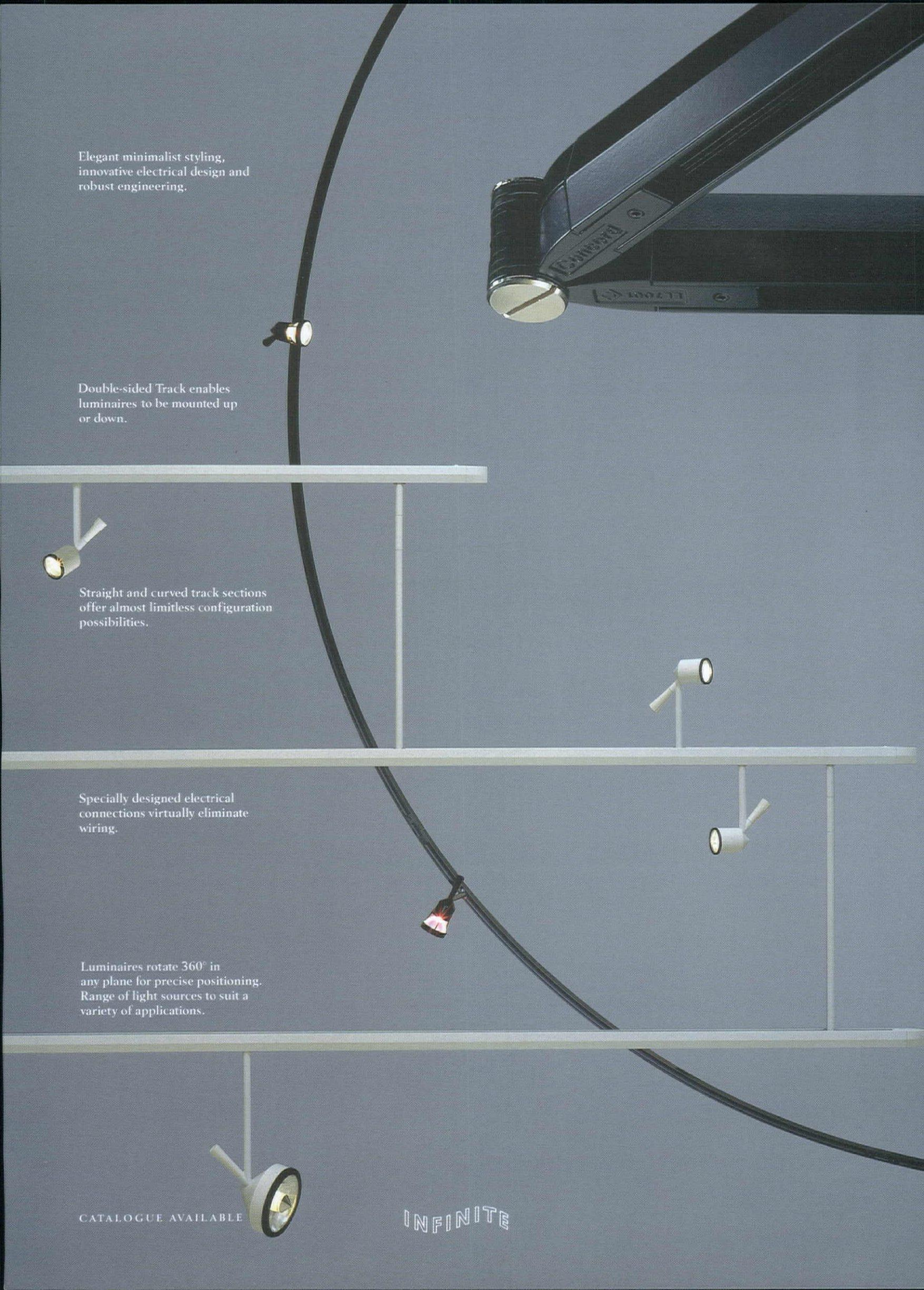

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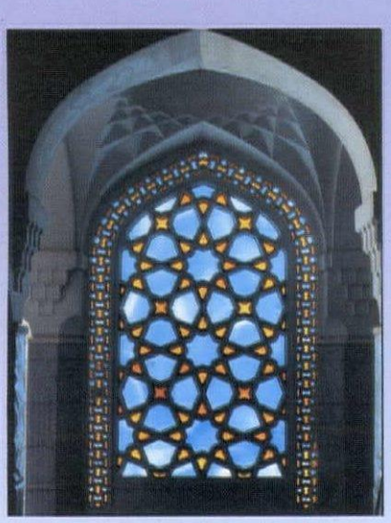

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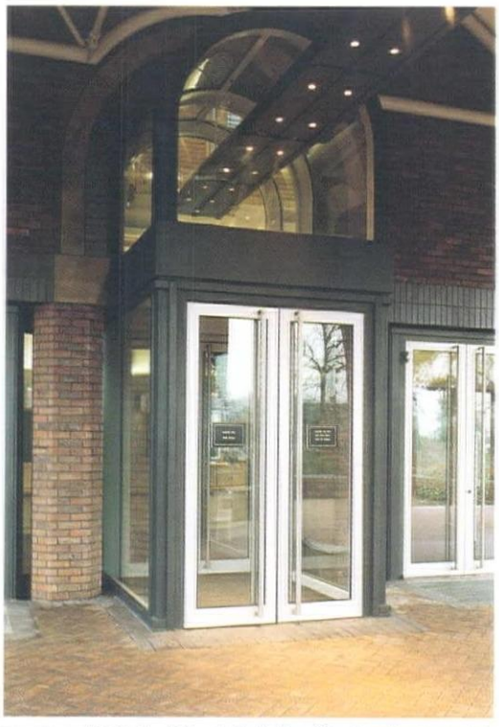

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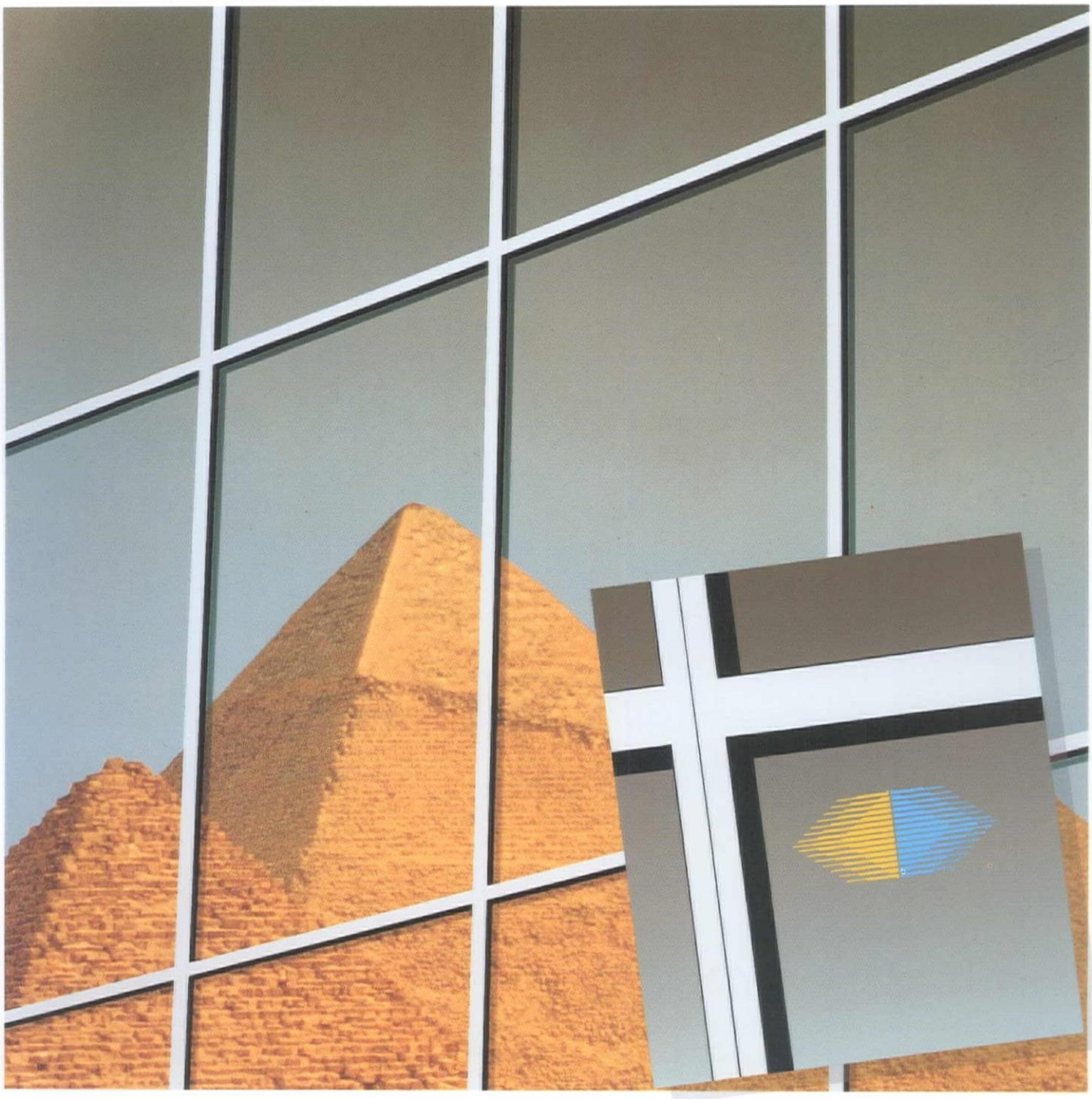

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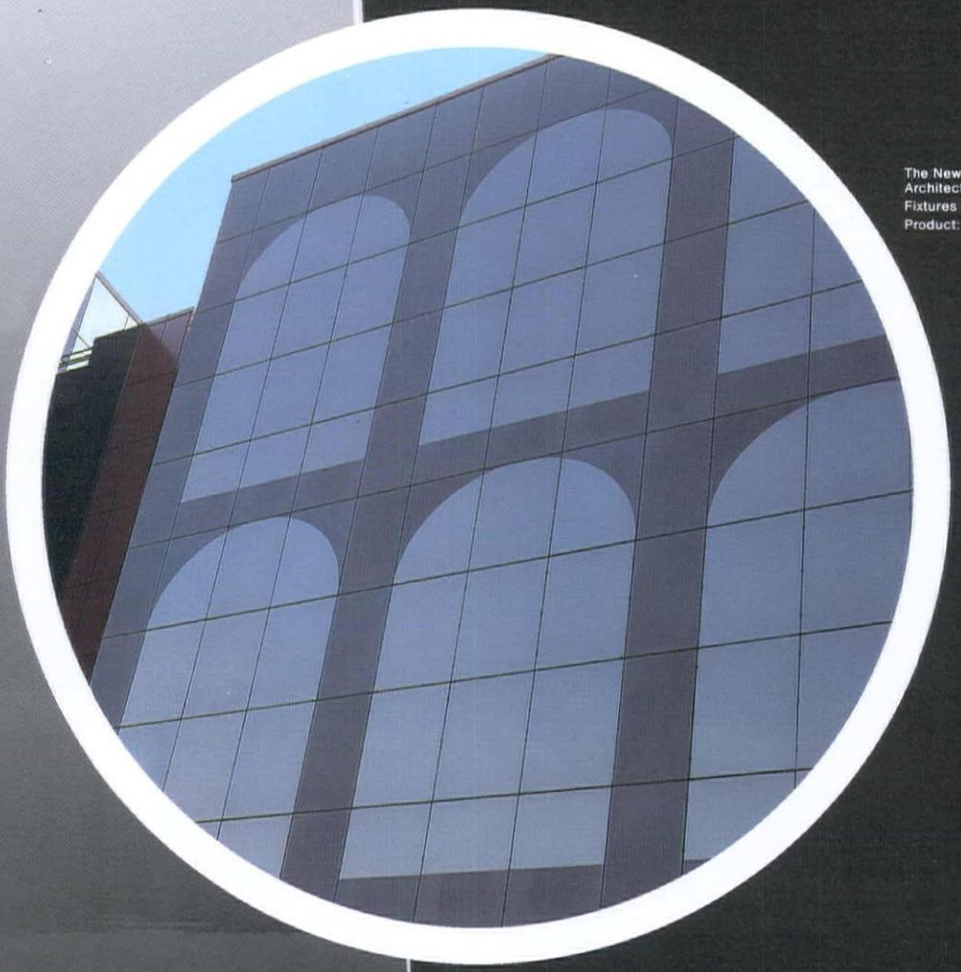

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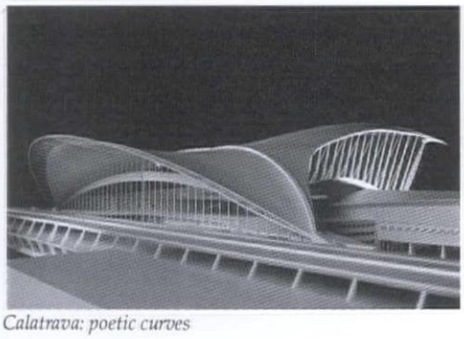
WORLD ARCHITECTURE

Candela: sensuous shells



Calatrava: poetic curves

Whatever happened to the beauty of structure? Increasingly, it seems, over the past decade or so component and skin construction has been used to obscure the structural element in building. It is really no longer possible to speak with conviction of structural "honesty" or, indeed, to propound critical theories – or expressions of sheer delight – about structural meaning in architecture.

The so called Hi-Tech designers have brought new meaning to the "junction" but the steel columns and flat sheets of their architecture – with a few notable exceptions – share little of the magic of say, Gaudi's, Torroja's or Nervi's great technological essays. In many cases structure is subsumed into a general aesthetic effect even in some of the most exhibitionist of recent architecture. Much of it is thus spineless.

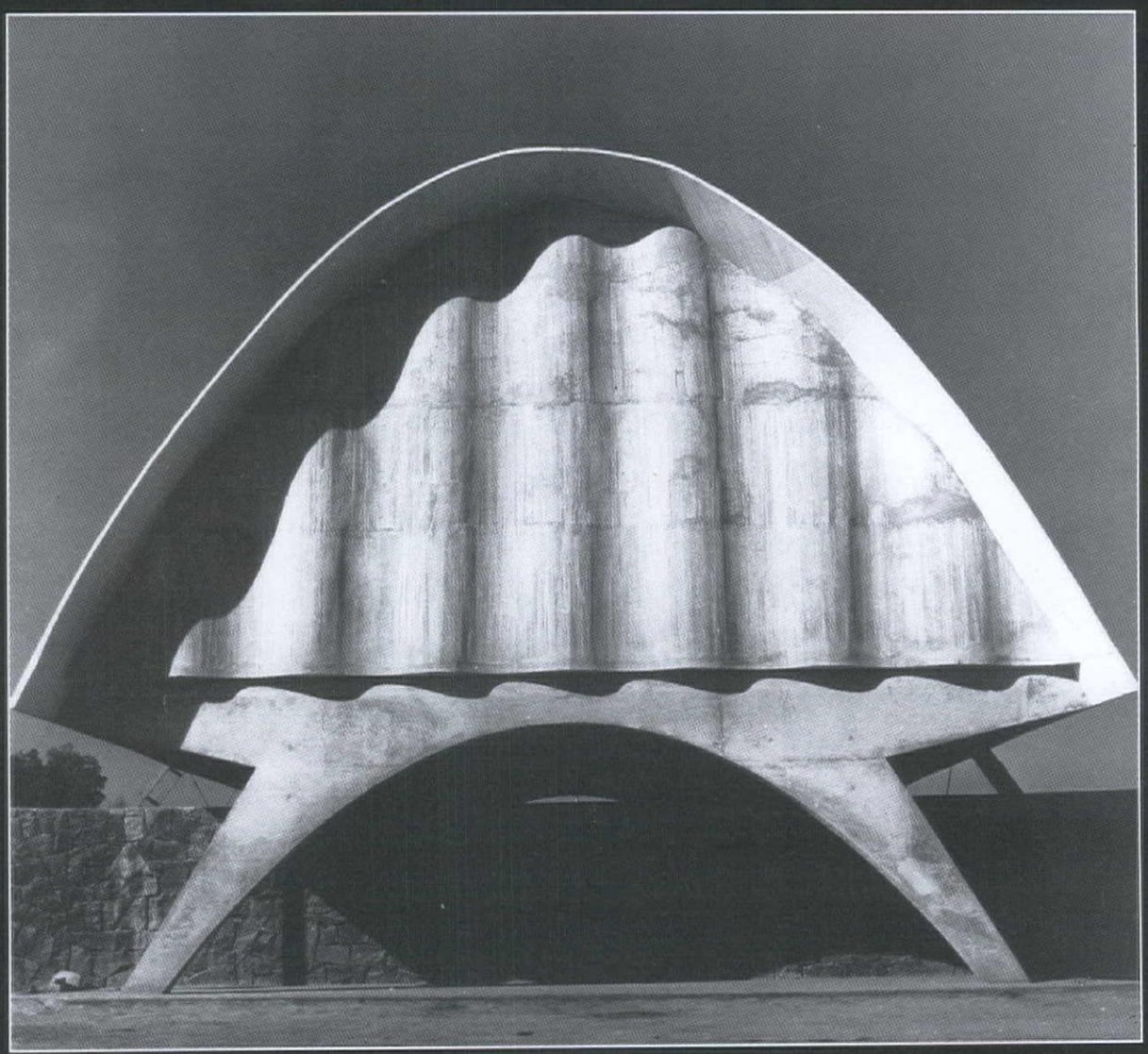
However there is one notable exception to this general trend. Santiago Calatrava, the talented young Spanish but largely Swiss-based engineer architect has taken up the challenge of reviving a design tradition within modern architecture that lays emphasis on the production of poetic structural forms. His design solutions have led to new, exciting and original shapes which serve as a vivid reminder that he is *this* generations' own Master Builder.

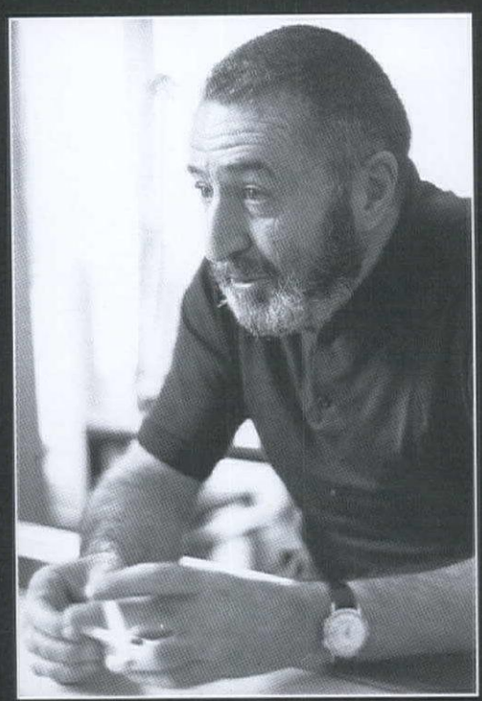
Soaring, uplifting, curvilinear concrete shapes often held in symmetrical geometrical poses (as well as his angular steel armatures) are set out with a cool and rational logic. They easily provoke comparisons with the structural forms to be found in nature. His bridges perhaps best of all convey his work's essential characteristics. They are heady things, these designs; as sensual as they are technological. They are also tough and resilient and contribute effectively to modern life and urban planning in the cities in which they have appeared.

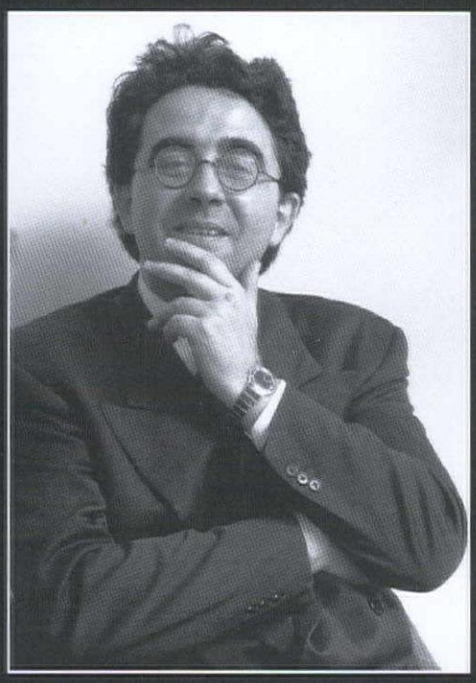
As artefacts they have a special beauty that derives partly from the desire to push design to the edge of technological limits and also partly from an artistic impulse that is keen to accept the challenge of historical contexts and yet also acknowledge the need today for a monumental (but not grandiose) urban symbolism. Also, all of Calatrava's works are, from various accounts, economic. In that sense, as well in many others, they clearly owe a debt to the experience of another remarkable twentieth century engineer architect, Felix Candela – an older generation Academician of the IAA – whom Calatrava much admires. This admiration is mutual. Candela, the artist of the thin concrete shell roof, is also Spanish by birth but now resides in the USA. His best known buildings, however, were designed and built in Mexico in the 50s and 60s. In this special issue devoted to the work of these original designers – both of whom incidently share a common interest in, and undoubtedly debts to Antoni Gaudi, Pier Luigi Nervi and the great Swiss architect engineer Robert Maillart – we span something like 40 years of a consistent but individual line of structural development. Much of what we show helps to reaffirm one's faith in the intrinsic nature of structural beauty where, according to Maillart: "force follows form". *Dennis Sharp*

TWO GENERATIONS OF ENGINEERING ARCHITECTURE

FELIX CANDELA

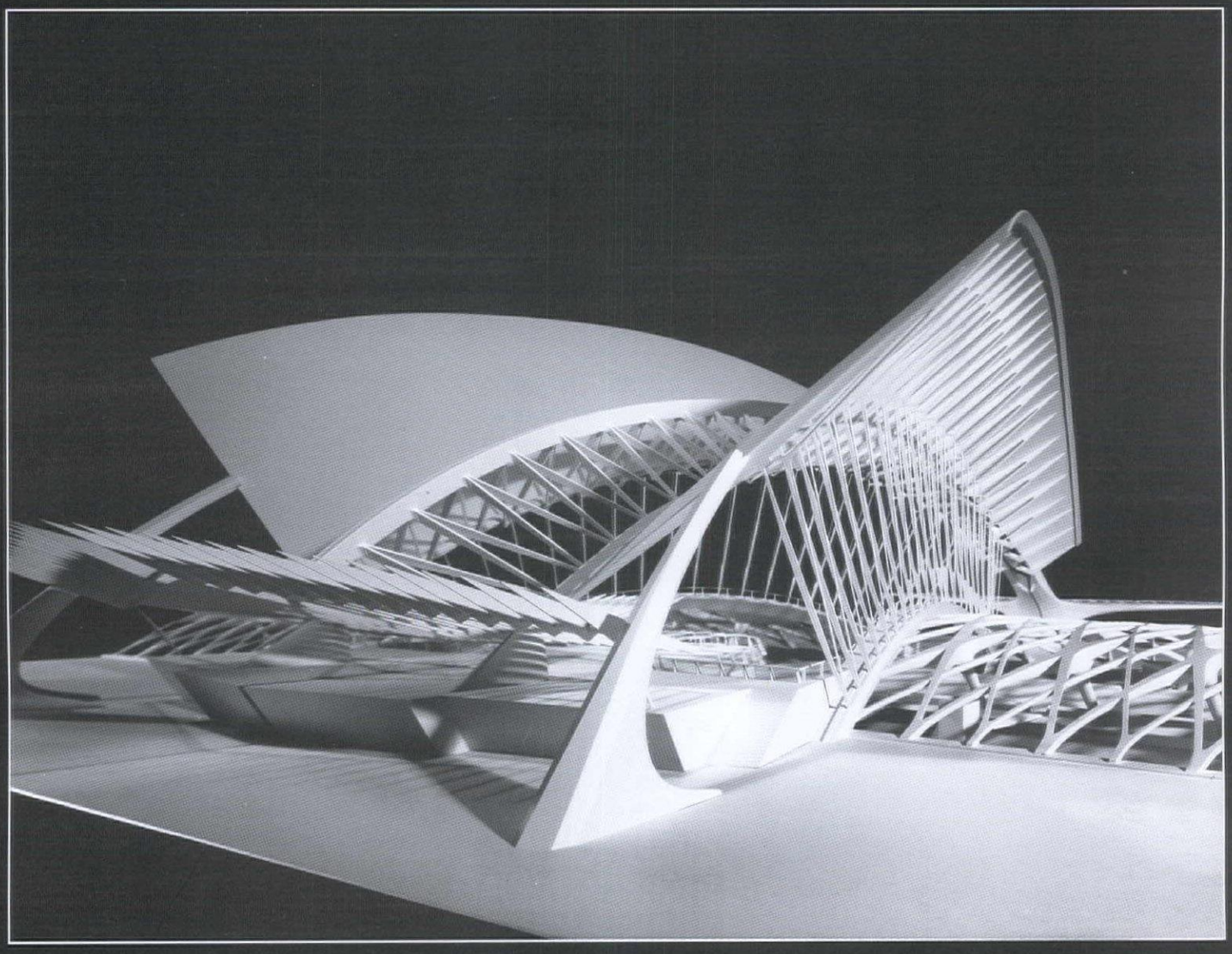






In this issue, World Architecture *spans two generations of engineer-architects by profiling the work of Felix Candela and Santiago Calatrava. They are linked by a thread of work which transcends conventional boundaries to take both disciplines into new territory. Both are Academicians of the International Academy of Architecture, of Spanish origin, and share a common debt to Antoni Gaudi and to Robert Maillart, the great Swiss engineer. In an age increasingly oriented towards teamwork, the individual vision and unique projects of Candela and Calatrava provide an important counterpoint to the conformities and conventions of group design.*

& SANTIAGO CALATRAVA



A MASTER BUILDER IN MEXICO

Felix Candela's dual role as architect and builder enabled him to explore new spatial and structural concepts with outstanding results from the late 1940s onwards. Louise Noelle Mereles traces his career in Mexico where a prolific body of work demonstrates his unique form of expression.

The achievements of international architecture have given rise to a certain inflexibility in its principles and placed limitations on its range of expression. The only way to prevent the creative flow being stemmed altogether has been to search for new modes of expression.

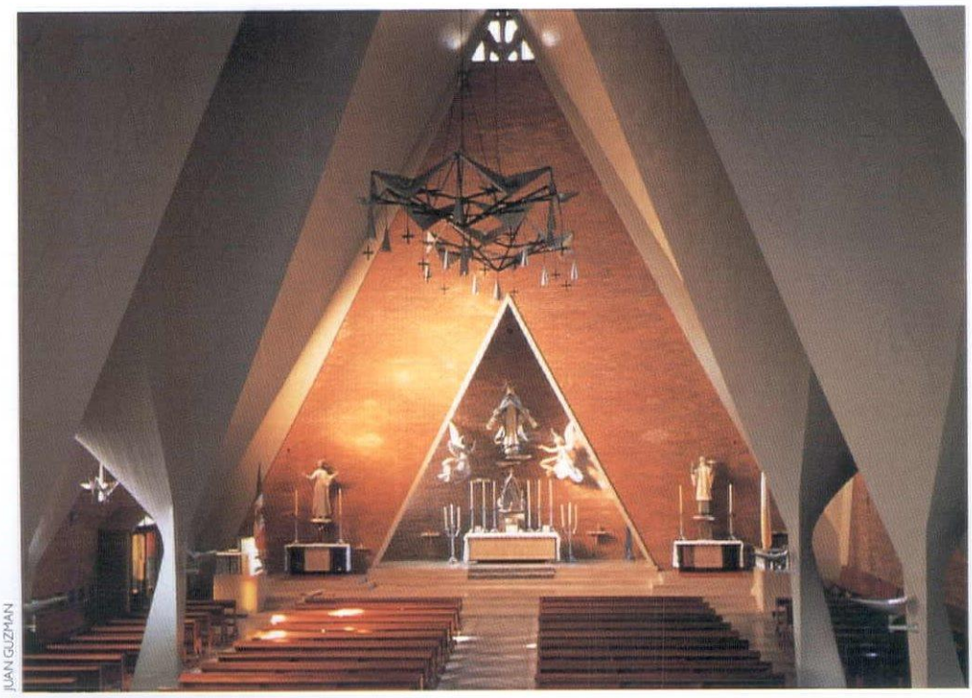
In the middle of this century, Felix Candela emerged as one of the initiators of new formal and spatial concepts based on unique structural solutions. At the same time he became well-known for a large number of projects, most of which are to be found in Mexico. These were executed either by Candela alone or in collaboration with other architects.

This daring designer trained in the city of his birth, at Madrid's School of Architecture. In 1936 his architectural diploma was endorsed by the Escuela de Bellas Artes de San Fernando (the Fine Arts Institute in Madrid), enabling him to obtain a grant to continue his studies in Germany. However, the Spanish Civil War forced Candela, a Captain of Engineers in the Army of the Republic, to seek refuge in Mexico in 1939. He took Mexican nationality in 1941.

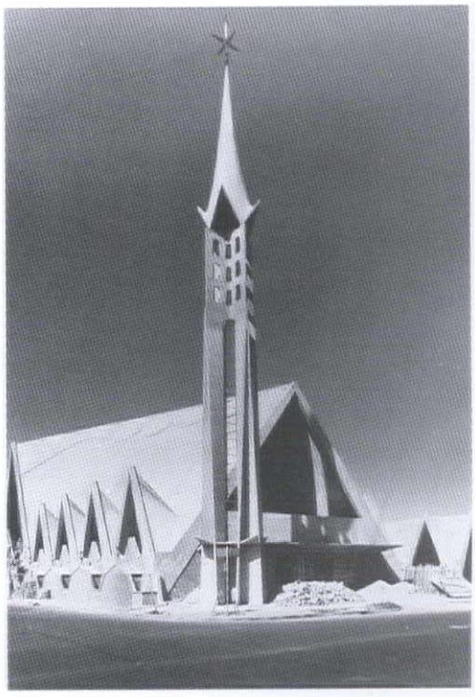
In his native city, Felix Candela had witnessed the building of some of the works of Eduardo Torroja[1], whose use of laminated, pre-stressed concrete left a lasting impression on the young newcomer to the profession.

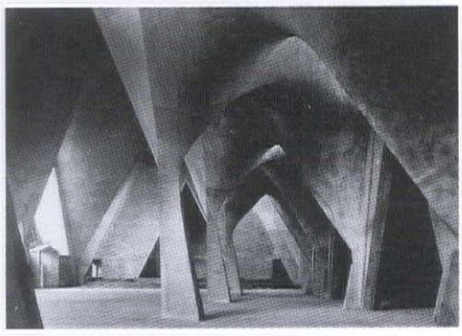
When Candela arrived in Mexico, he found a country which, as a result of the Second World War, was experiencing a period of

(Above) Felix Candela's Cosmic Ray pavilion at the Ciudad University, Mexico, 1952, designed in collaboration with Jorge Gonzalez Reyna; (opposite page) Church of the Immaculate Virgin, Mexico City, 1953. The internal space recalls the mysticism of Gothic architecture; the concrete roof is composed of hyperbolic parabolas which amalgamate to form the supports.



JUAN GUZMAN

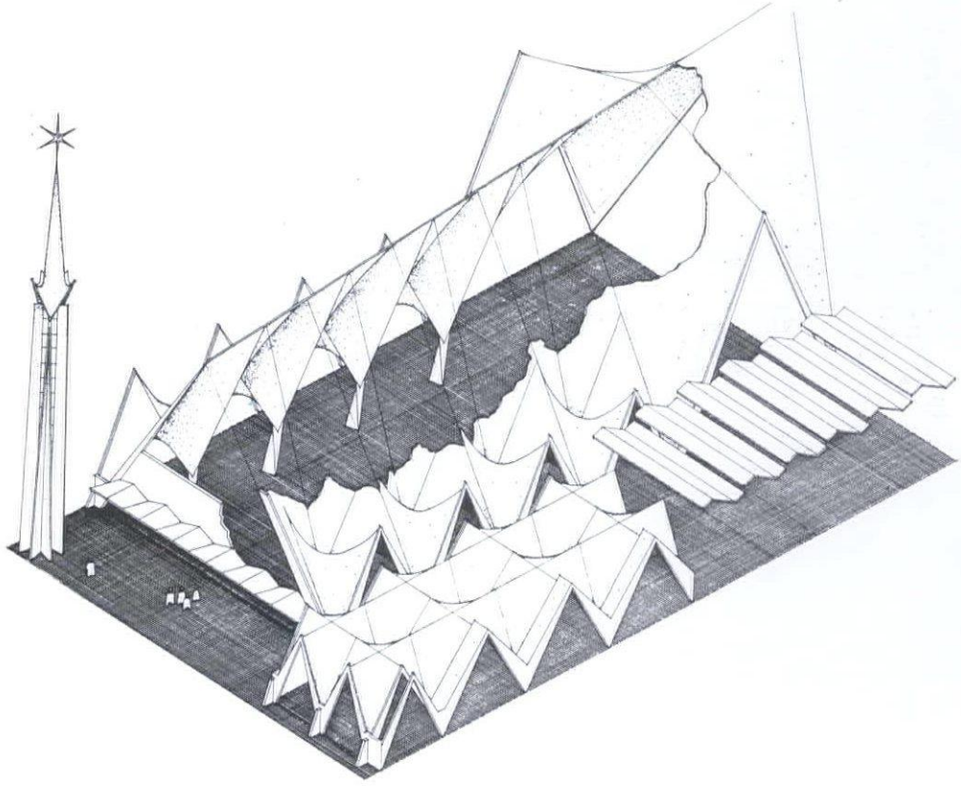




major economic growth. This had a particularly marked effect on the construction industry. At the same time, there was an air of excitement in Mexico's architectural community; always on the lookout for innovative and original buildings, it was eager for fresh contributions.

Under such favourable conditions, Candela was able to develop his ingenious projects, playing the dual role of architect and builder. In 1950, with his brother Antonio and sister Julia, he founded the company Cubiertas ALA (ALA Roofs). This, as the name suggests, specialised in roof construction.

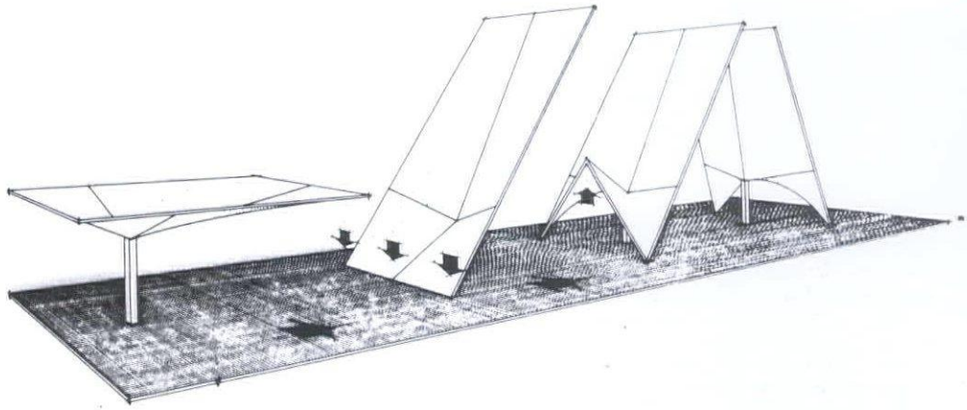
Alongside his business activities, Candela continued to develop his ideas on structures and roofs, both as a lecturer and through his writings.[2] Perhaps the most enlightening of Candela's essays is "Towards a new philosophy of construction", in which he expounds his theories on concrete shell roofs and outlines the principles on which his calculations are based.



Fertile ground for talent

Mexico proved fertile ground to cultivate Candela's talent. The country offered a cheap but skilled workforce, with carpenters able to make wooden support frames in complex shapes. At the same time the materials used, particularly wood,[3] were inexpensive.

Moreover, there was a demand for buildings with plenty of natural light, especially those intended for industrial use, and the



Warehouse demonstrating umbrella construction, Mexico, 1956.

components which could provide this facility were difficult to come by. So "eggshell" structures, so called because of their extreme thinness, found particular favour.

Felix Candela's work not only had a great impact on the national scene, where he also encouraged Mexican architects to innovate. It soon achieved international acclaim too. He completed many projects, around 900 of them with Cubiertas ALA, of which a large proportion - more than 800 - were factories and warehouses.[4]

Experimental concrete umbrella

He began in 1944 with a series of laminated concrete structures, building his first concrete shell structure in 1949. This is a long vault with a textile frame. Later a second experiment was carried out for the Fernández factory with four cones in saw-tooth formation. In 1953, inside a double-curved roof, he constructed an experimental concrete umbrella.[5]

Thus Candela's main contribution to structural design has been the hyperbolic parabola, which involves complicated planning. Nevertheless he was able to simplify the relevant calculations without the aid of a computer. These forms, which are both visually attractive and very economical to build, became the hallmark of his work.

Among his many works, several are outstanding both for their conception and the quality of the end product. It is these which have made him unique as a designer and won him international acclaim. The first is the National University's Cosmic Ray Pavilion, planned in collaboration with Jorge Gonzalez Reyna and built in 1952.

One of the conditions which this building had to fulfil was that the thickness of the roof should not exceed 15 mm in order that cosmic rays could penetrate it. The result, which was as functional as it was attractive, triggered Candela's career as an architect.

The following year he designed the Church of Santa María Milagrosa in Mexico City. The importance of this work lies in its structural logic. The roof, built entirely in concrete only four centimetres thick, is composed of hyperbolic parabolas which amalgamate to form the supports. The internal space is strongly reminiscent of the mysticism of Gothic architecture.

Another notable example is the Jamaica Flower Market, built in 1955, where Candela uses a series of umbrellas to cover the storage and sales areas. Then in 1960 he built the Bacardi bottling plant, based on three arris-domed modules with parabolic profile.

On many occasions Candela worked in cooperation with other well-known Mexican architects, who recognised the potential to create audacious and innovative projects. All were professionals whose own careers already tended towards the original and who demanded large internal spaces.

Enrique de la Mora was one with whom Candela frequently worked. Their joint schemes include the Old Stock Exchange, built in 1955, which obviously required an unencumbered interior space, and a series of religious buildings. Here the use of concrete shell not only provides a roof but offers a large interior space where worshippers can participate freely in the liturgy in a mystical atmosphere.

Landmarks in urban planning

Viewed from the outside, they are also landmarks in urban planning, because of their originality. The large number of churches in Mexico City include Nuestra Señora de la Soledad (1955), San Antonio de las Huertas (1956), the Chapel of the Order of St Vincent de Paul (1960), and the Church of San José Obrero (1959) in Monterrey. Also worthy of mention is the imposing open-air chapel in Cuernavaca, built in 1959 in collaboration with Guillermo Rossell and Manual Barrosa.

In addition, Candela was responsible for a number of buildings which are assimilated into the urban landscape more for their decorative qualities than for their usefulness. These include the entrance to the housing estate at Lake Terquesquitengo (1957) and the ornamental group in the Plaza de los Abanicos in Cuernavaca (1958).

Also in this category of symbolic and promotional works are Mario Pani's Music Pavilion, part of the Santa Fé housing scheme, and the entrances to the pharmaceutical laboratories of Ciba (1953) and Lederle (1954) designed by Alejandro Prieto. In each of these cases variations of the umbrella theme are used.

Felix Candela also distinguished himself in the field of private architecture, with his designs for clubs, nightclubs and restaurants. He won acclaim for the La Jacaranda nightclub in Acapulco, designed in 1957 in collaboration

Notes:

1. The engineer Eduardo Torroja y Miret (1899-1961) built the Recoletos Pediment and the Zarzuela Racecourse building in 1935. The latter is considered to be his masterpiece in a reinforced concrete shell.
2. Candela was a lecturer at the School of Architecture of Mexico's Universidad Nacional Autónoma between 1953 and 1975. From 1950 he began to publish his theories, writing more than 40 articles in specialised journals throughout the world.
3. This type of mould, because of its curvilinear form, has to be cut in a particular way in order to achieve the desired profile. This means, however, that the wood cannot be re-used once it has been cut.
4. Data from thesis of Jorge Arturo Germenos "La Arquitectura, fenómeno económico social. Félix Candela" (Architecture, a socio-economic phenomenon. Félix Candela). The author consulted the files of Cubiertas ALA and found a total of 896 projects dated between 1950 and 1976, of which 839 were for industrial use. For further information see Colin Faber, *Candela, the Shell Builder*, Reinhold, New York, 1963.
5. Umbrellas create a very attractive roof and consist of four rectangular hyperbolic paraboloids resting on a central support. This system provides large lights with few supports, allows the support structure to be re-used and permits lighting at points where the modules meet.

with Juan Sordo. The Las Chalupas Restaurant, built in 1958 in association with Joaquín Alvarez Ordóñez and situated in the typically Mexican Xochimilco district, has also achieved renown. This is due to its eight modules, formed by eight hyperbolic parabolas arranged radially and presenting a pleasing outline.

The concern and creativity of this outstanding designer continued for the three decades during which he lived in Mexico. During this period, he also completed a dozen works outside the country. He was not deterred by the enormously increased cost of labour and wood. He developed a revolving frame that could be re-used, and examined new structural systems that could be adapted to local economic and technical conditions.

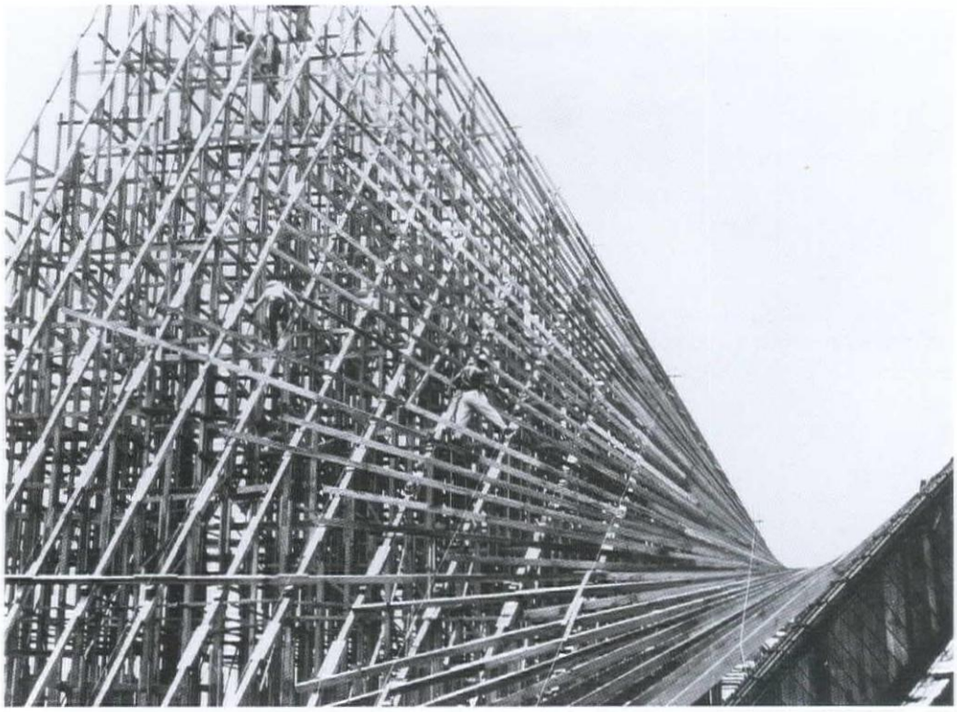
He was commissioned, with Enrique Castañeda Tamborrel and Antonio Peyri, to design the Olympic Stadium for the 1968 Mexico Olympics. This was a vast geodesic roof covered with copper plates, supported by a steel structure resting on 104 concrete struts.

Felix Candela's achievements in Mexico serve to demonstrate his important contribution to the ideology of modern construction. At the same time they enable us to see how he was able to find a form of expression which was uniquely his own, remarkable for its boldness, structural clarity and visual appeal. □

The Olympic stadium for the 1968 Mexico Olympic Games was designed by Candela, Enrique Castaneda Tamborrel and Antonio Peyri with a vast geodesic roof covered with copper plates.

In this essay, Felix Candela explains how he was able to move away from slavish adherence to mathematical formulae to challenge existing hypotheses and create shell structures which combine economy and beauty.

THE INTRIGUING CHALLENGE OF SHELLS



(Above) Imposing open-air chapel in Cuernavaca, 1959, built in collaboration with Guillermo Rosell and Manual Barrosa: in construction and on completion in the landscape. (Opposite page) La Jacaranda nightclub, Acapulco, 1957, designed with Juan Sordo.

I was trained as an architect with, you might say, quite a backward kind of curriculum in Madrid during the 1930s. We had only one course in strength of materials, but it was a very good course, dealing mainly with theory of elasticity and following the classical and rigorous French tradition.

As you can imagine, most students considered the matter completely useless for their professional practice and, as it required some knowledge of mathematics, it was very difficult for most of them to pass the examination. This gave me the opportunity to do some private tutoring to my classmates, which was a very useful way to make some money to pay for my studies. As a result, I became more familiar with the theoretical basis of the current methods of calculation of indeterminate structures.

I discovered later that this modest background made me more knowledgeable on the matter than most practising engineers, whose training and interest tend to be directed towards mastering the accepted methods of analysis rather than questioning the basic hypotheses.

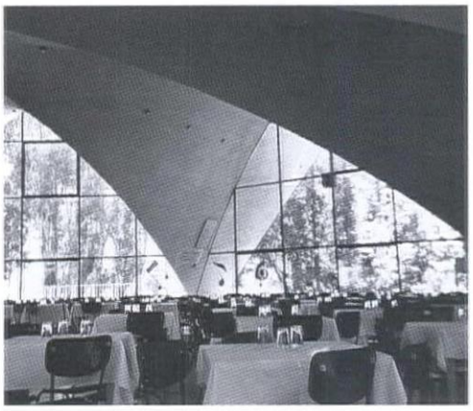
Anyway, since I never had a high opinion of myself as an artist, I was more interested in the technical part of the curriculum and began to read extensively about structures. Among my lectures, I found several French and German papers dealing with shells which were beginning to come into vogue at that time in Europe. Examples of such structures built in Germany and France could be found in magazines, and Torroja was building the famous roof of the Fronton Recoletos in Madrid, with an unusual shape and a record span.

Shells appeared to be an intriguing challenge for me, and I dreamed about the possibility of building some in the future. But my lack of experience and my youthful faith in the impressive wisdom displayed in learned magazines led me to believe that the key to shell design was in complete mathematical calculation, and I tried, rather unsuccessfully, to understand and follow them and to make some sense of their results.

Cunning mathematical barrier

I was not the only one misled and discouraged by the mathematical barrier so cunningly deployed by German engineers, a clever move which secured them practically an exclusive on the construction of barrel vaults for more than 20 years, hindering the normal employment of such structures during that time.

However, such was my enthusiasm with this mathematical approach that I managed to get a fellowship to go to Germany, hoping to learn something more from the German professors. But the outbreak of the Spanish Civil War saved me from such an ordeal. I could not leave the country and ended in Mexico after three years of military service, with no more baggage than my bare hands and no further addition to



my academic background.

After several years of general practice in Mexico, as draftsman, designer and contractor, I recalled my old fancy with shells and again began to collect papers on the subject. Whatever I learned from then on was to be the hard way, working alone, with no direct help from any university or engineering office. But I am indebted to many people who did help me indirectly through their writings. Robert Maillart (1872-1940) was one of the foremost.

Devouring structure articles

I discovered Maillart in Giedion's *Space, Time and Architecture;* and then I got Max Bill's book with its invaluable collection of Maillart's essays. I devoured his articles about "Reinforced Concrete Design and Calculation", "The Engineer and the Authorities" which expresses his position *vis à vis* the establishment, and "Mass and Quality in Reinforced Concrete Structures".

My own attitude to calculations of reinforced concrete structures was becoming unorthodox. I was tired perhaps of performing long and tedious routines whose results were not always meaningful. Therefore, I found Maillart's thoughts delightfully sympathetic and encouraging. If a rebel was able to produce such beautiful and sound structures, there could not be anything wrong with becoming a rebel myself. Besides, this was my only way to break the mystery surrounding shell analysis.

Thus I started to follow the bibliographic tread and met, through their writings, Freudenthal, Johansen, Van der Broek, Kist, Saliger, Kacinczy and so many others who showed me there was more than a single and infallible way to approach structural analysis.

The discovery of rupture methods, with their emphasis on simple statics and their bearing on the actual properties of construction materials and their behaviour in the plastic range, allowed me to trust in simplified procedures to understand and analyse the distribution of stresses in shell structures. It also helped me to get out of my naive belief in the indisputable truth of the printed word and to start reading with a new critical outlook.

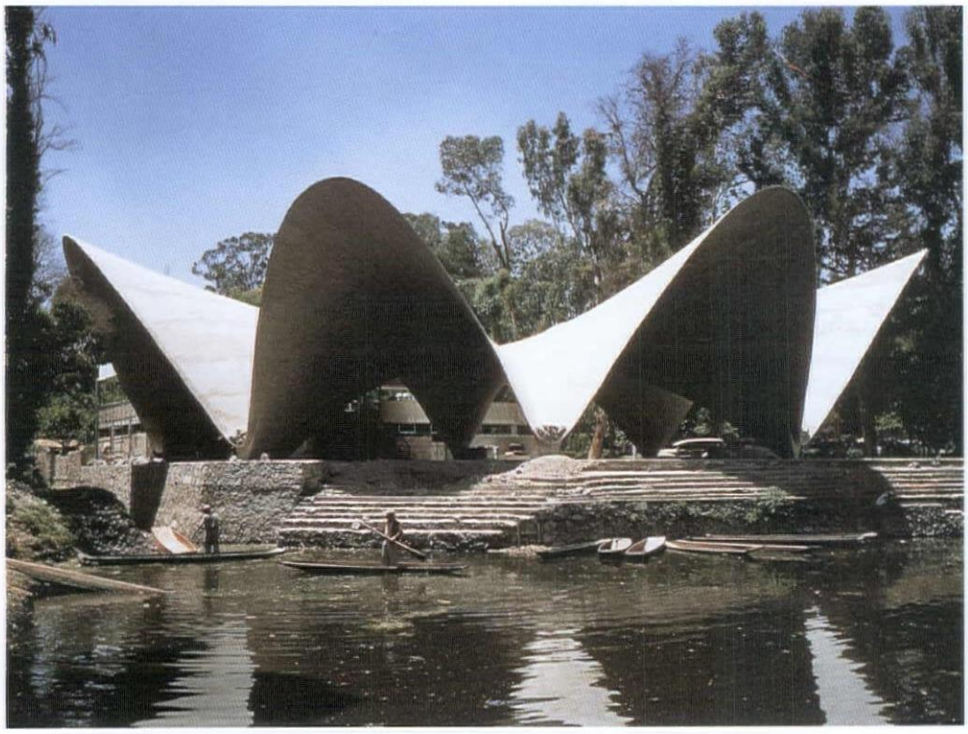
No longer did I need to believe whatever was in print, no matter how high-sounding the name of the author. I could make my own judgements about what methods of stress analysis were better suited for my practice.

Since I was working practically alone, I could not afford nor had time for complex calculations. I welcomed Maillart's advice that simpler calculations are more reliable than complex ones, especially for somebody who builds his own structures.

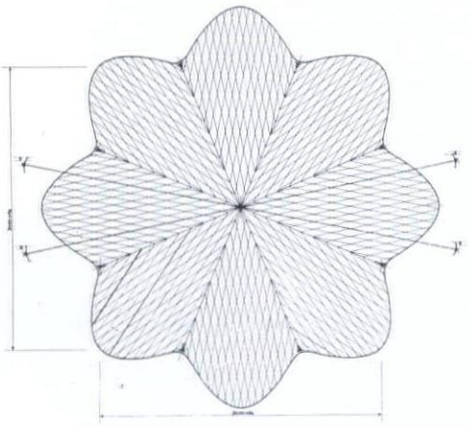
This was exactly my case and, since most structures I was building were of modest scale, I could control what was happening, check the results and confirm the accuracy of my judgement or correct my mistakes. In a way, I was working with full-scale models. I understand that this was also true of Maillart who, in many cases, was the actual builder of his designs.

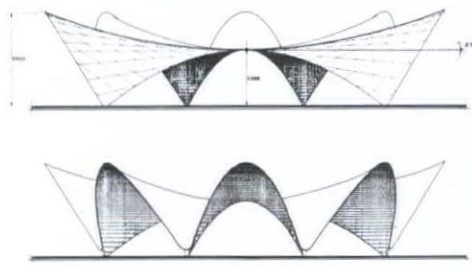
Following the general trend to confuse issues, there has been a lot of speculation about the engineer as artist and in some instances, as in the case of Nervi, about the engineer as a architect (as if the title of architect could confer *per se* artistic ability to its holder). But few people realise that the only way to be an artist in this difficult speciality of building is to be your own contractor.

In countries where the building industry has been thoroughly and irreversibly fragmented and the responsibility diluted among so many trades, it may be shocking to think of a contractor as an artist. But it is indeed the only way to have in your hands the whole set of tools or instruments to perform the forgotten art of building, to produce "works of art" which, by the way, was the common expression to designate a bridge in the old French



(Above and below) Las Chalupas restaurant, Xochimilco, Mexico, 1958, designed with Joaquin Alvarez Ordonez: eight hyperbolic parabolas arranged radially present a pleasing outline. (Below right) Candela takes his shell form to an Oslo botanical garden, 1962.





engineering vocabulary.

To be your own contractor is a very difficult proposition in some countries where such mergings of today's disparate professions may even be considered unlawful. It means, of course, that the price for being the master of your trade is to accept total responsibility for the performance of the structure. Not too many people today would readily endorse such an awesome commitment. I am not advocating a return to the past; history is an irreversible process.

Complexity and elegance

I would also like to insist on something that everybody knows but which is easily forgotten; that no calculation, no matter how sophisticated and complex, can be more than a rough approximation of the natural phenomenon it is trying to represent by means of a mathematical model. The complexity, or even elegance, of such a model bears no relation at all to the degree of approximation.

There is not such a thing as an exact method of structural analysis and, notwithstanding the popular belief in the letter of the codes, the accuracy of any calculation is still a question of personal judgement. This fortunate circumstance allows engineering to sometimes reach the highest category of art, to the despair of dull and inflexible technicians.

My interest when I was working in Mexico was to build shells and I tried, with great efforts, to equip myself with the necessary knowledge for such an endeavour. Thanks perhaps to the special circumstances of the country in the 1950s, I was able to convince people – laymen as well as professionals – of the feasibility and economy of building such structures.

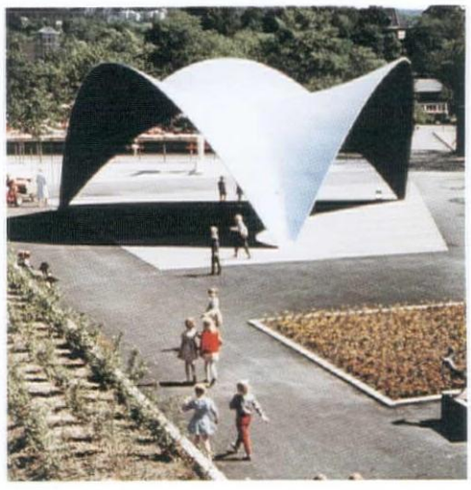
In the course of the overwhelming amount of work that resulted, I made at least two discoveries that could be considered extraordinary, given the general attitude of the profession to that kind of construction at the time.

First: the intrinsic economy of these structures when built in a repetitive manner, reusing a formwork that, in spite of the general belief, is in many cases as simple as that of a flat slab. Since I had to compete with the cheapest kind of construction in order to get any commission, I was forced to prove that the umbrellas were the most economical way to cover space.

This fact makes me very proud, because any development that saves money and effort in construction contributes more to the general well being of mankind than all the messianic claims so common in the profession.

Second: that, in spite of their economy, many of these structures were not unpleasant. In fact, in retrospect, I even find some of them beautiful. This may be due to the inherent attractiveness of the geometric surface I was working with or perhaps to some unsuspected personal abilities. Anyway, I have to recognise in fairness that the contribution and ideas of many of the architects for whom I worked made possible such achievements.

However, when I talk about beauty I have to apologise and even feel a little shy because it is no longer a fashionable word. □



FELIX CANDELA: A Biography

Felix Candela was born in Madrid, Spain on January 27, 1910. He emigrated to Mexico in 1939 and has lived in the USA since 1970.

He received his title of Architect from the Escuela Superior de Arquitectura, Madrid, 1935 and has been a registered architect in Mexico and in Spain.

He was Professor at the Escuela Nacional de Arquitectura, University of Mexico from 1953 and Chairman of the Department of Construction. He became Full Professor of the Department of Architecture of the University of Illinois at Chicago Circle in 1971, and Professor Emeritus in 1978.

He founded with his brother and sister, Antonio and Julia, a Mexican firm, Cubiertas ALA, with subsidiaries abroad, specialising in the design and construction of reinforced concrete shell structures. He has acted as consultant for shells built in Central and South America, USA, UK, Scandinavia, Spain and the Middle East.

Among his major works in this capacity are: a project for the sport facilities of Brown University in Rhode Island, USA, 1969; a preliminary project for a Sports City 1969; and the urban design for the new industrial city of Yanbu in Saudi Arabia, 1980, as chief architect of the Saudi firm, Idea Center.

His many works in the City of Mexico include the Church of the Medal of the Miraculous Virgin, 1953, and the Sports Palace of the Mexican Olympic Games in 1968, as winner of a competition in collaboration with Enrique Castañeda and Antonio Peiri.

He has published many articles in architectural and engineering magazines and regularly gives lectures throughout the world. The book *Candela: the Shell Builder*, by Colin Faber, Reinhold Publishing Co, NY, 1963, translated into German *(Candela und seine Schalen)* and into Spanish *(Las Estructuras de Candela)*, describes his work and development. He has also published a book of essays in Spanish, called *En Defensa del Formalismo*, Xarait Ediciones, Madrid, 1985.

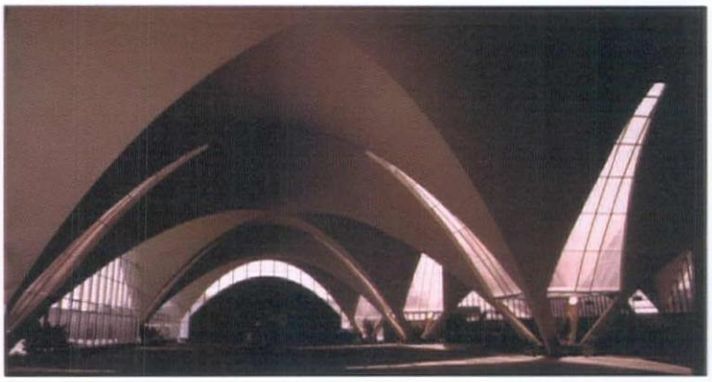
Member Emeritus of:
- Sociedad y Colegio de Arquitectos de Mexico.
- Colegio de Arquitectos de Madrid.

He was appointed:
- Charles Elliot Norton Professor of Poetry, Harvard University, 1961-62.
- Jefferson Memorial Professor, University of Virginia, 1966.
- Andrew D. White Professor at Large, Cornell Univ. 1969-74.
- Professor Honorario, Escuela Superior de Arquitectura de Madrid, 1969.
- William Hoffman Wood Chair of Architecture, University of Leeds, UK, 1974-75.
- Professor Honorario, Universidad Nacional Federico Villareal, Lima, Perú, 1977.

JUAN GUZMAN

He was awarded:
- Gold Medal, Institution of Structural Engineers, UK, 1961.
- Auguste Perret Prize, UIA, London, 1961.
- Plomada de Oro, Sociedad de Arquitectos Mexicanos, 1963.
- Doctor in Fine Arts Honoris Causa, University of New Mexico, 1964.
- Alfred E Lindau Award, American Concrete Institute, 1965.
- Doctor en Ingenieria Honoris Causa, Universidad de Santa Maria, Caracas, Venezuela, 1968.
- Officer of the Order of Mérito Civil, Spain, 1978.
- Doctor in Fine Arts Honoris Causa, University of Illinois, USA, 1978.
- Grand Medaille d'Argent de la Recherche et de la Technique, Academie d'Architecture, Paris, 1980.
- Medalla de Oro, Consejo Superior de Colegios de Arquitectos de España, Granada, Spain, 1981.
- Silver Medal, Union des Architectes Bulgares, Sofia, 1983.
- Member Emeritus, Academia de Arquitectura, Mexico, 1984.
- Premio Antonio Camuñas, Madrid, 1985.
- Founding Member, International Academy of Architecture, Sofia, 1986.
- Doctor Honoris Causa, Universidad de Sevilla, Spain, 1990.
- Corresponding Member, Academie D'Architecture, France, 1991.

He is an Honorary Member of:
- Royal Institute of British Architects.
- American Institute of Architects.
- American Concrete Institute.
- The Church Architectural Guild of America.
- International Association for Shell Structures.
- Sociedad Colombiana de Arquitectos.
- Sociedad de Arquitectos Venezolanos.
- Asociación Costarricense de Arquitectos.
- Colegio de Arquitectos del Perú.
- Sociedad Bolivariana de Arquitectos.
- Union des Architectes Bulgares.



Candela's dream of shells realised: (top) symbolic structure for Sant Fe housing; (left) Bacardi bottling hall, Mexico, 1960.

CALATRAVA'S GRACEFUL SHAPES

Felix Candela introduces five of Santiago Calatrava's recent projects with an assessment of why the younger architect engineer has become one of the most genuinely original and exciting talents on the contemporary scene.

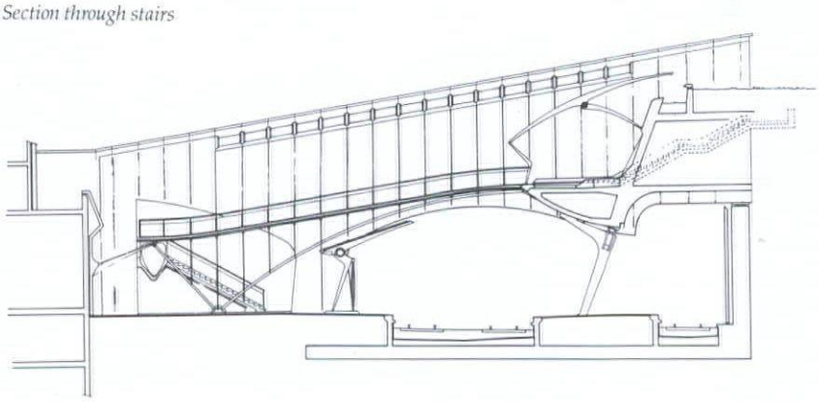
The occasions on which one finds the qualities and the knowledge required to create true architecture combined in a single person are very rare. One of the few examples of such an extraordinary combination is Santiago Calatrava. He has a profound knowledge of the laws of statics and the procedures for analysis and evaluation of the internal tensions with which a structure reacts to external stresses.

He has an unusual feeling for form and a fondness for detail which enables him to tackle the most complicated problems with clearly defined aesthetic aims and to come up with enviably elegant and surprisingly simple solutions to them; that simplicity, delight and cheerfulness in appearance, that Michelangelo regarded as the essence of a true work of art.

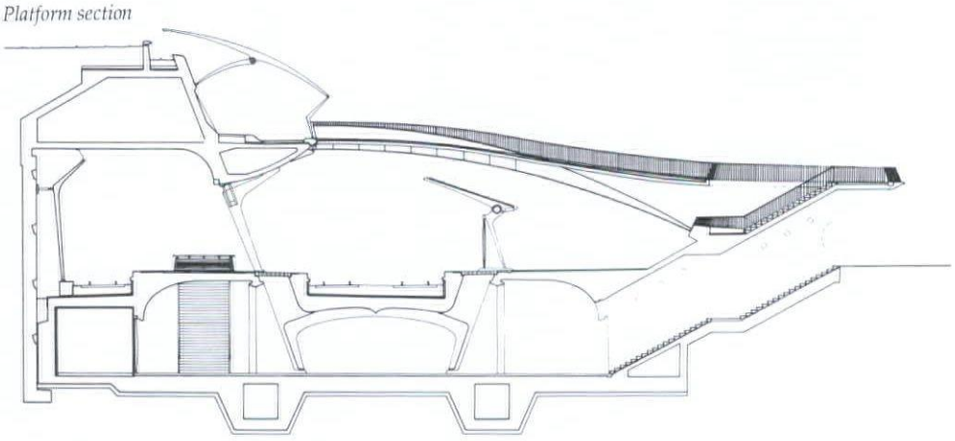
For what Santiago Calatrava sets out to create, and actually does create, are real works of art, even when he is dealing with the most prosaic of problems. Calatrava's extraordinary precocity has brought him a sound professional maturity and a mastery of the craft. The multiplicity of opportunities that his renown ought to bring him lead us to hope that his future work will consolidate the new direction which he has opened up in contemporary architecture. It is a direction based on solid and enduring tectonic bases and not, as we have become accustomed to see in recent times, on frivolous and arbitrary fashions that seek justification in esoteric aesthetic theories.

A true work of art has no need for justifications or explanations. Santiago Calatrava's work brings an invigorating breath of life into the confused and disoriented architectural panorama of the present day. Yet, to the disappointment of those who are ever on the lookout for a new fashion to follow, it is difficult to imitate since it requires a sound mastery of structural technique and of engineering and construction processes. Above all, it requires a considerable dose of that indefinable ingredient known as gracefulness. □

Section through stairs



Platform section



Stadelhofen Railway Station, Zurich, 1983-90

The project for the new Stadelhofen station, which emerged from a competition held in 1982, is now in the process of execution. For a variety of reasons, the setting in which it stands is an exceptional one. Primarily this is because of the scale of the intervention, together with the urban surroundings.

The scheme affects an area of about 270 by 40 metres located at the edge of the old fortifications in the centre of modern Zurich, next to the square in front of the Opera House. The project is also exceptional since it involves alterations on an urban level, in an attempt to give such a characteristic location a distinctive new identity.

The project for the Stadelhofen station is a typical "design by section". The cross-section, which is split up into three levels, remains almost identical throughout the 270 metres that the slightly curved plan extends, following the layout of the tracks.

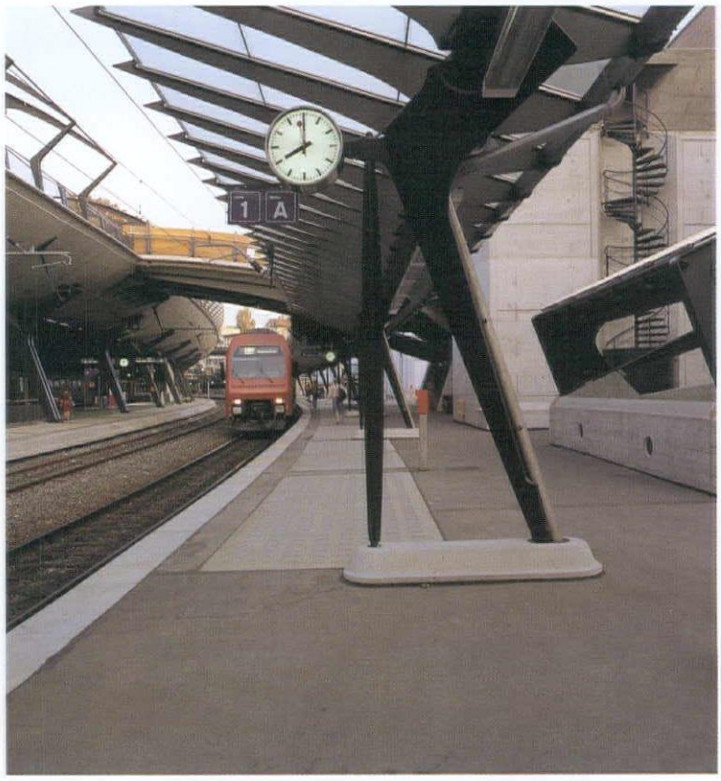
This sharp line is interrupted at four points by the same number of bridges linking the upper level, made up of a passage covered by a metal trellis, to the lower one of the platform

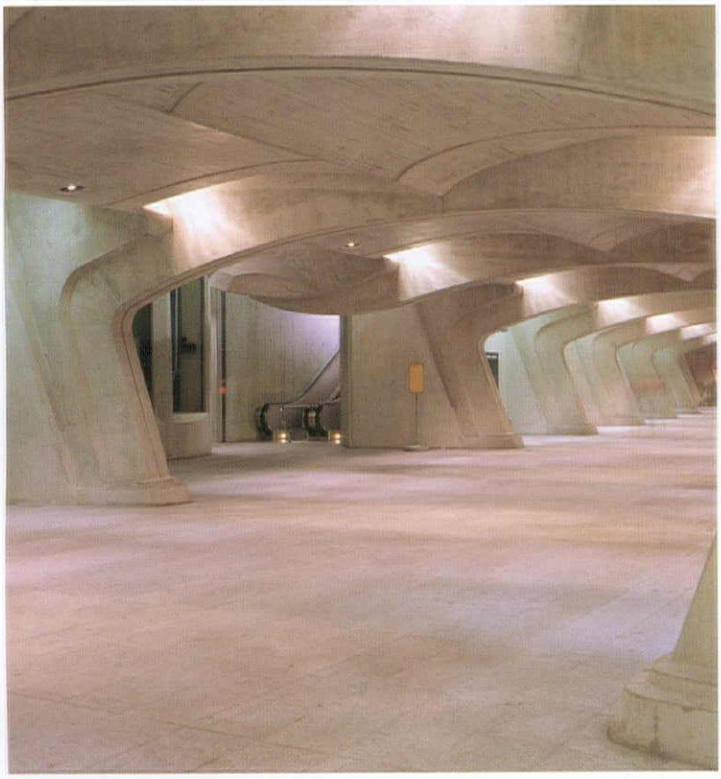
and the station square. The bridges link the project to the existing road system and accentuate the contrast between the upper and lower sides of the station. Each bridge constitutes an independent element of the project.

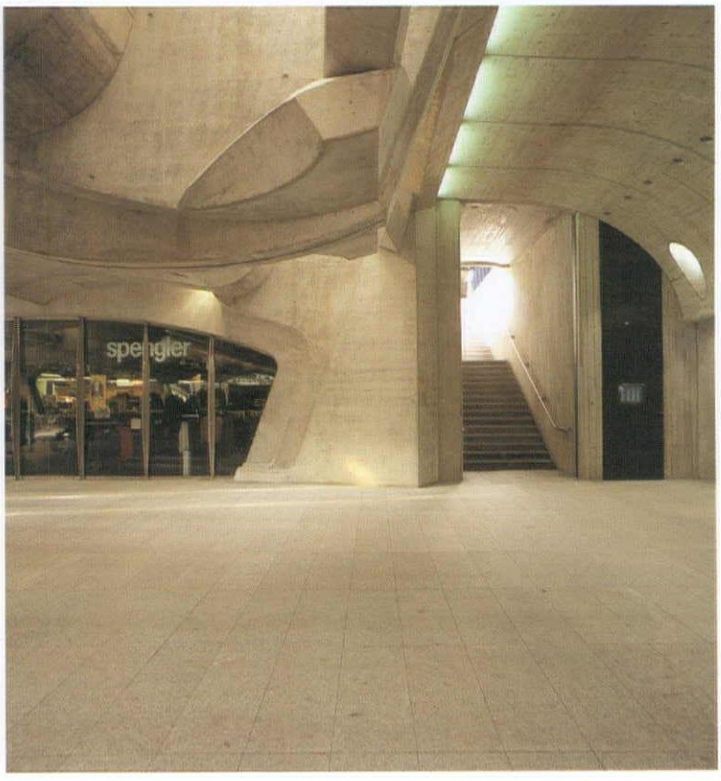
As part of the local railway network, Stadelhofen Station must accommodate the heavy traffic expected in the next few years. As a result, a third track is being added along with an adjacent trackless platform.

The main structural components are the protective wall, which is set back from the platforms, the gallery which covers the railway on the side nearest the mountain, the newly-erected bridge connections and a retail level which acts as an underpass to the intermediate track.

The duality of the mountain and the valley, which arises from the positioning of the railway line, is emphasised by the structural elements inbetween. Light steel bridges connect both areas. The remaining elements of the station, the roofs above the tracks and the canopies combine to convey the greatest possible unity. Calatrava comments: "This large-scale attack on the urban landscape is characterised by the organisation and repetition on the part of the constructive element."







Site plan: Stadelhofen Station

TGV Railway Station, Lyon, 1989-1992

This project is the result of a first prize-winning entry to a competition for the extension of Lyons Satolas airport.

A number of different structures have been created: the new TGV station, a connecting gallery, the airport hall and new office wings. These various buildings are linked together by the structural features common to them all. The hall is particularly notable for the expressive power of its symbolism.

From the existing situation a layout was developed in which the composition axis runs as a diagonal through the rectangle of the main building. In the new urban planning scheme it was intended that passengers should not be in doubt that they are arriving at the airport.

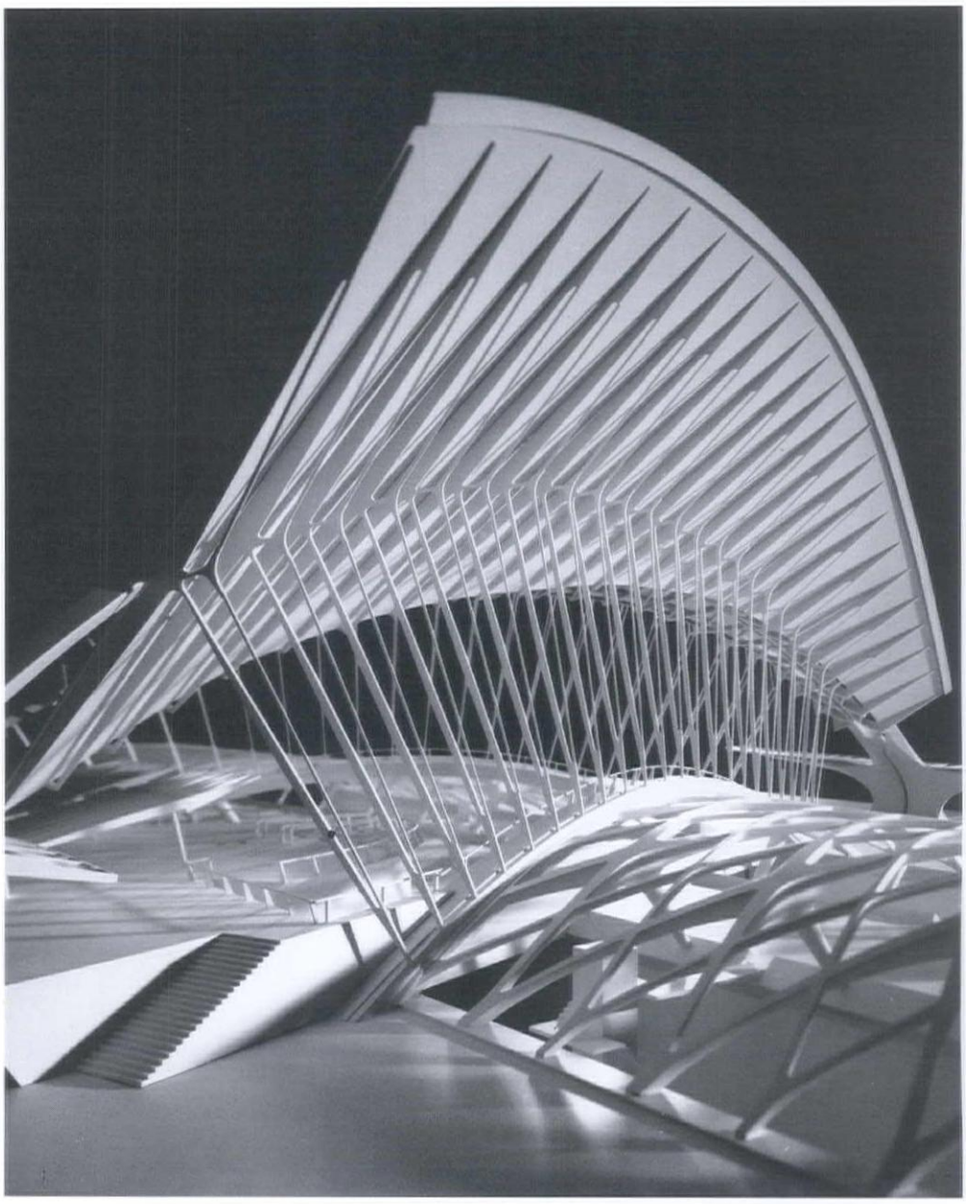
Two architectural decisions were therefore taken: the platform roofs were lowered to give an unobstructed view of the station against the background of the airport building; and the traffic access was arranged to approach the main building frontally so as to emphasise its appearance and function.

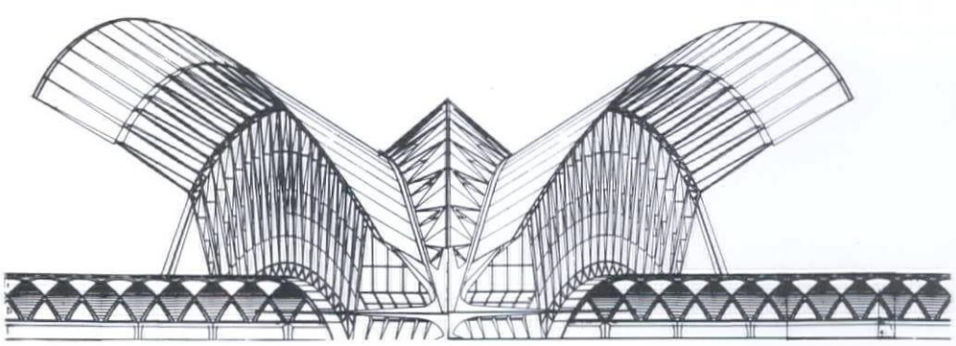
The access ramps were elevated to allow this sequence of views to be more clearly perceived. From the raised road, which approaches the façade of the main building at right angles, arriving passengers can view the complex of buildings as an architectural whole.

It was felt that the existing architecture of the airport was worthy of preservation and should therefore be respected and enhanced by the new building operations. For this reason the front of the building is framed, as seen by passengers on arrival, by the gallery and the international terminal. The symmetry is underlined by the matching curvatures of the façades of the two new buildings. The administrative block is subordinated to the central building and linked with it so as to highlight its mass in the overall complex.

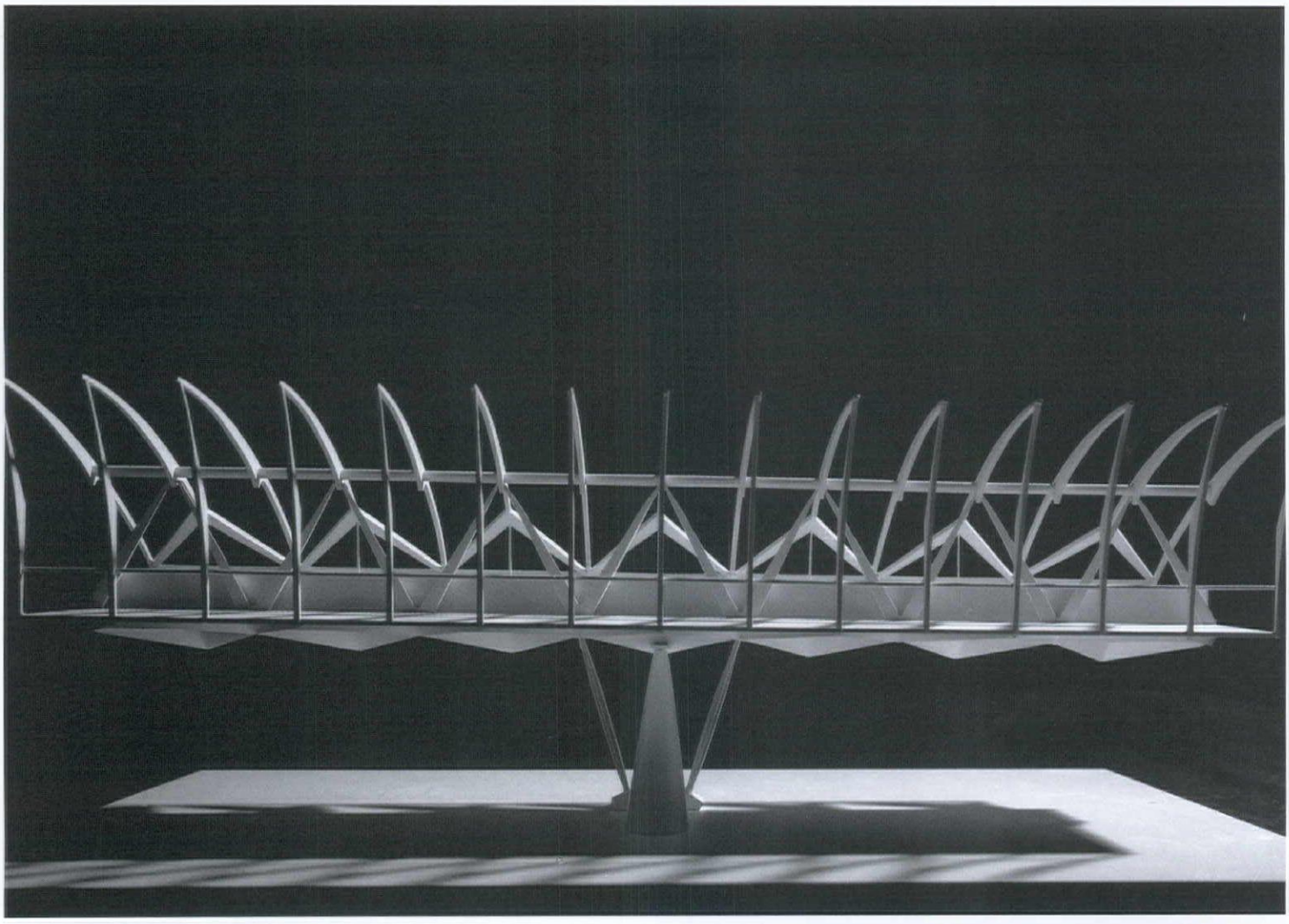
For the station an expressive and easily grasped form was selected, the image of which can be readily associated with the region when seen from both the ground and the air. As a symbol it embodies the idea of flight.

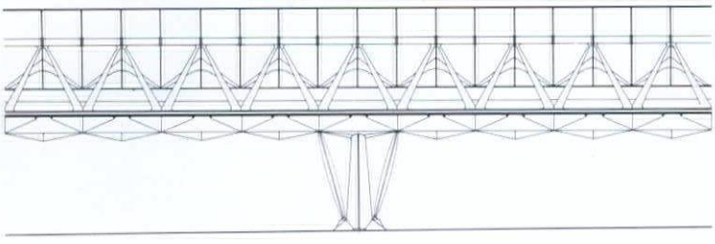
A broadly spreading roof unfolds its wings longitudinally over the platforms like a bird taking flight. Lifted above the ground, it reflects the profile and appearance of the TGV and allows the passage of trains to be seen from the outside.

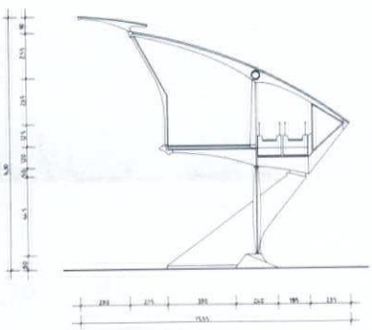


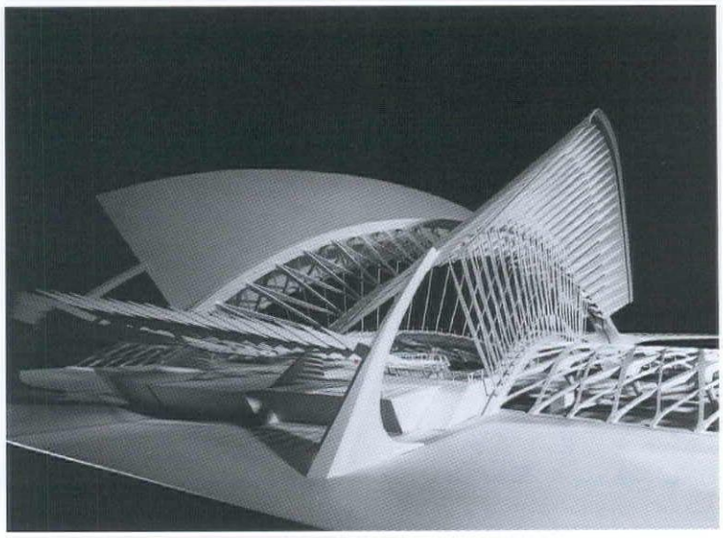


Sectional elevation



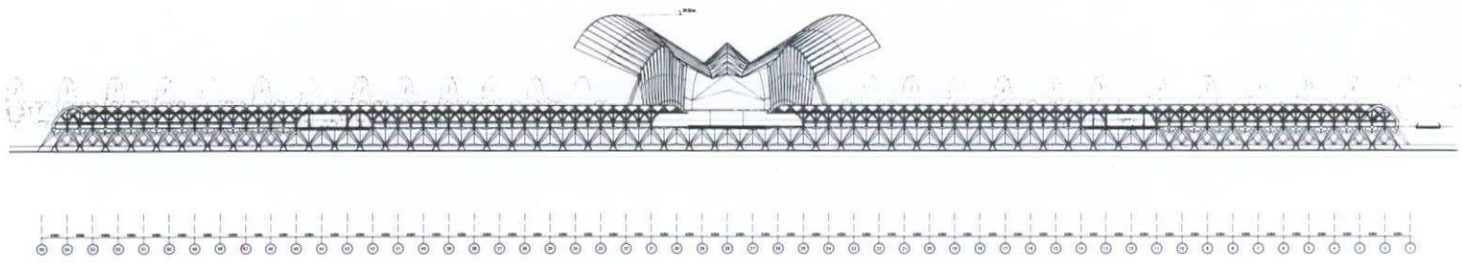


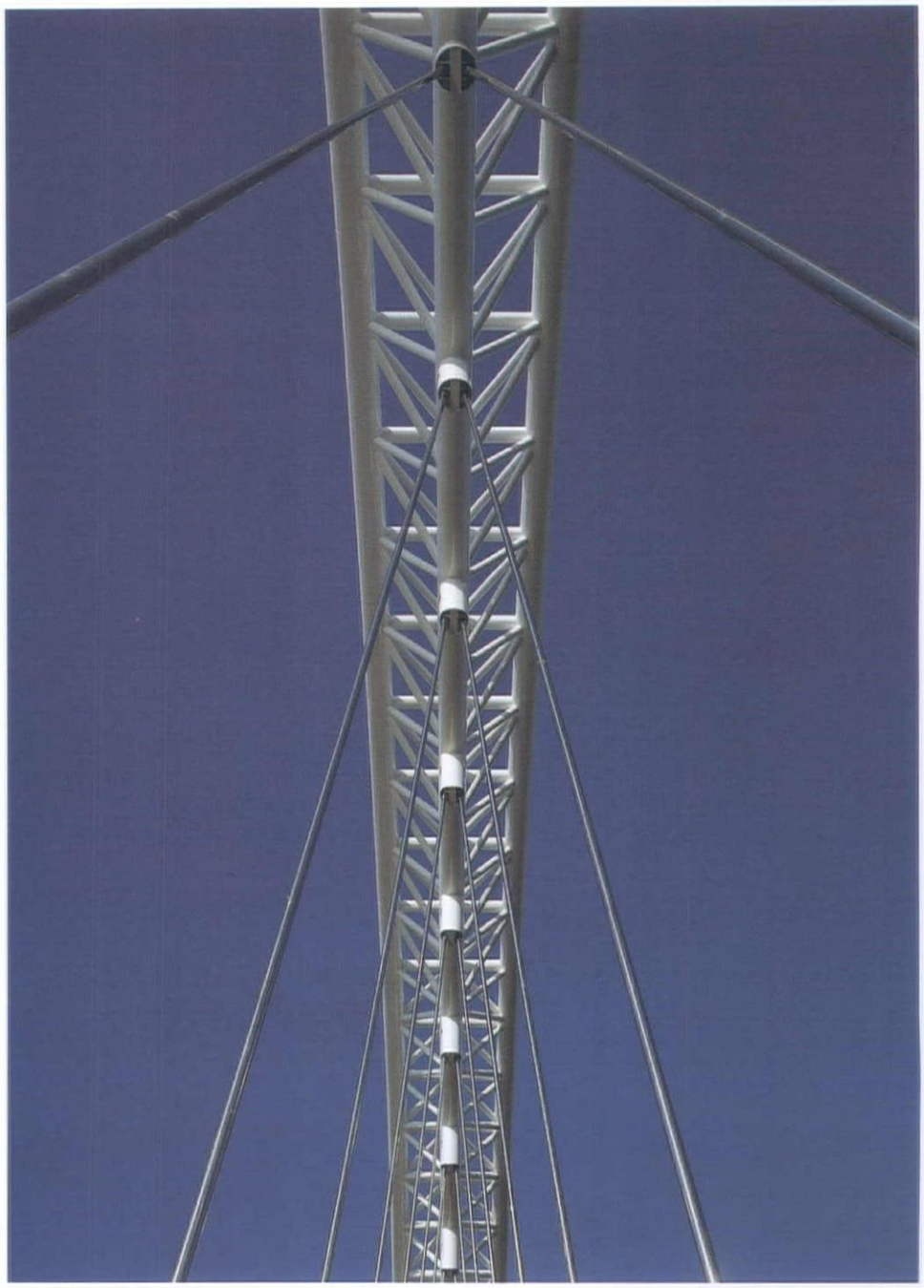




Model of the terminal with gallery connection

TGV Station, Lyon: longitudinal and transverse sections with detail model above



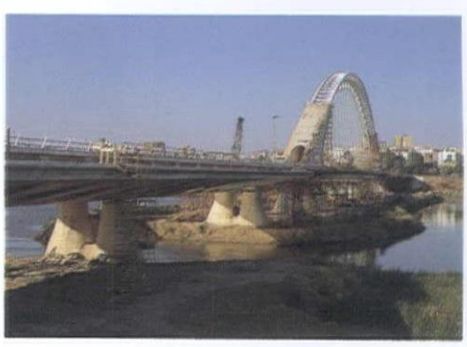


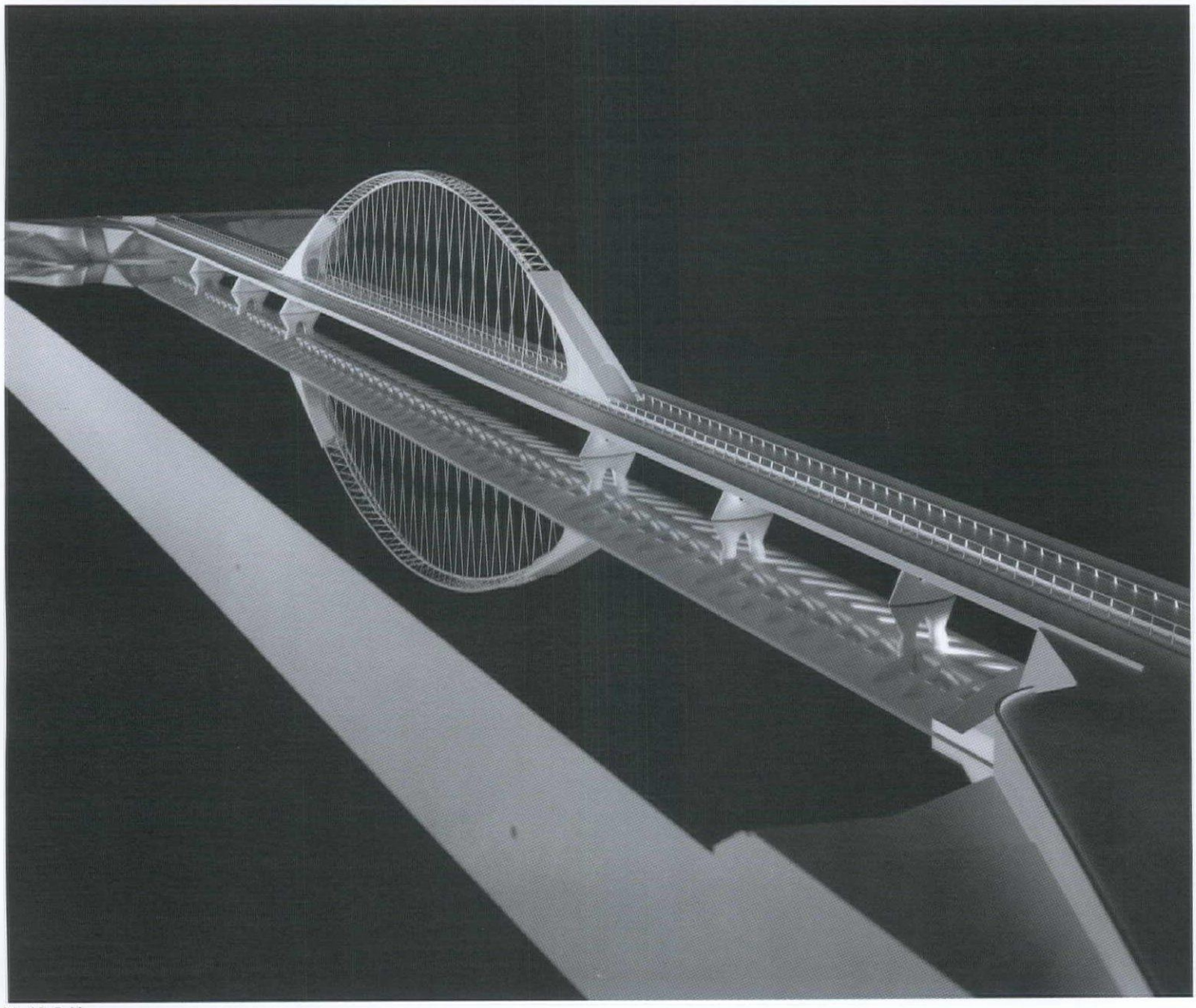
Merida Bridge
Spain, 1988-

The bridge in Merida spans the River Guadiana where it flows through the town of the same name. The riverbed is some 500 m wide, and the bridge's measurements are correspondingly generous. The bridge is located about 600 m downstream from a Roman bridge, and the resulting fusion of ancient and modern is most effective.

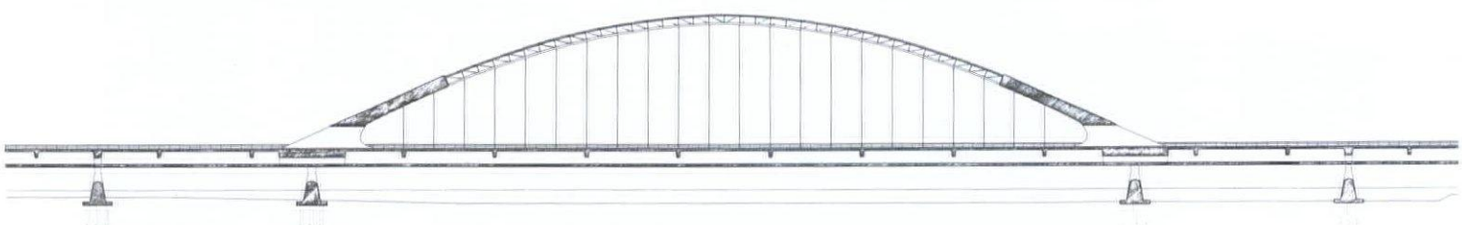
The challenge represented by the 2,000-year-old Roman structure is met by a rhythmic repetition of loadbearing elements in the three zones of the new bridge. The bridge is defined by a huge arch situated in the middle zone which spans 195 m. Pedestrians cross the bridge at a height of 1.5 m above the traffic by means of a 500 m long walkway.

Materials and dimensions: concrete (beams), steel (arch), total length 500 m, width 24 m, span of arch 195 m.



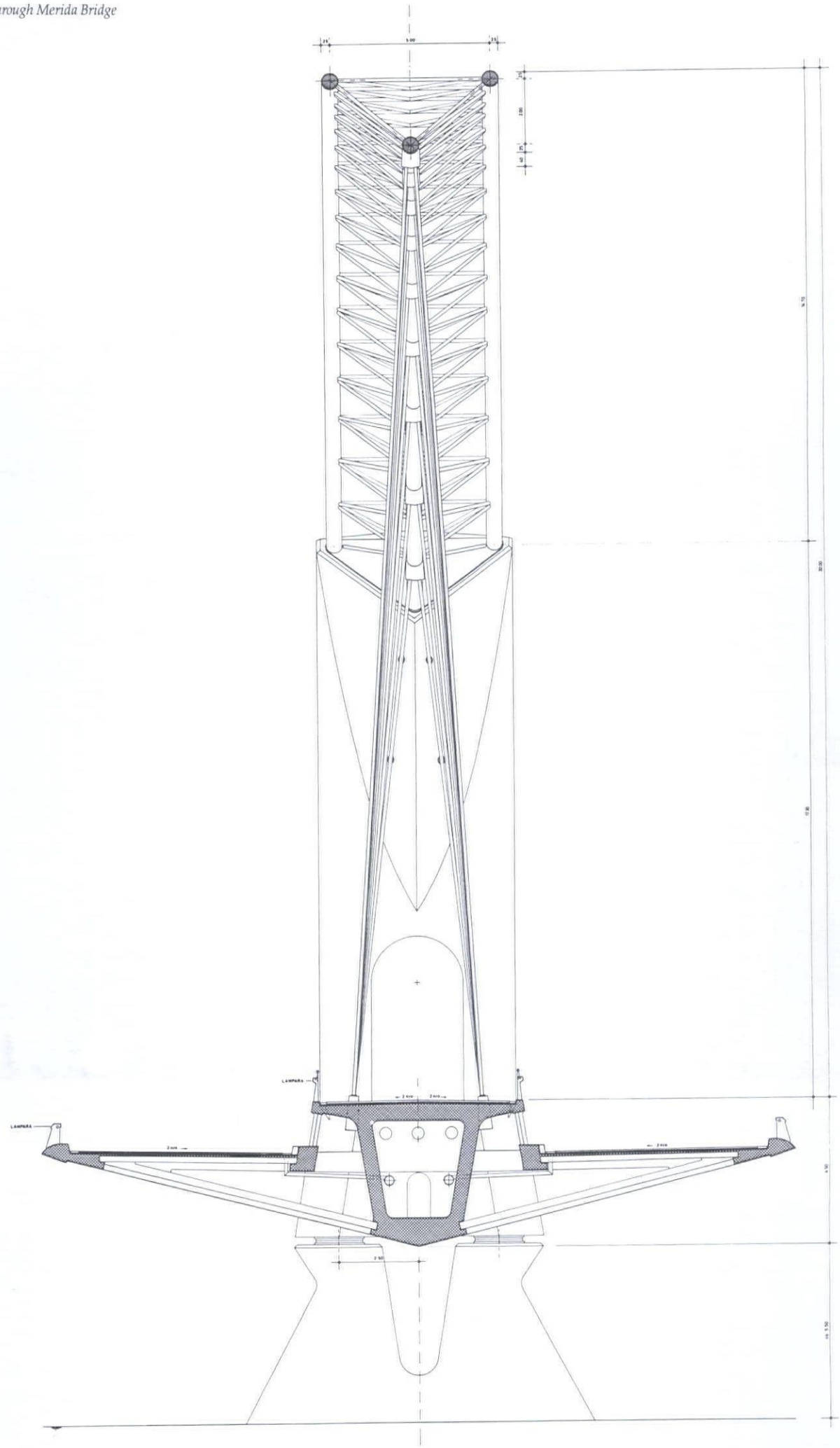


Merida Bridge



Merida Bridge: longitudinal section

Detail section through Merida Bridge



Bilbao Airport, Spain, 1991-

The Airport building at Bilbao is divided into two sections: the access zones and the terminal. The access zones comprise entry roads, a central park and parking areas. The terminal has the following levels: services/runway level; arrivals; departures; waiting areas and restaurant.

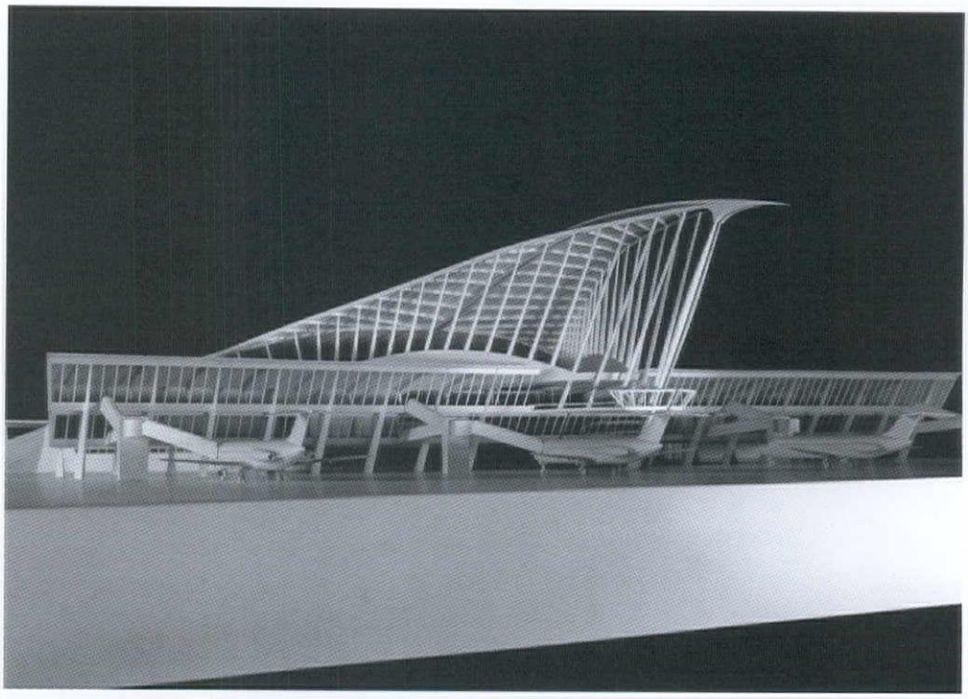
The building is integrated into a smooth slope in the direction of the main symmetrical axis, through a succession of different levels that go from the upper side of the park (57 m) to the services level (47 m). Throughout this 10 m slope, car parking is accommodated around the central park.

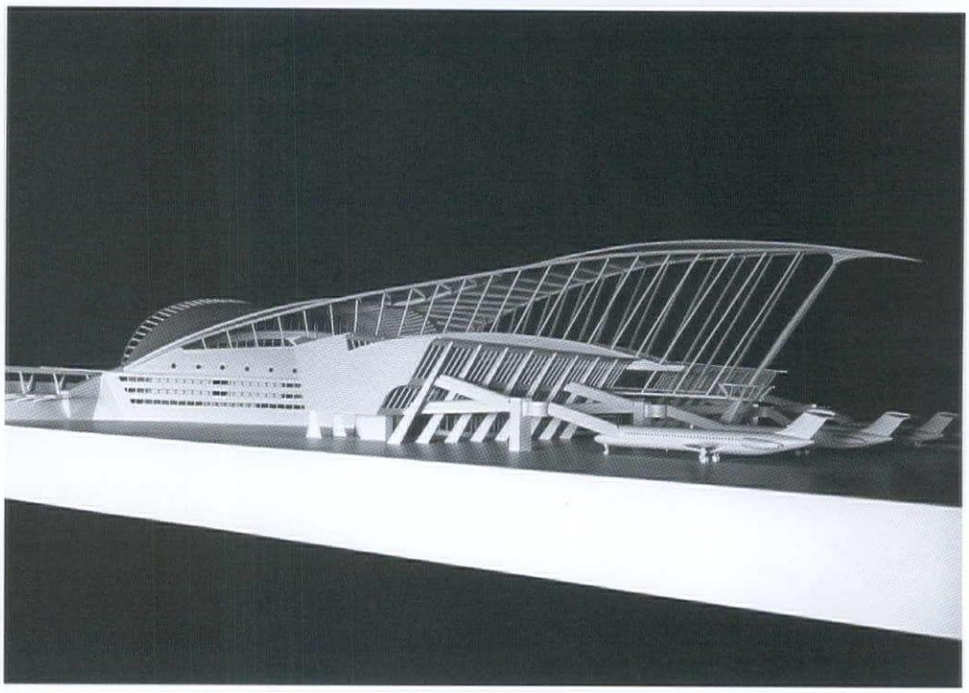
The terminal building has a compact volume and is divided into two different parts. The main building is structured on four levels. In this way, a superimposition of circulation routes is achieved, so that the traveller approaching the airport comes off the highway and orients towards its axial direction.

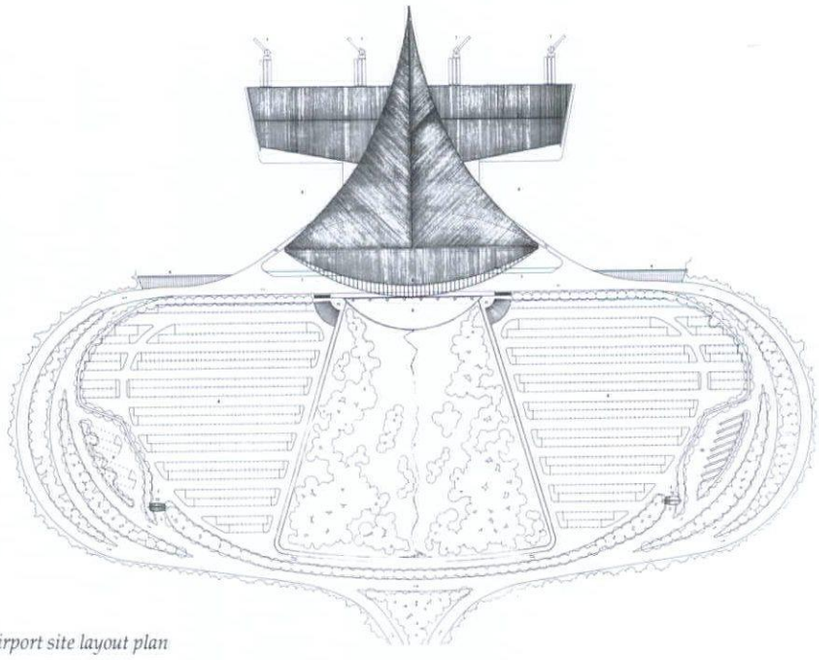
The waiting areas for arrivals and departures are located in lateral wings which have a domestic and international section. They are designed to allow for future expansion by increasing the number of "fingers" which will serve the growing number of passengers.

The structure is in concrete and steel. The concrete structure is used for the four levels of the terminal building, based on a system of beams and columns. This forms a stable statistical unit. Steel structures are used for the roofs and for the exterior façades of the terminal.

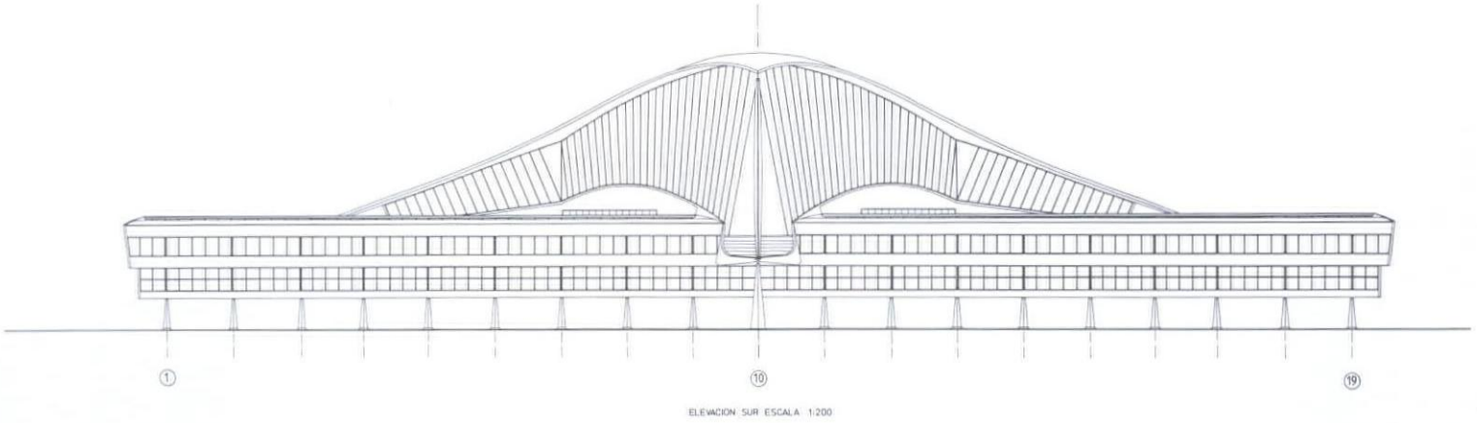
For the two lateral wings, the double cylindrical roof is formed by a series of steel ribs that are supported on longitudinal steel sections. These are supported on steel columns that follow the concrete structure of the lower levels. The concrete columns are on a 10 m grid and are 10 m high. Because of the transversal cut of the wingroofs, the front part of the roof is variable; the back is constant. The roof spans longitudinally in the direction of the cylinder, and the front façade is framed by steel members spaced on a 2.5 m grid. The façade is inclined outwards. The façade members themselves support the roof as well as the weight of the façades. They are supported by two concrete-bearing arcs that transmit the forces to the ground. The roof of the terminal building is a free form, with a pseudo-triangular plan, supported by the façade elements on its perimeter.





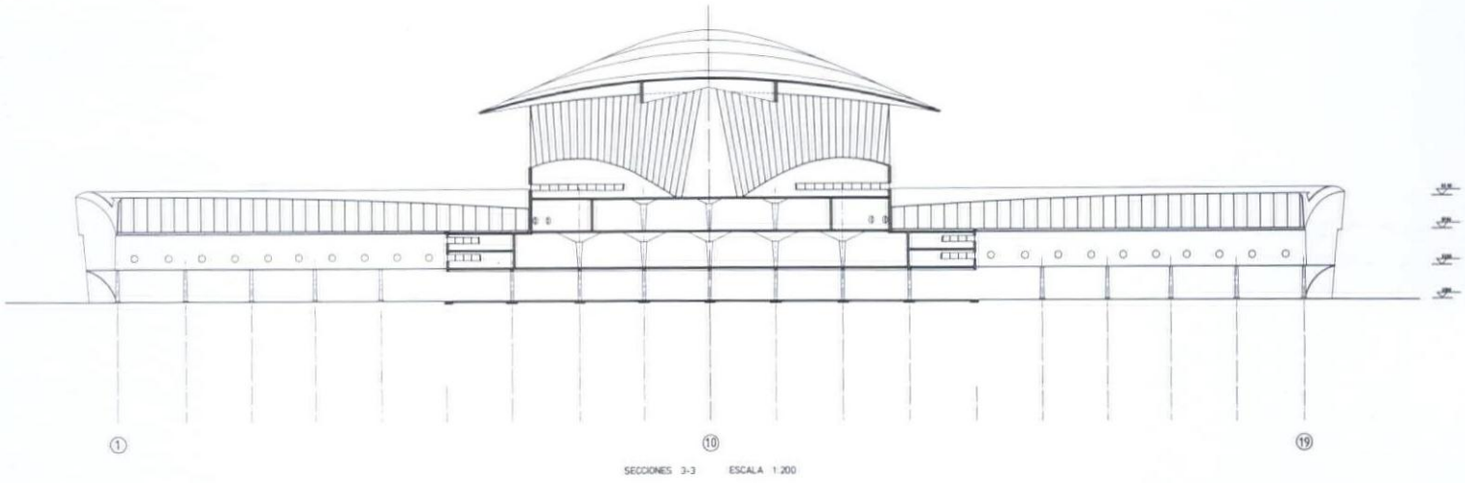


Bilbao Airport site layout plan



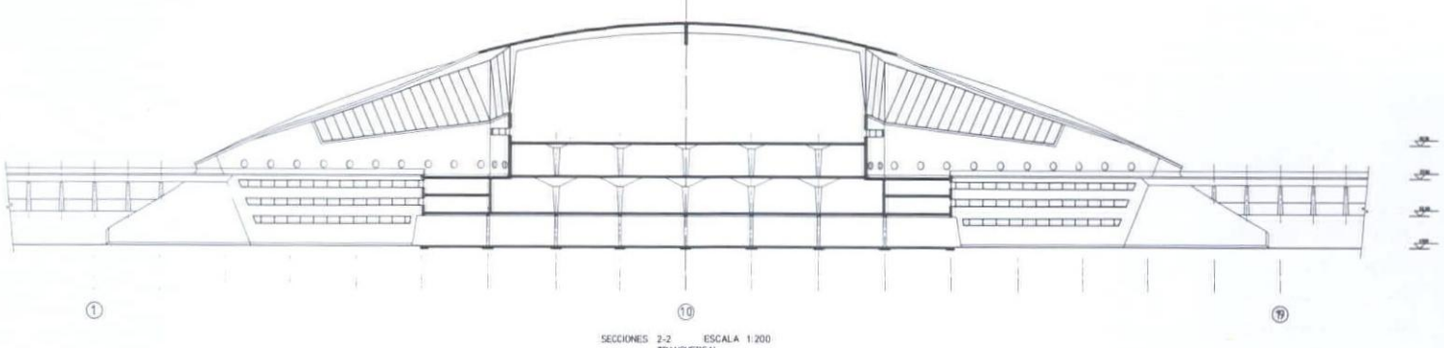
ELEVACION SUR ESCALA 1:200

Bilbao Airport: Elevation



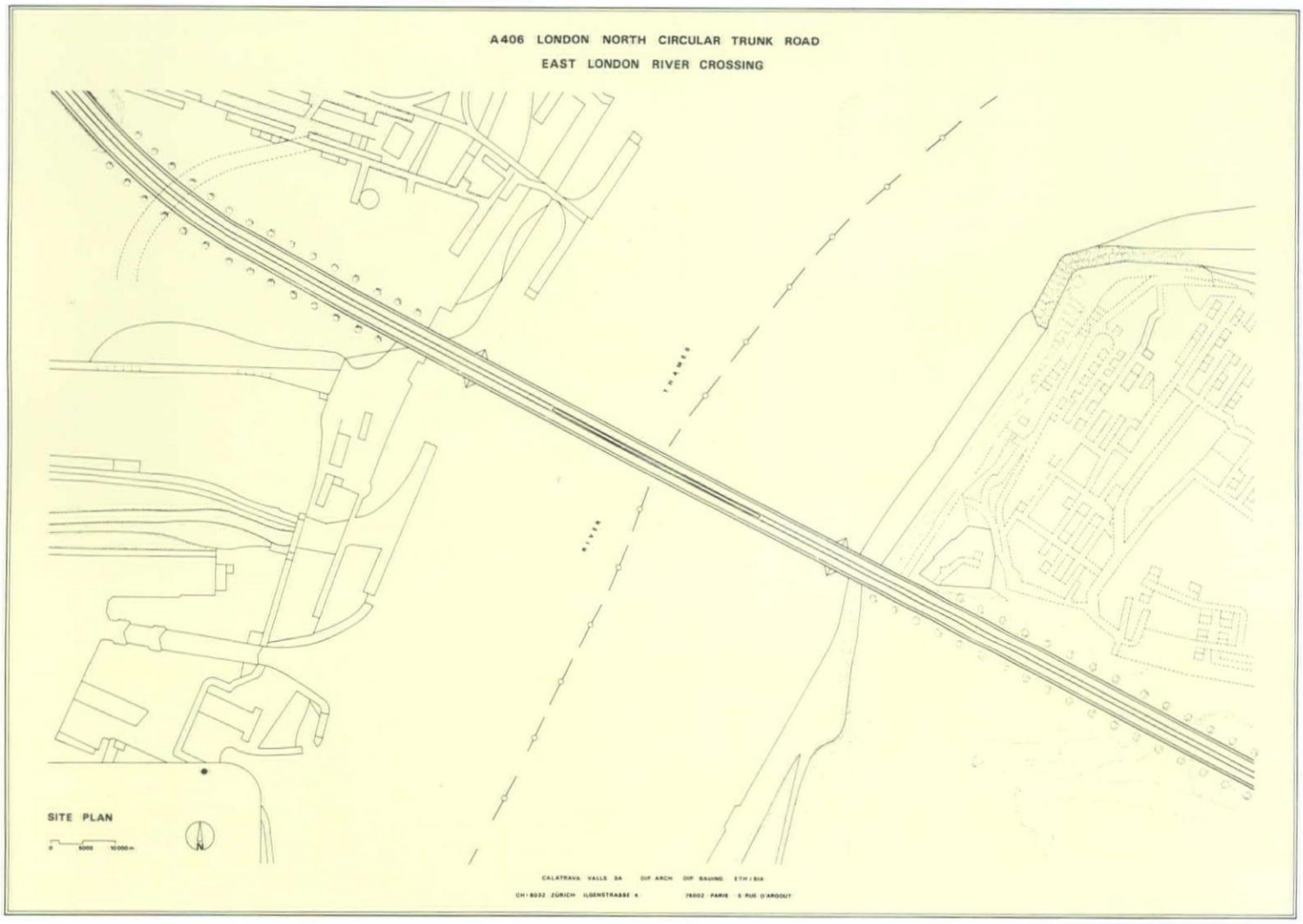
SECCIONES 3-3 ESCALA 1:200

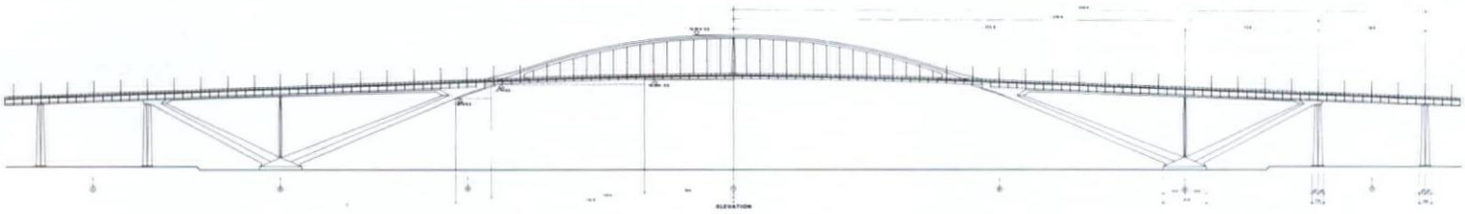
Section



SECCIONES 2-2 ESCALA 1:200
TRANSVERSAL

Transverse section





East London River Crossing Bridge, 1990-

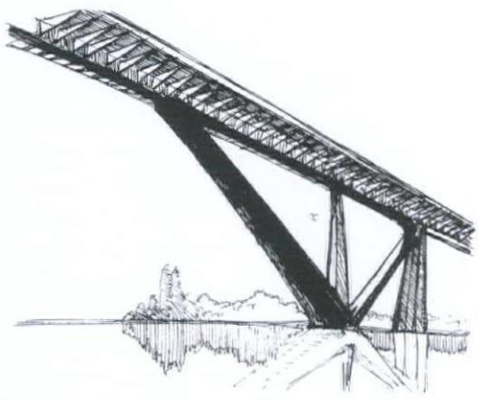
This will span the Thames to the east of the famous Royal Docks and London City Airport in East London.

The current design proposal from the Department of Transport is for a plain box girder solution. Stanhope Properties, having major development interests in London, believe along with many others that the box girder solution is inadequate and not worthy of this location. They therefore commissioned Santiago Calatrava to design a bridge within the tight air and shipping clearance constraints of the site as an alternative to that offered by the Department.

Calatrava's elegant solution, which has met with universal approval, solves those constraints and typifies his ability to create a stunning monument from a structure. The design comprises a central span of the tied arch type carried off triangular structures at each end, the whole forming an apparently continuous arch from bank to bank. The central tied span is some 240 m long, the total arch approximately 450 m and the bridge structure overall approximately 630 m.

The proposed design presents a smooth arched form which with its lightness and transparency provides a logical solution that will fully integrate with its surrounding landscape. Colour, lighting and detail will be studied in order to emphasise the relationship with the river and the surrounding areas.

The proposed design presents a technical challenge in respect of its location and surroundings. Functional solutions will be studied to respond to its user requirements, providing clear and efficient passage for pedestrians, cyclists and motor traffic and the form will be developed to respond to the urban requirements of its surroundings, bearing in mind the importance of the location.



The design envisages the use of steel throughout, although the side supports could be in concrete. The central section would be fabricated off-site and barge/lifted into position as a complete entity. The bridge will carry three lanes of highway across the river cantilevered on each side of the arch together with footpaths and cycleways. The outcome of a public enquiry into the bridge is expected shortly.

SANTIAGO CALATRAVA: A Biography

1951 Born in Valencia, Spain, 28 July.
1956-1961 Elementary school in Valencia.
1959-1960 Visited evening courses at the School for Arts and Crafts in Burgasot, Spain.
1961-1968 Secondary school and graduation in Valencia.
1968-1969 Art school in Valencia.
1969-1973 Studied architecture at the Escuela Technica Superior de Arquitectura de Valencia.
1973 Graduate work in urban studies in Valencia.
1975-1979 Studies civil engineering at the ETH Zurich.
1979-1981 Doctorate of Technical Science from the Architecture Dept, ETH Zurich; dissertation. "Concerning the foldability of frameworks."
Assistant at the Institute for Building Statics and Construction, ETH Zurich, Dept 1.
Assistant at the Institute for Plane Statics and Light Constructions, ETH Zurich, Dept 3.
1981- Own architecture and civil engineering office in Zurich.
1987- Member of the BSA (Union of Swiss architects).
1987 Auguste Perret Prize UIA (Union Internationale d'Architectes). Member of the International Academy of Architecture
1988 Art prize of the city of Barcelona for the bridge in Barcelona. Premio de la Asociacion de la prensa, Valencia.
1988 Awarded Internationale Vereinigung für Brückenbau und Hochbau prize, 1988
Fad prize Spain 1988
Award for "opinion/space/architecture"
Fritz Schumacher prize Germany 1988, for Städtebau Architektur/Ingenieurwesen
Fazlur Rahman Khan International Fellowship for Architecture in Engineering
1989 Honorary Member of BDA (Bund Deutscher Architekten)
1990 Médaille d'Argent de la Recherche et de la Technique, Paris Académie d'Architecture.
1991 European Holzleimbau-Preis, Munich.

Buildings, projects and competitions

1979 Bridge, Disentis project overall length 240 m, max span 102 m
1981 Züspa-Halle, Zurich competition: 7th prize
1982 Various prize-winning projects Switzerland Germany
1983 Jakem Stahlbau, Münchwilen/AG warehouse realized 1984
Ernsting's Miniladen GmbH, Coesfeld-Lette façade for new distribution centre competition: 1st prize realized 1985
Extension (with 5 bridges) of Stadelhofen railway station, Zurich competition: 1st Prize completed 1990
Städtische Verkehrsbetriebe St. Gallen public transport waiting room constructed 1985
Post office building (PTT), Luzern canopy constructed 1985
1984 Roofing of the new community assembly hall, Biasca/TI, project
Roofing project High School in Wohlen/AG constructed 1988
SBB (Swiss Federal Railway), Luzern portico and roof of the reception hall completed 1989
Steel construction and roof of the community centre, Bärenmatte, Suhr/AG constructed 1988
Henz AG and Dobi Inter AG office building in Suhr/AG "Rundhaus" constructed 1985
De Sede, Zurich Moveable exhibition pavillion
1985 Footbridge, Leirda competition overall length 150 m, max span 140 m
Bridge "Bach de Roda-Felipe II", Barcelona constructed 1987 overall length 180 m, max span 68 m
Footbridge Park & Ride, Feldenmoos grounds, Zurich not executed
Station square and bus waiting stand roofs, Luzern competition: 1st phase: 1st prize, 2nd phase (1986): 2nd prize
1986 Traffic signal, Barcelona span 22 m, 3 lights
Christofle, Paris cutlery and table accessories
De Sede, Zurich couch and chair
Blackbox AG, Zurich television studio completed in 1987
Remodelling of the Cabaret-Theatre "Tabourettli", Spalenhof, Basel completed in 1987
Entrance footbridge, staircase, pedestrian overpass competition for the city of Salzburg
1987 Bridge, Seville EXPO 92, under construction overall length 4200 m, one-sided span 220 m
Motorway bridge 9 d'octubre Valencia completed 1990 overall length 140 m, max span 7,2 m
Footbridge, Créteil, Paris constructed 1988 overall length 120 m, max span 68 m
Diagonal cable bridge, Pontewedra competition: 2nd prize one-sided span 180 m
BCE-Place: Gallery and Heritage Square, for BCE-Development Corporation Toronto under construction
Underground station, Bilbao competition
Banco Exterior SA, Zeltweg 63, Zurich remodelling
1988 Arcade bridge, Merida under construction span 220 m/completed 1990
Television tower, Barcelona competition
Bridge "Wettsteinbrücke", Basel not executed
Bridge "Austerlitz" Paris competition
Sport Centre for Schweiz. Bankverein, Geneva project
1989 Olympia Communication Tower, Barcelona under construction
42 terrace houses for PCW-Immobilien AG Ueberbauung Eibenweg-Buchenweg Würenlingen
Concrete-Pavillion for the fair "Swissbau 89" project
Restaurant "Bauschänzli" Zurich project
Bridge "Leimbach", Train-Station Leimbach over the river "Sihl", Zurich project; Bus-Station in St. Gallen
Communication and Alarm Centre in St. Gallen.
Remodelling of the University Building at Rämistrasse 74 in Zurich, library Project
Roofing project for a cloister in Muri
Reuss-Steg, pedestrian bridge over the river "Reuss" competition, 2. prize
TGV-Station and connection-gallery to the airport in Lyon Satolas competition, 1. prize, under construction. Concrete Pavillion, floating platform for the 700th anniversary of Switzerland project
Bridge "Miraflores" in Cordoba 130 m span, project.
Pedestrian bridge in Ripoll 65 m span, under construction. Junction in Barcelona Street- and bridge project
Exhibition project for a bridge in Bordeaux, France
1990 Bridge "Ondarroa" Bilbao, project
Bridge in Bilbao
Spitalfields, London Galleria and Cupola, project
Stanhope Properties, London Bridge over the river Thames, London project
Bridge "Nouveau Pont sur le Vecchio", Corsica Competition
Roof "Toiture Belluard", Fribourg Project
"Viaduc du Val" and insertion in urban context, Rennes Competition
Aeropuerto Bilbao, project
Music hall, Tenerife project

Exhibitions

1978 Department of architecture ETH Zurich Studentwork in Valencia
1985 Gallery Jamileh Weber, Zurich Sculptures
1985/86 Fundacio Joan Miro, Barcelona Sculptures and architecture
1986 Palma de Mallorca: Architecture
Gerona: Architecture Valencia: Architecture
1987 Participation to the "Triennale di Milano"
Darmstadt, Hannover, Stuttgart, Munich: Architecture; Museum of Architecture, Basle
1988 Barcelona: Gallery Sala Vinçon Furniture
Basle: Berowergut Riehen Sculptures, drawings, architecture
1989: Columbia University, Washington University, St. Louis, SOM Foundation, Chicago, University of Southern California, Cornell University.
1990 Royal Canadian Academy, Toronto, Canada
The Montreal, Canada
Centre Georges Pompidou (CCI), Paris
Cahill Building Centre Trust, London
IMPU, Barcelona Torre Montjuic
Forum of architecture, Zurich
1991 Design museum, Zurich Concrete Lodge 89
Finnish Museum of Architecture, Helsinki
GA Gallery, Tokyo, Japan
K2 Gallery, Osaka, Japan
Lyon-Satolas
Design museum, Zurich Touring exhibition

DESERT DIPLOMAT

The new Australian Chancery and Residence in Riyadh, Saudi Arabia, is a dedicated response to culture and climate. Australian architect Daryl Jackson explains his firm's approach to its design.

Daryl Jackson's new Australian Chancery and Residence in Saudi Arabia (above) forms parts of a tightly regulated diplomatic enclave on the edge of the desert, which reflects the desert architecture of "central Nadj". A two-storey high interior atrium (right) welcomes visitors to a public waiting area in a four-columned seating pit.

The modern city of Riyadh is founded upon the ancient oasis of the *Wadi Hanifah.* The mud-walled fortress attacked and won by Ibn Saud to establish Saudi Arabia and begin the progression of the new Kingdom towards its present state, remains resolutely intact alongside the more exotic richness of the gold buyers' souk. This fortress and others of its kind are symbolic of a regional desert architecture termed "central Nadj".

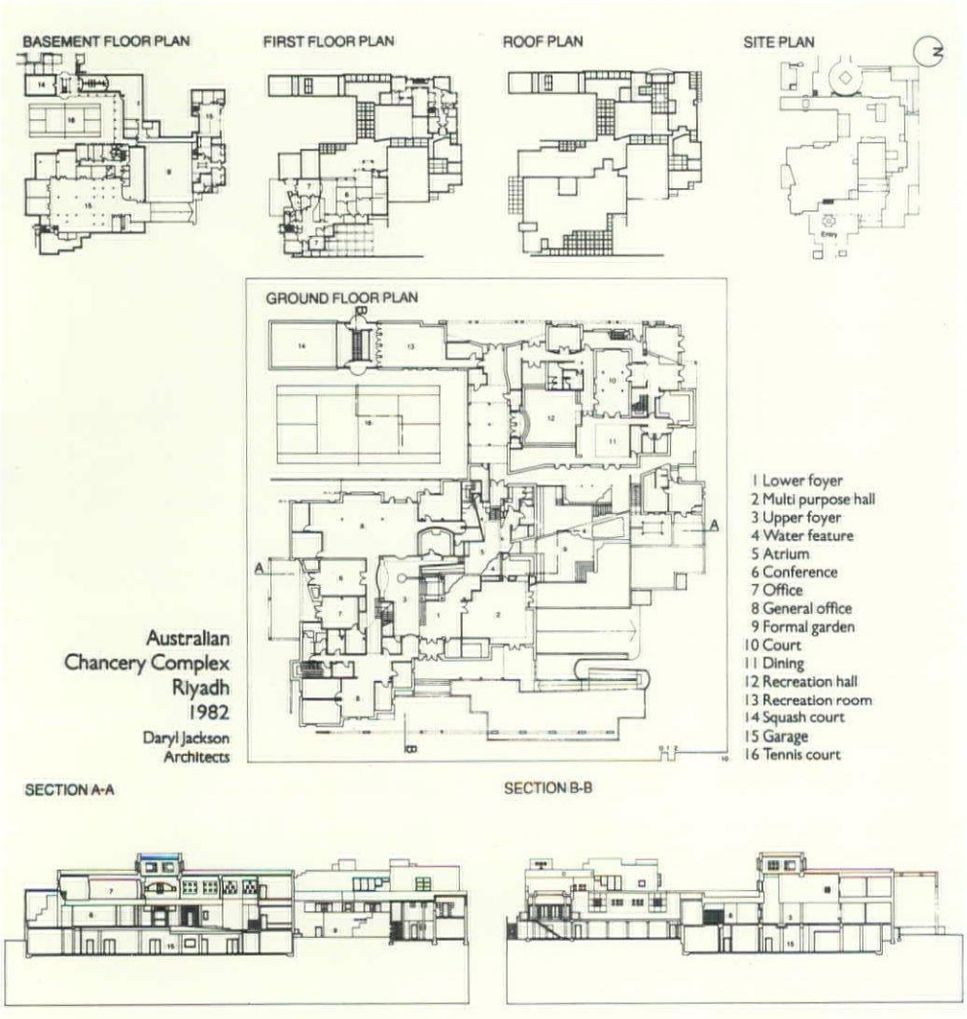
Since the 1960s there have been the customary additions of western-style hotels, banks and office blocks. Henning Larsen's Foreign Office more than balances such assaults, and, somewhat alone in the inner city transcends insensitivity and banality.

The Riyadh Diplomatic Quarter is set well apart from the city to project a new skyline and edge to the desert escarpment which overlooks one section of the verdant meander of the wadi below.

The Australian Chancery and Residence form part of an enclave of tightly regulated embassies, all of which were expected to reflect the regional essence of "central Nadj" architecture; historically created as planar mud brick, fortified walls and a cellular plan form which exploits the courtyard as both social entity (place of gathering) and climatic conditioner.

These planning rules for the Quarter were established in Germany by Speerplan and adopted by the Diplomatic Quarter planning agency. They react against the cutomary lightweight building technology introduced into Riyadh by western glass and steel (with the exception of the shade roof tensile structures); and demand a less self conscious "national" architectural representation than the unhappy Disneyland effect of such quarters in other modern capitals.

The Australian capital, Canberra, for instance, possesses an American embassy *pie a la mode* Williamsburg, a Chinese temple, a Rajasthani palace, a Mexican *hacienda,* and a displaced chip of Whitehall that must have travelled upper deck P & O. Fortunately, other countries have shown more restraint. The native Australian landscape and undulating topography just manages to hold on to any integrating idea



(Left) Plan and sections. (Below) Shaded swimming pool – Australians take their sports seriously. (Opposite page) Light and shade in interior spaces provide an intricate complexity of surface pattern, which is psychologically significant for residents forced to spend all day indoors because of the heat.

that Walter Burley Griffin (amongst others) once had about this suburban capital.

But Riyadh is not Canberra and a call to "central Nadj" may be addressed within the guidelines, without having to replicate the style or stifle intelligent and useful architectural response and idea. Our principal architectural plot resides in the expression of "the wall" as the primary enclosing element. The wall is folded to form a cubic mass from which hollowed out courtyards are removed. A protective interior maze with limited openings for light and access results from this decision.

Wall distinguished as metaphor

To ensure that the wall is distinguished as a metaphor for the region and the rules (and not as real), the east and west planes are "detached" to float free of the residual mass. Whilst this ensures that the expression form is made apparent, there is also the common sense cooling that derives early morning and late evening from the shadows such layering offers.

There are also opportunities to cut freely into this wall to establish arcades and that necessary sense of welcome that deep shading gives to structure in the white light of the desert.

The thermal principle of these loose walls resembles that of the free-floating outer garment or *Thobe* worn by the Arabs to provide an essential "cooled" layer of air that separates and insulates the body from the ambient heat.

Like all deserts, the climatic condition is extreme: days in excess of 45°C and freezing nights. North-south oriented courtyards cut into the building mass, work best when they are long and narrow, as well as deep, trapping the night air for as long as possible into the day. The cooling presence of water splashed into such outdoor rooms has long been known to Arab architects.

Shade and privacy

Further modifiers of climatic, religious and social considerations reside in the battened light filters (which were prefabricated in Perth of Australian Jarrah and shipped to Riyadh).

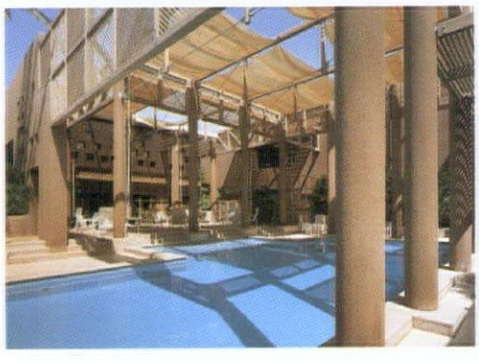
These offer shade and privacy, as well as the intricate complexity of the light of the sun changing the surface pattern of wall and floor throughout the day. For residents who spend most of their time indoors out of the heat this is a significant psychological factor.

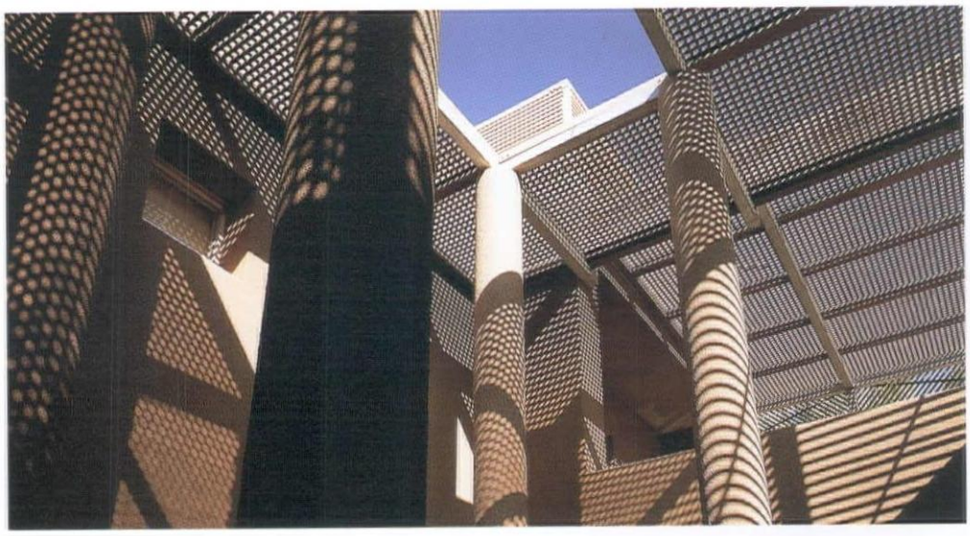
For these reasons the plan is deliberately assembled as a network of combined yet varied spaces: courtyards, blind alleys, exaggerated perspective through inclined walls; changes of level and volume; and the feeling of mystery sensed in a labyrinth.

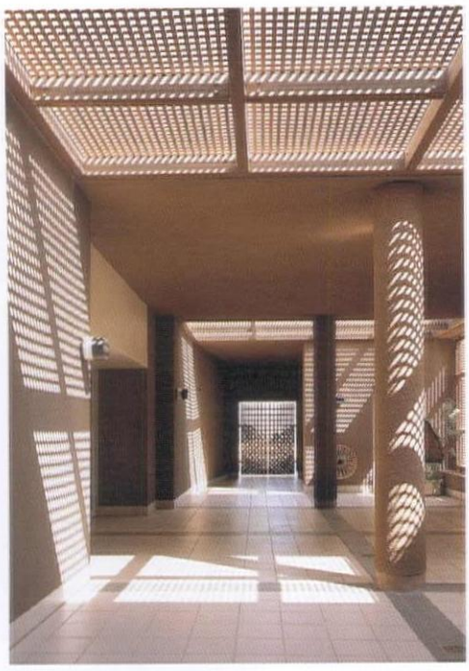
Predetermined and non-negotiable road entries on east and west to the Residence and Chancery respectively, are formal and respect the diplomatic custom/habit of arrival, greeting and introduction. But only just. Once inside, the sequence breaks down to offer a spatially orchestrated interior of intricate variety and shadowed vitality that one only experiences in the reality of a souk enclosure.

Within the Chancery, a two-storey high enclosed interior atrium, is the major reception room and foyer. Visitors may wait within a four-columned seating pit. Secure consular and official tasks are segregated on the upper level away from the more public trade and cultural exchanges witnessed in the reception hall, library and garden courtyard.

One corner of atrium edges away to allow the principal east-west passage (a verandah terrace) to connect to the Residence and to the recreation centre for

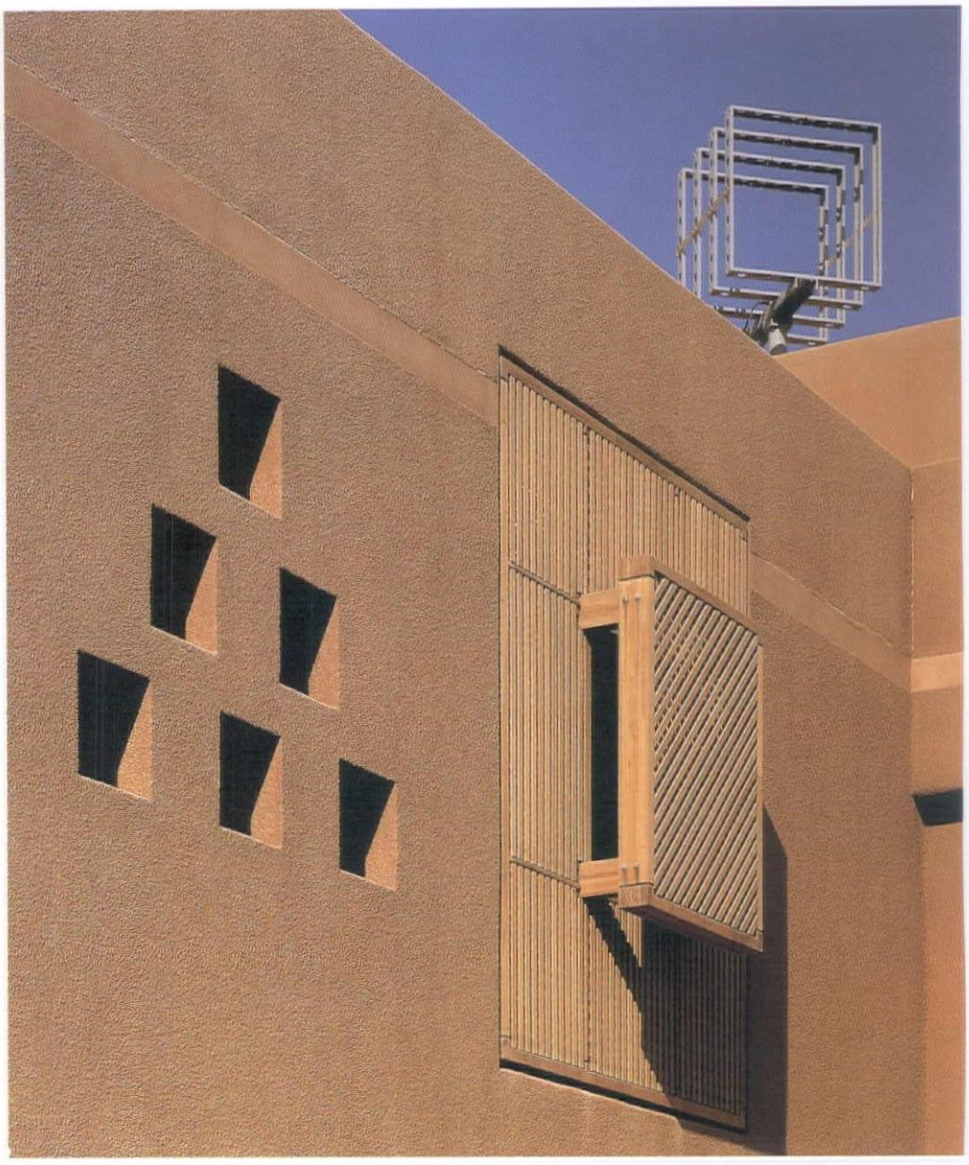






families and staff. In this case, the tennis court and shaded swimming pool (Australians generally take sports to be serious fun) both occupy courtyards. They are joined by the squash court and social club for embassy families. The south-east corner of the complex is the Residence and service quarters. Here, a series of double height open (yet batten roofed) courtyards define the territory and orient the enclosure system.

Solid walls, punched openings, flat roofs, broken cubist massing, controlled and condensed day lighting, the presence of fountains and Austrialian and Saudi desert plantings pursue an urban analogy that is both monumental and fragmented, friendly and formal.

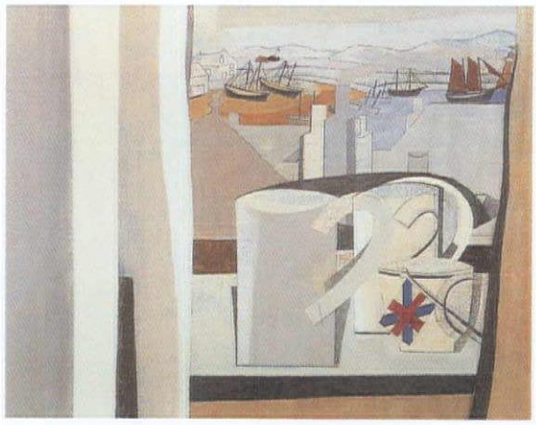


Condensed and taut forms

Like the buildings of the Nadj, a solid mass emerges and holds the ground line in place as a plinth. Forms are closed and condensed, taut and planar. One has to look within to find those more intimate spatial conditions which draw together the romantic yet difficult poetry of desert sand and starlit sky as well as the tenuous diplomacy of the engagement between a host and a visiting nation. □

(Left and above) Designing in a feeling of mystery sensed in a labyrinth with a network of combined yet varied spaces: courtyards, blind alleys, exaggerated perspective through inclined walls.

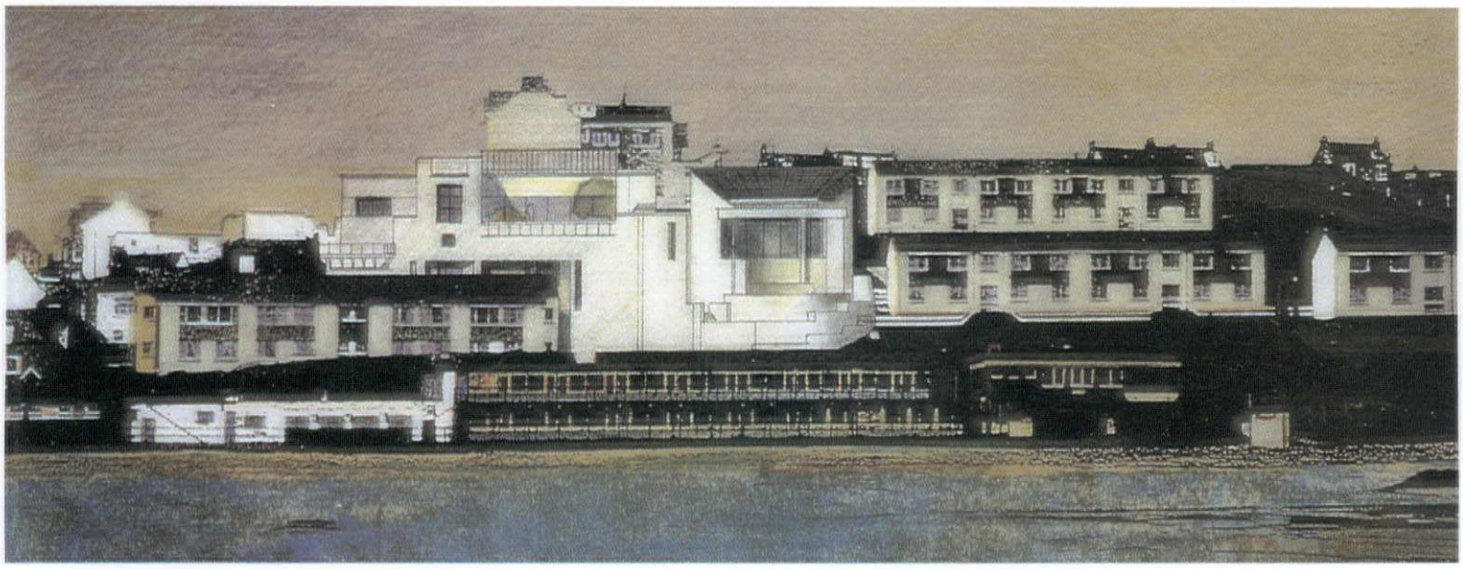
Australian architect Daryl Jackson is founding principal of Daryl Jackson International.



Ben Nicholson, St Ives 1943-45, oil on board.

THE TATE BY THE SEA

The new Tate Gallery at St Ives in Cornwall will provide an important new architectural landmark in a place which has been of major artistic importance since the nineteenth century. Here we introduce the project while, overleaf, architects Eldred Evans and David Shalev provide their own guide to a gallery with space, light and proportions which reflect the lives of St Ives artists.



(Above) View of the new St Ives Gallery from the sea.

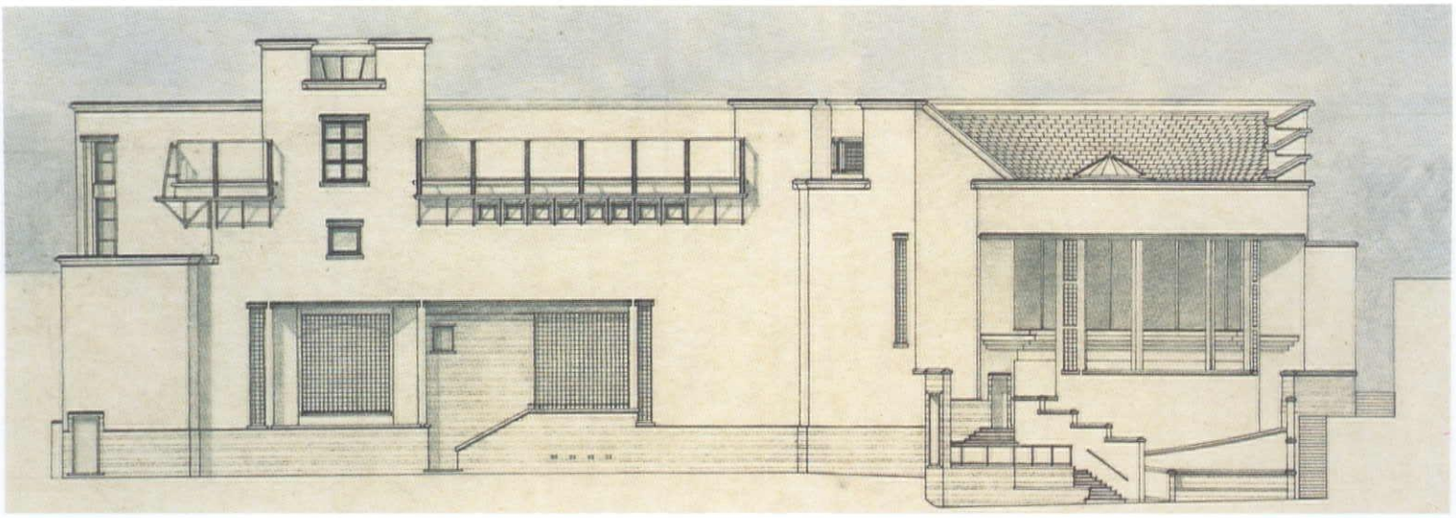
The design for the new Tate Gallery at St Ives, which will open late 1992 or early 1993, was won in competition by the London-based architects Eldred Evans and David Shalev in 1990. Their earlier Law Courts Building in Truro, Cornwall, completed in 1988, has been widely acknowledged as one of the best buildings in the area.

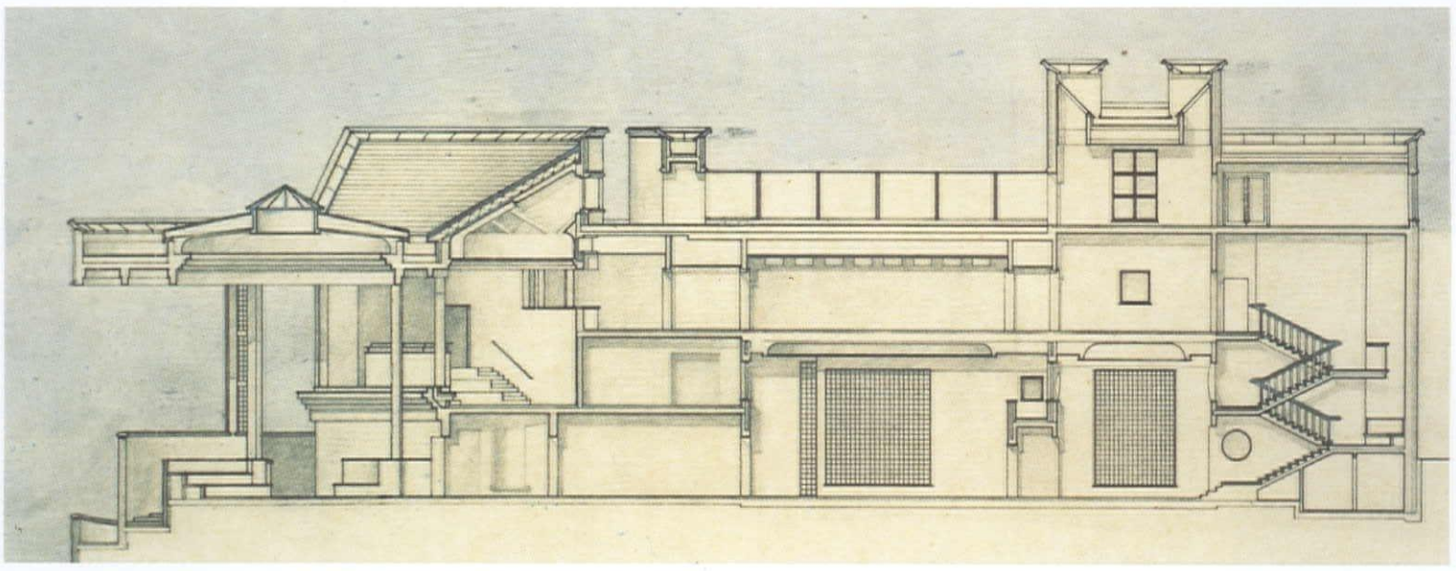
The new museum will be built by Cornwall County Council and work gets underway this year. When completed it will be leased out to the Tate Gallery, the main home of modern art in Britain, which was also responsible for opening the Barbara Hepworth Museum in St Ives in 1980.

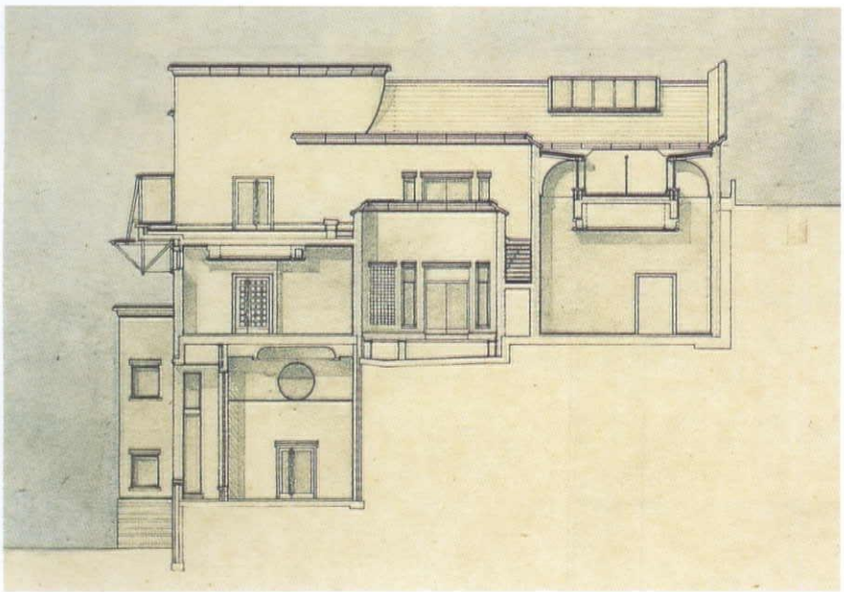
The total cost of the new Cornish building is estimated at just under £3 million, most of which has already been raised or promised, including a major grant from the European Regional Development Fund. More than £800,000 has been contributed from private sources.

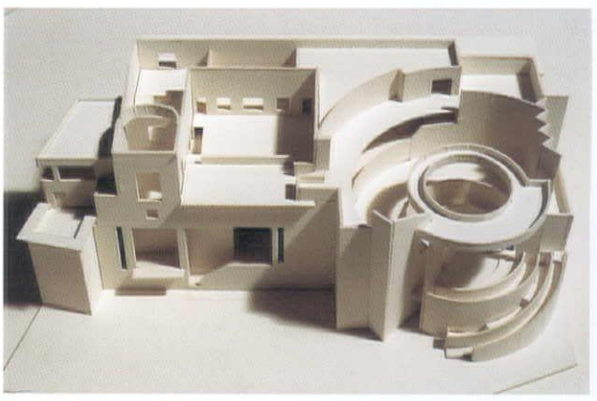
It is expected that the new gallery will be run in association with the Hepworth Museum and that it will reinforce the strong associations that already exist between the Tate Gallery and St Ives, which is an important creative centre for the arts.

It is envisaged that the new regional gallery will offer a changing selection of paintings as well as sculpture, drawings, prints, ceramics and archival material drawn from the main national collection. About 50 works will be on view in the new gallery areas designed by Evans and Shalev, including those of early British Modernists like Hepworth and Nicholson.







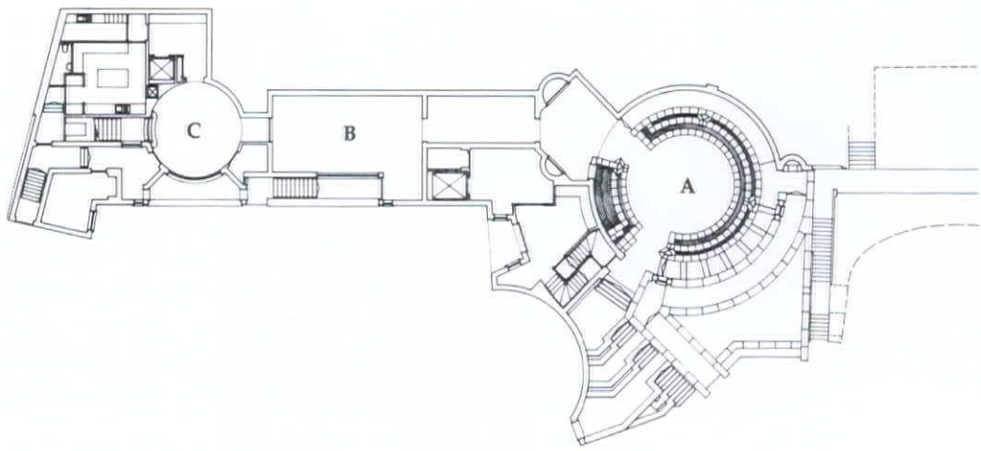


(Top) North elevation from the Bay; (centre) longitudinal section; (left) cross section; (above) architects' model.

Upper ground floor plan.

KEY

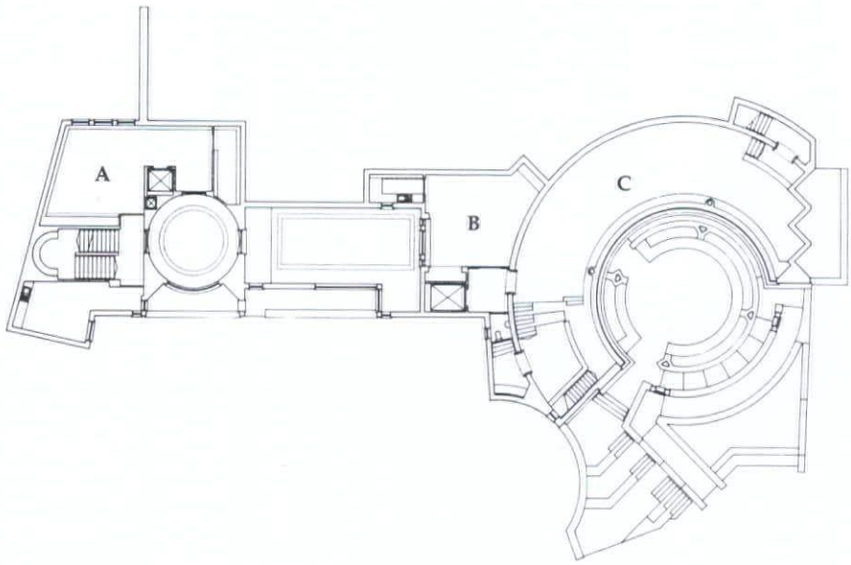
A - Loggia
B - Mall
C - Rotunda



First floor plan.

KEY

A - Bookshop
B - Education
C - Sculpture Gallery



ARCHITECTURAL APPROACH

The St Ives Tate Gallery will occupy a derelict, steeply falling, north facing site commanding Porthmeor Bay. It is designed to show works of art in the surroundings and atmosphere in which they were created.

The Gallery, comprising a number of studio-like daylit rooms, is perched on top of a sheer wall facing the bay. The sheltered undercroft is for the use of the town and provides (a perfect) space for theatrical, musical and other cultural events. The view from the restaurant, placed on the roof, extends over the rooftops of the town and its harbour, out to sea, along the horizon.

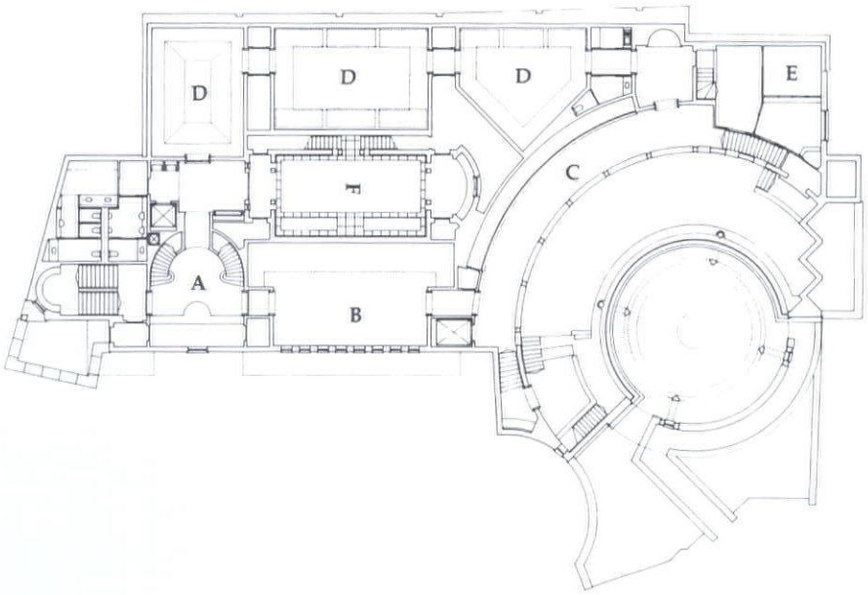
The building may be entered from below and above. The approach to the bottom entrance from Beach Road is via the loggia, a small amphitheatrical space, which forms, once in the building, the window to the Atlantic. The approach to the top entrance from the town is via the steeply rising narrow streets and alleyways onto the roof terrace. Once on the main Gallery level, the visitor follows a route through five rooms of differing scale proportions and light. The rooms are no larger than those of a St Ives artist – sparse in detail with silent floors and softly lit; the spaces allow the exhibits to come into their own.

The first low and elongated space lends itself to an introduction to the St Ives School. The bay is rediscovered from the circular space. Brightly lit, this largest space in the building will house sculpture by artists such as Hepworth, Gabo, Mitchell and Milne with ceramic work by Leach and his School, along the curved balcony. From here the route continues through the three main painting rooms with ever increasing height and light, showing painters such as Ben Nicholson, Bryan Wynter, Peter Lanyon, Patrick Heron, and many others.

A peaceful, protected courtyard, in the centre of the building, ends the tour – to relax, to reflect. Flexibility in use is achieved, not by creating a flexible anonymous structure, but by designing a set of unique rooms.

An important part of an art gallery is the facility to introduce children to the art world. To this end a small work/demonstration room is located en route, integrated but discreet. A bookshop is located on the way out. On the roof, as the deck of a ship about to set sail, is the restaurant, a place to visit at all times, whether or not one is visiting the Gallery.

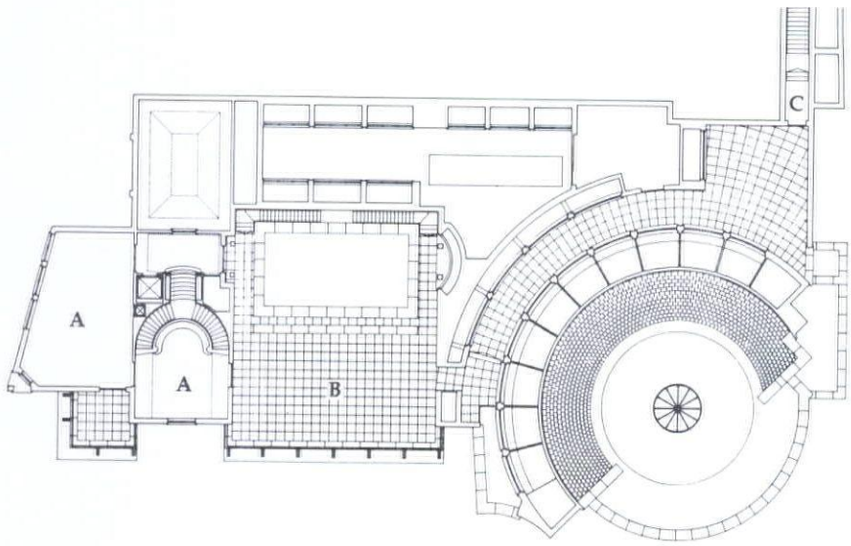
St Ives is a town of white walls, grey slate roof and small windows. So is the new building. The experience of visiting the Gallery ought to be a natural extension to visiting St Ives and thus provide some insight into the artists' inspirations and aspirations on this remote and magical island. □



Main gallery plan.

KEY

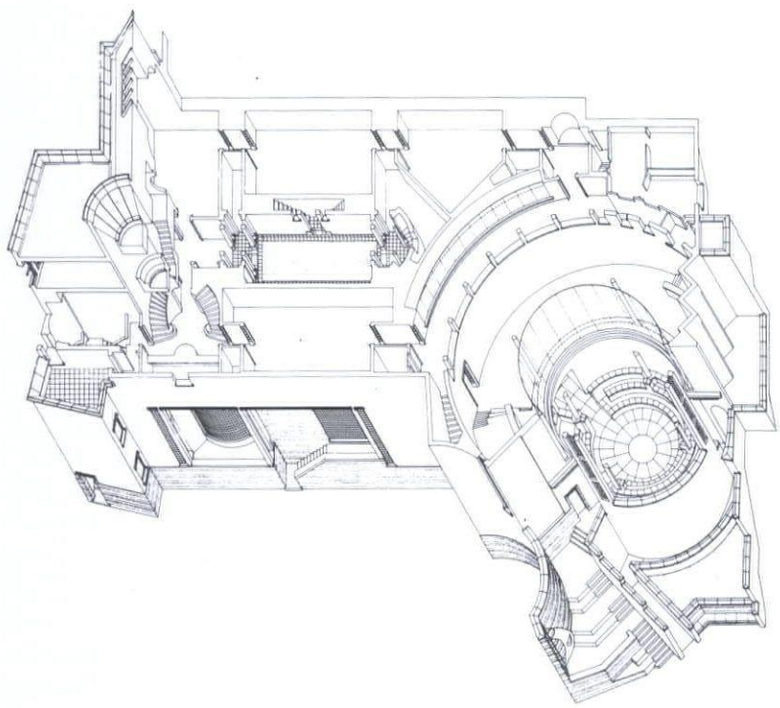
A - Main Entrance
B - Gallery Introduction
C - Ceramics
D - Paintings
E - Curator's Suite
F - Courtyard



Roof level plan.

KEY

A - Restaurant
B - Roof Terrace
C - Upper Level Entrance



Cutaway isometric view through the Gallery.

Klaus Maack, long-standing chairman of leading German lighting manufacturer Erco, is renowned for coaxing the highest quality modern design from practitioners in both architecture and product development. In the latest in World Architecture's *series of face-to-face interviews with exceptional clients, Jeremy Myerson gains an insight into Maack's methodology.*

TRUE BELIEVER

To the outsider, Erco Lighting has a carefully cultivated reputation for commissioning good modern design and architecture. Have you consciously steered policy in this way?

I know nothing about aesthetics but I do know about function. And I know that yellow triangles and pink squares don't improve the function. So Erco has always remained true to Modernist principles, even though I personally know a lot more Post-Modern architects – Hans Hollein, Jim Stirling, Charles Jencks – than modern ones. A lot of architects bring their clients to Erco at Ludenscheid. When they seek information on lighting, that's fine. But when they just use us as an example of a high-tech building style, I protest. We are not about style

Yet given your collaborations with such figures as Sir Norman Foster, it is inevitable that you will be regarded as the standard-bearer for a certain type of architecture.

I never though that Erco was about art. It is about a method: what is the best way to get the job done? But functionalism has to be redefined. It has been discredited. The Bauhaus and the Ulm School of Design have been too dogmatic. As soon as you are dogmatic about functionalism, it becomes less functional. At Erco, we don't say that ornament is a crime. But we don't like the misuse of decoration. We've actually produced some wonderful technical solutions – for example, the boardroom fittings in the Hong Kong and Shanghai Bank with decorative contours.

How did you become involved with Erco – and what is your own background?

I married the owner's daughter – what a way to forge a career! I have been with this

Klaus Maack of Erco Lighting (left) pursues a design policy which remains true to Modernist principles: "I don't know about aesthetics but I do know about function". (Right) Erco's new technical centre.

family firm for 28 years, and I've been chief executive for all but the first three years. But my love of modern design was there before Erco. I'm a printing engineer by background and I had an esoteric training in typography and graphic design, which may explain why I went to such lengths to contact Otl Aicher, designer of the acclaimed pictograms at the Munich Olympics, to create Erco's corporate identity.

Do you differentiate between design and architecture in the way you commission?
Product design involves mass production, so you must be much more cost-conscious, whereas architecture involves just one prototype. But I take the view that it is only possible to produce good work in both design and architecture if the client knows what he wants. I don't mean the client telling the designer that he wants grey marble on the floor. I mean developing a brief which tells the client what sort of architect or designer he should be commissioning.

Is this how you went about choosing the right architect for Erco's new technical centre building at Ludenscheid?
Yes, it was a logical process. I wrote a short brief in which I outlined what Erco expected from the architecture. The headline was "Erco needs an overall for engineers!" Overalls mean practical dress. If your car breaks down, you trust the person wearing the overalls to fix it more than if a man in a tuxedo turns up. I then made a shortlist of German architects, deliberately avoiding the shooting stars. If the architect was to become famous through our building, fine. But our building was not to become famous through the architect. I then removed the sinners from the shortlist – those who had done Post-Modern entrances, for example, and shown themselves to be in the *haute couture* business rather than overalls. There was nobody left to commission.

So what did you do then?
I noticed a Munich bakery published in a small magazine. The shots were just black and white but the bakery had the feeling of what I felt overalls should be like. The architect Uwe Kiessler was not on my original shortlist. I rang him and went to Munich to see his bakery. Maybe it was the smell of the cookies but I was seduced by his architecture. I then asked him to give Erco a lecture, describing ten buildings he hadn't built and why he liked them. These ranged from the Johnson Wax building to a Charles Eames house and a rose-growing farm in Lake Garda – very informative. Once he'd got the job, we collaborated well. If he became too flamboyant, I pulled him back, and *vice versa*. He once suggested painting the pipes for the compressed air into the workshops blue. I said: "Blue is a wonderful colour but not for us." The building cost just under DM 30 million, an inexpensive and successful project. I recommend Kiessler highly. Unusually for client and architect, we're still friends.

In a way, the Erco technical centre symbolises the progressive values of German industry generally. What is the current economic and political mood?
We must pay for reunification but the German economy is very stable and strong. There has actually been an economic boost from reunification. The building industry is doing well and German architects are busy. This is even though reconstruction in the East has not yet really started. So far it has largely been confined to painting and restoration, while they're still arguing about who owns the land.

Do you think the unification of Europe is now inevitable?
I anticipate a currency union in Europe by the year 2000. Erco is selling a pan-European product without cultural variations to suit national markets so, of course, I welcome it. I believe that Europe has a fantastic chance to integrate the old East European countries. Poland, Hungary and Czechoslovakia must be good

Erco's impressive new technical centre, designed by Uwe Kiessler, was conceived by Klaus Maack as "an overall for engineers".

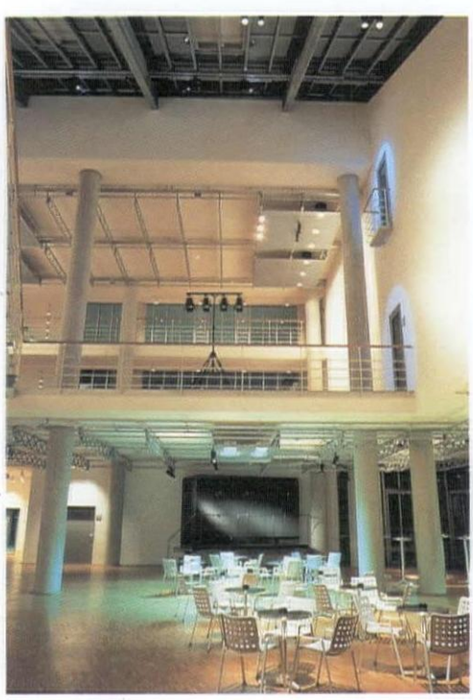
candidates. That is why we are currently giving a lot of lectures there. It is a cultural mission because they have no money for our products but we should at least let them know our world exists. They find some of our lighting projects unbelievable.

Your selection of product designers to work with has often been unconventional. We understand Mario Bellini was chosen because you both enjoy a Martini . . .

It's true that Bellini and I met in Frankfurt bar at midnight. It really was selection by Martini. But if you look at his Eclipse range of lighting, it is very different from his furniture. I think that is due to the very specific and detailed briefing we gave him. However we recently decided that most Italian designers are too flamboyant and fashionable for our needs. So we looked instead to Scandinavia. We are now working on a new range of light fittings by the Danish architect Knud Holscher, to be launched in April 1992.

What about your much-documented collaboration with the British architect Roy Fleetwood, designer of your Axis and Gantry ranges?

I knew Roy through his work on the Hong Kong and Shanghai Bank. When he started his own office, I went to see him in London with a problem I had perceived: how to span large spaces such as atria with light. That's my job at Erco: the problem perceiver. We turned to Roy again for our latest product Emanon. He has a marvellous talent at combining an orderly resolution of technical problems with an awareness of what is tolerable visually in a space.



What is your general opinion of how architects understand the use of lighting in their buildings?

Architects are starting to redevelop their knowledge of the effect of daylight. There has been a renaissance in this area, aided by such developments as better glass. But their expertise in handling artificial light is still not highly developed. They still can't grasp the concept of the light fitting as a tool to distribute light rather than a glitzy object in its own right. Clients will admit they are ignorant but architects won't.

There must surely be some exceptions to the rule?

Hans Hollein really understands lighting. We are designing a fixture for him at his new modern art museum in Frankfurt – a fluorescent wallwasher, which is difficult and unusual in a museum but he wanted it. He had good reasons. In fact he has a very sensible way of talking about lighting. This is a very rare quality among architects. Hollein's architecture may be very shape-oriented and formalistic, and I wouldn't like to live in it. But in terms of lighting he is a pure functionalist and I respect him for it.

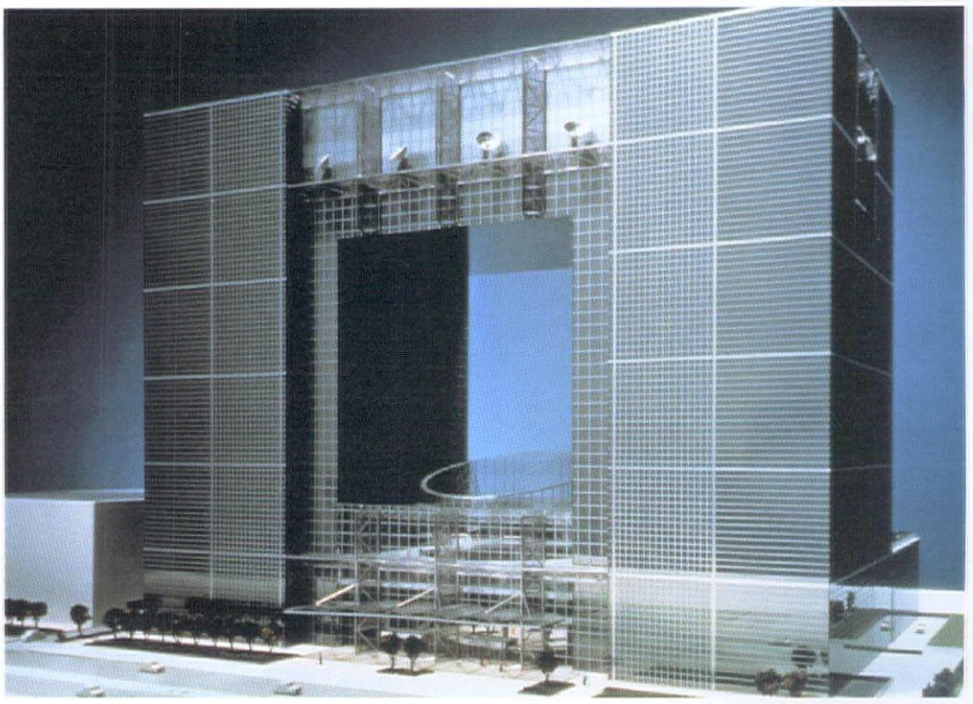
What aspects of the future most preoccupy you?

Erco has 1,200 people worldwide and a turnover of more than DM 200 million. We're now conducting a research programme into future logistics, analysing what it would take to shorten our delivery times to just 24 hours. It would mean redesigning our computer systems, shelving technology, transport, in fact our entire factory process. But it could happen so it must be addressed.

Will product development initiatives continue to spring from within Erco?

In 28 years I have never received an external proposal from a designer which I wanted to discuss further. A company should know the technical and commercial parameters of its own business better than any outsider. Maybe you could sell a new design idea to a glasswares or cutlery company. But lighting is so complicated. So if designers write to us, just tell us what you have designed for others, a brilliant new hand drill, for example. Don't try to tell us how to run our own lighting business. □

Diverse projects from HOK. (Right) Tokyo Telecom Centre, set to be the focus of the 1995 Telecom Expo. The practice is working with Japanese firm Nippon Sogo Architects and providing landscape, atrium and interior design. (Below) Scheme for Latter Day Saints Temple, Missouri, USA, inspired by the curves of a seashell. The spire peaks at 340 ft. (Below) Renovation of St Louis Union Station to add leisure dimension: will the grand railway stations of eastern Europe also get the HOK treatment?



INTO EUROPE

American multi-disciplinary architectural practice HOK is about to make its move into continental Europe as part of a longterm programme of international expansion. In the latest in World Architecture's *practice management series, Jeremy Myerson looks at how it aims to achieve its goal at a time of great uncertainty.*

One of the hardest aspects of managing an architectural practice is knowing when and how to expand into new international markets. Marked differences in culture, construction techniques and contracts can leave even the best-organised and most sensitive design firms groping around on alien territory looking uncomfortably like crass interlopers.

For the architectural outsider looking to expand into mainland Europe, the problems are magnified by the current state of political, economic and social flux, as the move to market privatisation and divergence in the east is counterbalanced by trade convergence in western Europe.

Major feasability study

But this has not deterred a number of the larger American architectural practices from assessing the prospects and practicalities of winning work there. Among them, Hellmuth Obata and Kassabaum, better known as HOK, has just carried out a major feasibility study into the European architectural market and is set to make its move into Germany and Spain as a result of its findings.

HOK recently appointed one of its senior managing architects, Larry Self, to spearhead this operation as executive director of HOK Europe. Self divides the world market for architecture into three core segments: the Americas, Pacific Rim and Europe. HOK, which has 1,100 employees worldwide and fee income in excess of US $ 100 million, already has a substantial presence in the first two. A foothold in the third would consolidate its multi-disciplinary design network which includes engineering, planning, landscaping and interior design as well as architecture, says Self.

HOK's international expansion has been almost a textbook example of practice management. Founded by its three principals in 1955, the firm prudently expanded from its base in the mid-west to build a strong American network with offices in St Louis, Kansas City, Dallas, New York, Washington, Tampa Florida, San Francisco and Los Angeles before venturing overseas in response to demand from multinational US clients.

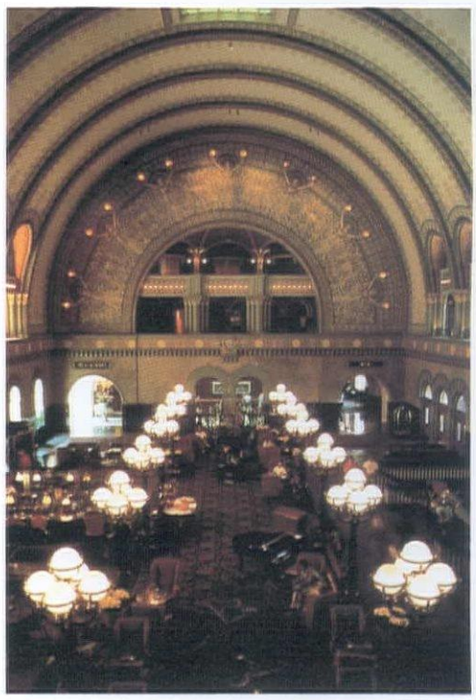
Its first foreign office was established in Hong Kong in 1986, followed by London (1988) and Tokyo (1991). With projects in motion all over the world, HOK regards London as the springboard into mainland Europe. Larry Self has based himself in Britain for the next three to five years to supervise the task.

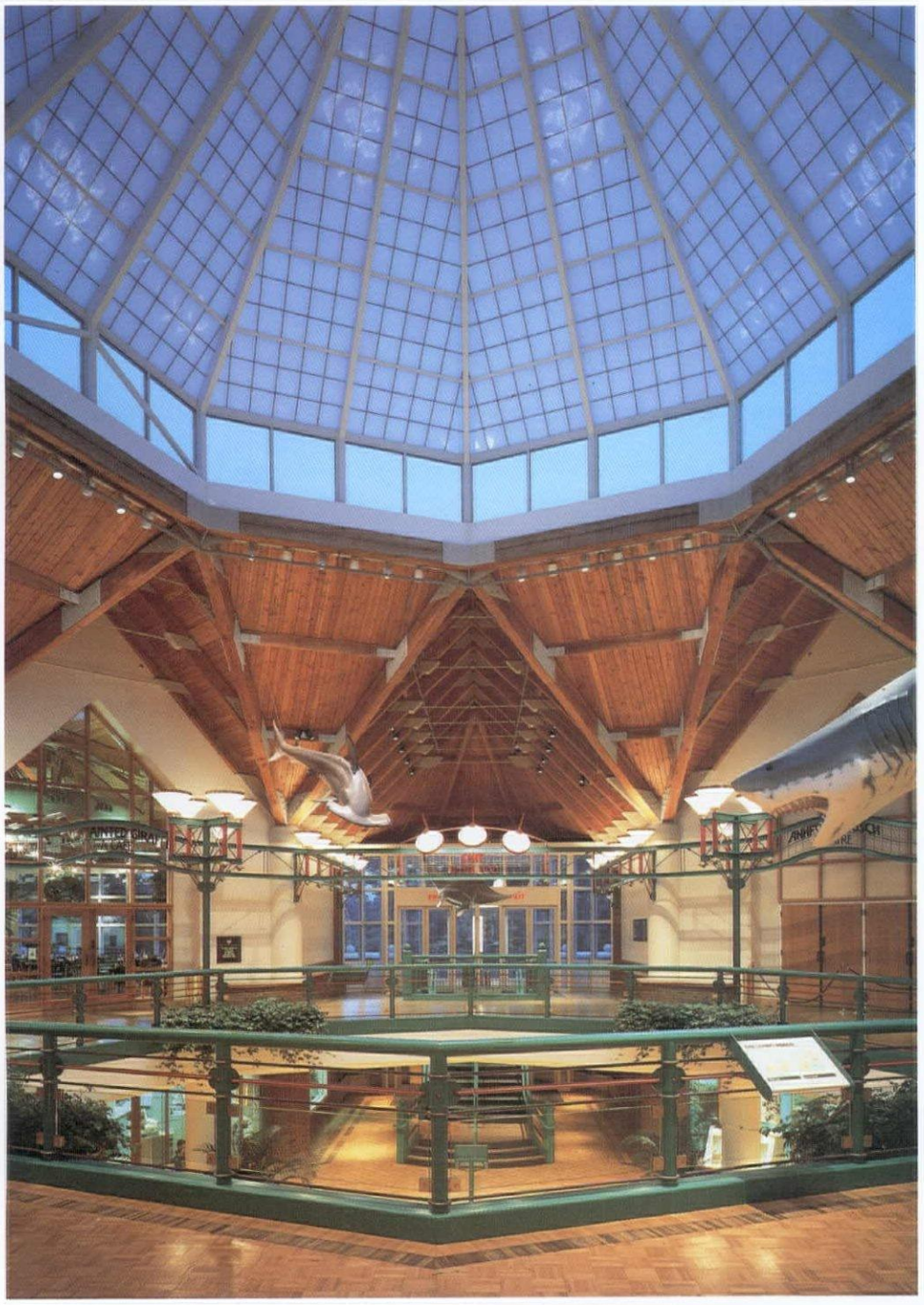
Blending into local culture

"We don't want to be the big Americans setting up overseas outposts", explains Self. "Our design philosophy is based on understanding the client to create responsive architecture. We want to blend into local culture and solve local problems. The majority of people in our London office are British. HOK in Germany will be German in character."

Research among builders, developers, architects and engineers confirmed Germany as the most receptive market for HOK to start its European operations. "The Wall has come down, the economy is strong, it is a land of opportunity", says Self. But HOK doesn't anticipate rich pickings in West Germany where local competition is highly sophisticated; the firm is more interested in Germany's position as a gateway to the emerging markets of Eastern Europe.

For that reason Berlin has now overtaken





Frankfurt as the favourite city in which to set up an HOK office. Self shrugs off doubts over the ability of Eastern Europe to develop sufficient economic infrastructure to pay for development within the next 20 years. "The need is unparalleled. The entrepreneurs exist. And where there is need and entrepreneurship, the need will get filled. It is just a matter of time and we'll be there when it happens."

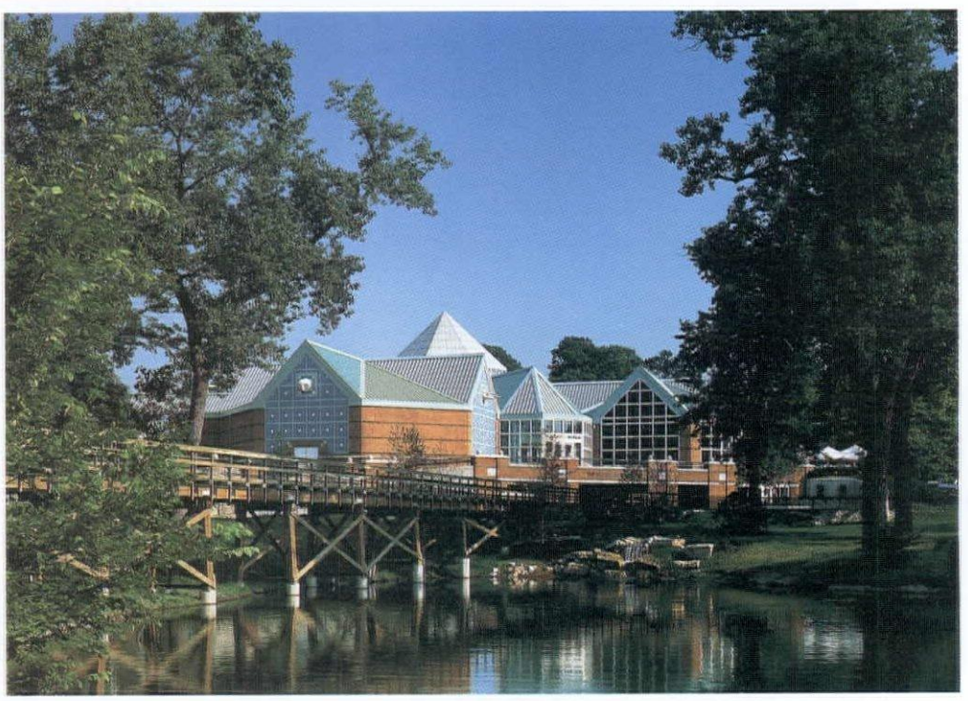
Grand station refurbishment

HOK is already in the running for a masterplanning role for a new East German technology park. Larry Self also sees design opportunities in the grand railway stations of Eastern Europe which could be adapted, he says, to incorporate retail and leisure facilities. "They are great spaces", he remarks, adding that a recent competition to restore Budapest's Western Railway Station gives a hint of things to come.

HOK has extensive experience in this area: one of its landmark projects is the renovation of the 1894 St Louis Union Station in Missouri to incorporate retail, entertainment and hotel facilities.

Spain is second on HOK's list, although the firm has to date completed less projects there than Germany. Self cites the projected rate of economic growth and the positive business atmosphere as reasons to move

(Above and right) The Living World visitor education centre, St Louis Zoo, Missouri, USA: multi-faceted, geometric design incorporates many facets of the animal kingdom and reduces the building's apparent scale to harmonise with natural surroundings.



into Spain. "It has started from such a low economic point that there is a lot of ground to be made up", he explains. As in Germany, HOK will pursue a strategy of linking up with a local architect, either through acquisition or merger.

France remains a lesser priority for HOK, although there is substantial US investment there in mixed use development, an HOK speciality, and the firm is currently looking at two French projects with a French-American client on publicly owned land. "Euro-Disney will spawn some more growth in that area," suggests Self.

He joined HOK 23 years ago when it had just one office in St Louis. So is he surprised at the subsequent rate of expansion? "We don't expand just to expand. We're not growth happy and every move has been different. There is no single strategy", he explains. "Our response has been to clients needing us there in new markets."

Room to move up

One of the benefits of overseas offices, he says, is that "it allows talented young staff in the organisation to move up and grasp new opportunities. HOK is built on the ethos of team design. We leave our egos outside and focus on client needs. There are no dogmas or dictates in our style of design. For instance, we never went big on Post-Modernism".

Indeed, HOK's portfolio immediately suggests a plurality of standpoint. Given the range of tasks which the firm undertakes, that is not unwise. Projects range in scale and character from a 1 million sq ft Telecom Centre in Tokyo scheduled to be the focus of the 1995 Telecom Expo to the engaging Living World exhibit at St Louis Zoo, completed in 1989.

Corporate office blocks such as Iowa's 801 Grand Avenue in Des Moines jostle with such delicate designs as a Missouri church inspired by the spirals of a seashell. There is also an extensive track record in sports facilities.

"We have a design discipline board which meets twice a year to review HOK projects and check the pulse of the practice", says Larry Self.

HOK's international development has not been all plain sailing, however. London was a buoyant market when the firm made its move in 1988. Since then, recession has taken its toll on the architectural scene and such schemes as Londondome – a new arena in Royal Victoria Docks – have gone on hold.

British Petroleum group headquarters, Finsbury Circus, London: space planning and full-service interior design for 200,000 sq ft facility. Projects of this kind provide a ray of hope on depressed UK scene.

Restoring Lutyens building

Larry Self sees the spate of interior refits caused by corporate relocation as "the only ray of hope" at present in Britain. HOK's stylish new scheme for British Petroleum in an historic Finsbury Circus building designed by Sir Edwin Lutyens is an example of such work.

But the London experience will have done much to pitch expectation for future European expansion on a realistic level. "We know it will take two years before any return on our move into continental Europe", says Self. "But we are willing to make the investment in time and money." □

INTERNATIONAL FORUM OF YOUNG ARCHITECTS PUBLICATION

The International Forum of Young Architects is a worldwide organisation for joint professional activities aiming at the stimulation and promotion of avant-garde trends, concepts and projects in the field of architecture.

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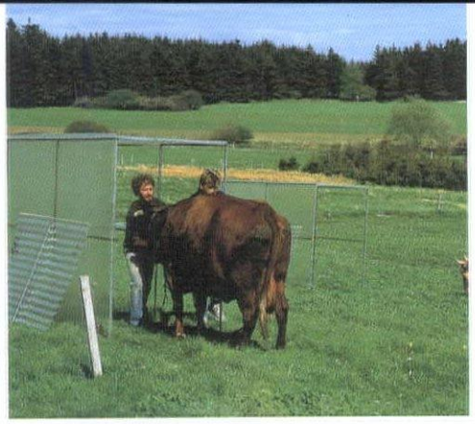
FORMALHAUT

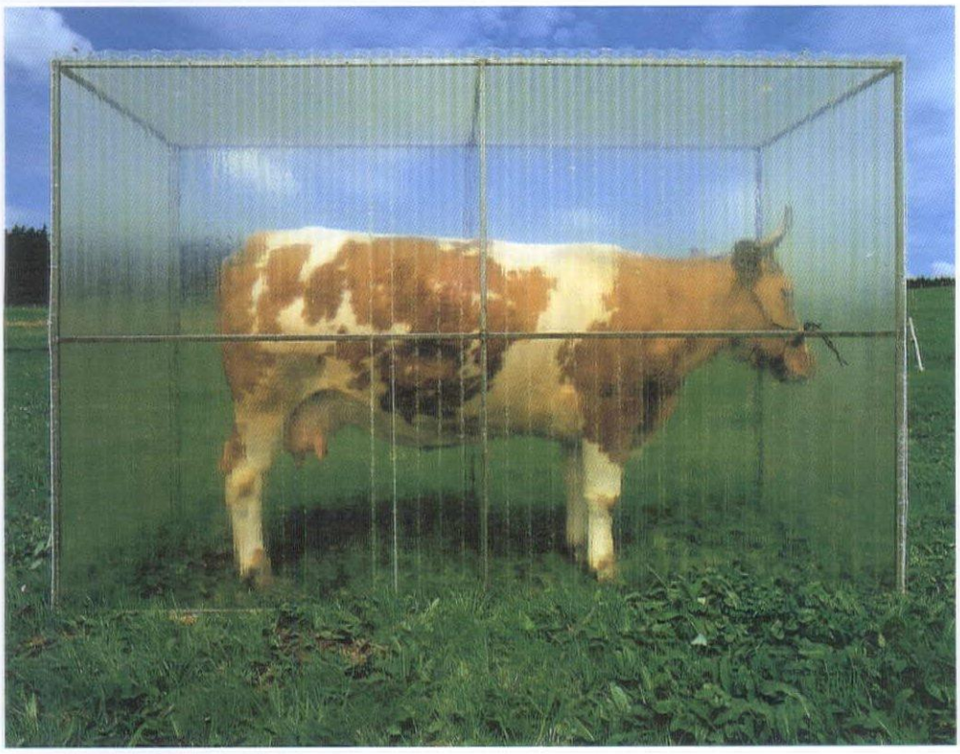
Conceptual Games with Norms and Forms

Architects Gabriela Seifert and Goetz Stöeckmann, and sculptor Ottmar Hoerl founded the group Formalhaut in Frankfurt in 1985. Their intention was to research the "formal" statements of "skins" (haut). These should be understood here as membranes or interfaces of expression between the different realms: individual and social, sensual and speculative, artificial and natural.

The work of this team is concentrated primarily on temporary installations that stimulate the cross-locking, mixed-media and interdisciplinary approaches in every joint project concept. In this publication, alongside the presentation of the team's latest projects, Peter Cook of the Bartlett School of Architecture explores the professional ideology and cultural background of Formalhaut in an interview with its founders.



Teddy bears peddling condensed milk from lush alpine meadows, purple cows standing for a famous brand of Swiss chocolate . . . The "Cow Product" was carried out on a fallow meadow in Vogelsberg, 1986. In a momentary constellation the movements of the animals were frozen by wrapping them in semi-transparent shells.



FORMALHAUT
interviewed by Peter Cook

Peter Cook: Emotionally, culturally and intellectually, we love the idea of architects and artists working together continually. But let's be specific. Would the artefacts you have created been as they are without this mix of backgrounds?

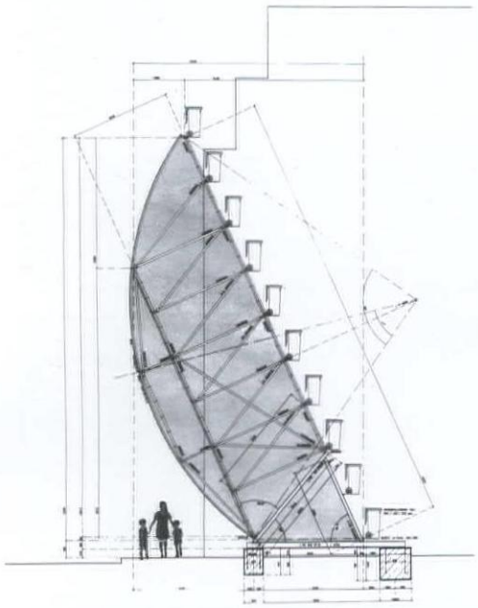
Ottmar Hoerl: If we took our individual backgrounds excessively seriously, then no other conception would have been accomplished other than a mixing machine. Formalhaut works in a not clearly defined area, which lies between architecture and sculpture, say on the seam of two fields of activity, where it starts getting interesting since both systems meet each other.

This means that sometimes we need to forget everything we have learned as specialists; it means creating first of all a neutral level in order to be open so that something can evolve at all.

From that, a reciprocal action should

(Below) The "Full House" project, designed for Hamburg in 1990 and the "Rendezvous" installation in Moerfelden, realised in 1985.

result so that we don't become one-track specialists, moving in a circle or decaying with questions of style and ideology. Primarily, we want to participate as individuals in the group's results. We also practice independently outside the group to further develop our work. Your question concerning the group's conception has never been raised. It is important for us that experiences and results coming out of the group are able to motivate and push the individual decisions – a dynamic process or a variable cycle, where group-dynamic formalisms are unnecessary.



You have chosen to stay in Frankfurt, which, despite much publicity, is not a noted centre for the avant-garde. Do you enjoy isolation from kindred spirits?

Goetz Stöeckmann: Certainly Frankfurt is not a city in the range of Hamburg or Munich, not to speak of Berlin. What is Frankfurt in our consciousness actually? It has been reorganised and remodelled after complete demolition in 1945. Ever since, it has been consolidating and growing in wealth. The Fair, service industries, middle and top management, the stock-market, Hoechst Chemicals, 360 banks and insurance companies pump money, spend money, invest. High-rise Manhattan – what an image! – the new skyline stages the Museum Embankment at the river, 13 museums built and opened between 1980 and 1990.

Around it – speculation. On top of it – a great drug scene, the leading crime ratio in German, corruption between town hall, business, trade and crime.

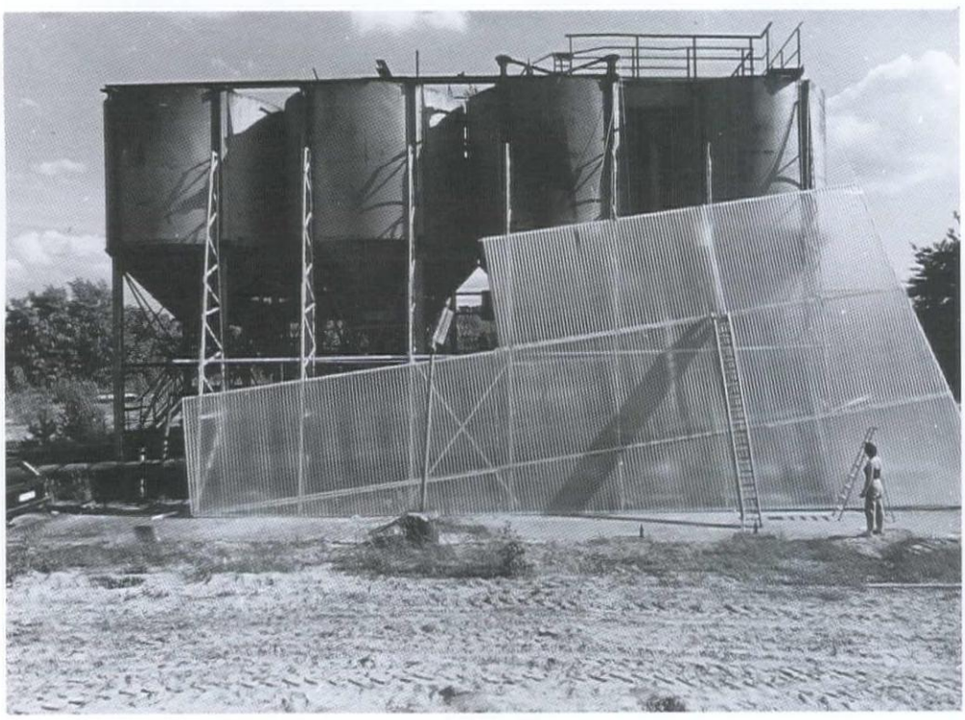
Along with that, a vigilant and politicised youth, not only in the campus. The '68 movement embedded in the Frankfurt Schule, Habermas still teaching and Cohn-Bendit departmental head for multi-cultural affairs. The first red/green coalition in the State of Hess, and today – a red/green government in the city's parliament.

Monitoring and living Frankfurt in the recent past has been an intriguing experience. It informs my architectural experience to challenge the actual infrastructures of urbanity as much as any intellectual chamber conversation with my colleagues. And this has nothing to do with them – simply, the urban conversation is going on somewhere else.

I feel that architects and critics overestimate the architect's influence on the built environment. Prospering post-war cities like Frankfurt prove that their entire 3D development is more infiltrated by commercial capital and political ideas than by architectural visions.

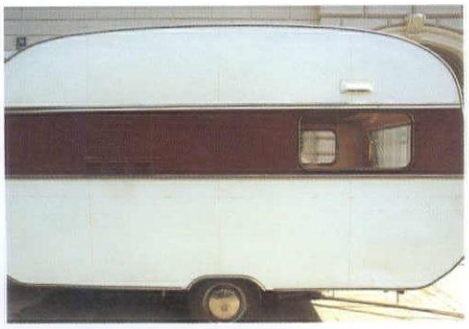
Architects are often degraded in their professional status to downright executioners, allowed to "make up" what the investors squeeze out of the authorities, what politicians envisage.

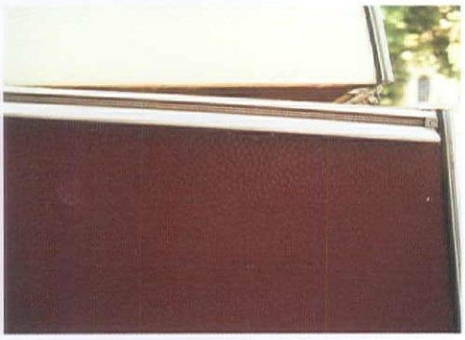
I may exaggerate. Still, I feel the gap between these realities and the current architectural flux, be it drawn, modelled build or taught. The avant-garde doesn't seem to be interested – you just don't talk about it. Much of this frustration is channelled in exotic attitudes and philosophies and design-isms. In some avant-garde schools, the majority of the teaching staff downright abort the student's mature experience with society, environment, space and circumstance. So what?

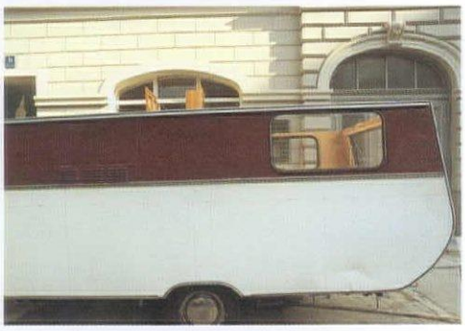


Some of your proposals for art applied to buildings are of architectural scale. What do you feel to be your relationship with the architects of the buildings you embellish?

Ottmar Hoerl: Co-operative, friendly, constructive, mediatory, energetic, unprejudiced, ready-to-take-a-risk, steady, sociable, progressive, sensuous, broad-minded, functionalistic, conciliatory, generous, conspiratorial, indulgent, imaginative, compromising, courageous, permissive, intellectual, decisive, lavish, reliable, practical, confidential, humorous, flexible, responsible, programatic, polite, fair, sensitive, futurist.







CARAVAN, 1987
Haffner Gallery, Munchen
Idea: O Hoerl

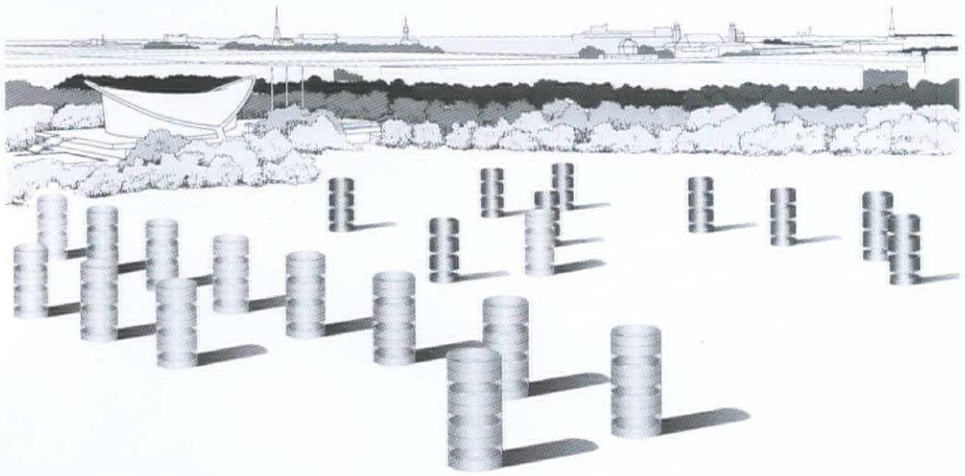
As house trailer, holiday vehicle or stall, the caravan embodies the modern variant of journey as it is undertaken by the Oriental and African caravan for the purpose of trade and research.

Moreover it represents the idea of an independent architecture as a building not attached to the ground – as in the constructivist and metabolist architecture, whose mega structures and urban organisms create a built dynamic equivalent to the complex interrelation of man, development and change.

The supersession of the mechanistic principle through the media/information network leads to a different perception of space in viewing the project.

The omnipresence and simultaneous availability of media denies spatial distance. At the same time an "abstract" space evolves beside the "real" space. In the present work this is understood as a sculptural process. The caravan as a model of human performance becomes detached from its typological appearance and function.

As object and space it is disassembled into fragmentary elements and becomes recognised in a new system. This methodical recasting of its substance refers formally and contextually to the changing reality of space and perception.



DOUBLE KNIGHT GAME, 1988
Frankfurt/Main Art Fair
Idea: O Hoerl, G Stöeckman
The chess game provides both form and context to this project. The arrangement and the design of the figures are derived from the actual play of eminent chess players. The position of the "men" are documented in chess literature. These configurations serve as the basis for the development of our project. Given that strategies, tactics and imagination employed by the original chess players followed in a logical manner, we can therefore reconstruct all phases of a game from any of the various individual positions.

In this way the chessboard configurations can be verified at each stage of play. Beyond the aesthetic representation of an imagined chess game, we also seek to address more abstract levels of meaning and to open up additional possibilities with this project. There might be the comparison between chess game and urban environment as in a scenario for co-operation/confrontation, or a struggle for control or territorial dominance. In the same context we would analyse the relationship between architectural and artistic conceptions as a link between function and creative autonomy.

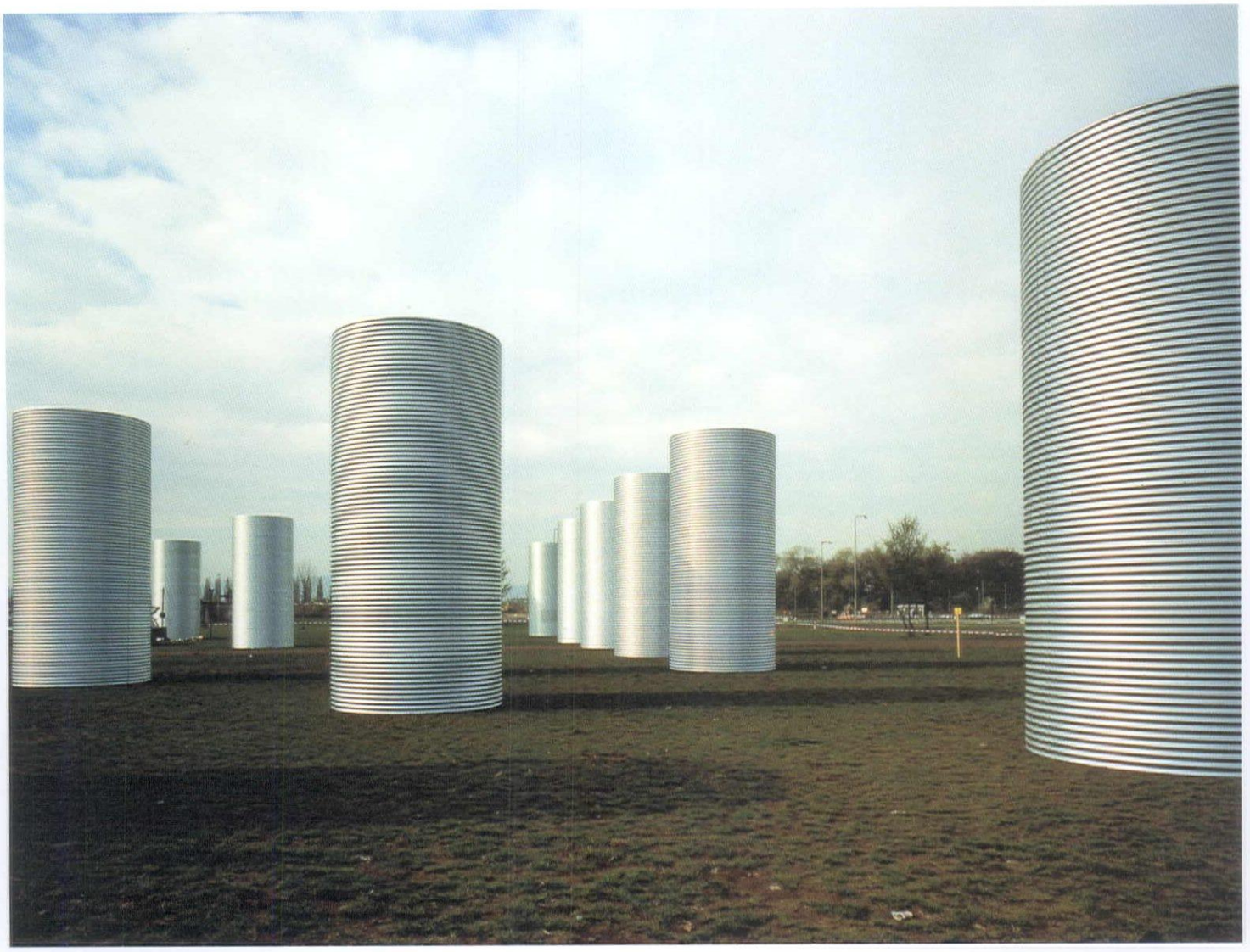
Do you see the publication of catalogues or the staging of exhibitions as part of a total strategy?
Gabriela Seifert: Of course we do. With a lot of the work being temporary, documentation and publication becomes an essential part of it. It is a vehicle for distributing ideas and concepts. In some cases a publication can play a vital part in a project.

This worked very well with the presentation of the Double Knight Game project, presented at the first Frankfurt Art Fair. There was the architectural sculpture itself to be experienced outdoors on a field near the city centre as well as a specially produced video with a lot of computer-generated tricks shown in our own booth at the fair, guided tours, press articles, a feature on TV and a book with background theory, history and contextual connotations. Now the latter is the only remnant of the project.

With the exhibitions themselves, it is more complex. They obey their own set of rules and the ones of the art market. They are formal disciplines – like sports – a game between the work and the public/critic in an exposed context. For example, cutting a caravan into pieces and recognising it according to a different set of rules, which speaks about the changing ways to perceive space today, is hardly effective without the exhibition context.

All fine – but in the end it is only ersatz – what we really like to do most is to work in the real world, as opposed to the art-world. Our hope lies in the evolution of a special genre – a field of art-applied-to-building, where we just have got a major commission from the state. It is a project for the new Frankfurt Revenue Offices, where we can execute a four-part concept that also incorporates – like a Trojan Horse – the work by other artists and a public video-forum for avant-garde film. So the total strategy gives room without taking much space.

You are all frequently exposed to students and younger architects and artists. How do you feel towards the challenge or the preoccupations of the under thirties?
Goetz Stöeckmann: I will focus my answer on teaching, otherwise I find the question too general. I'll give you an example. In November 1988, the Academy of Fine Arts



HOUSES FOR SINGLES, 1988

Idea: O Hoerl
Design: G Seifert

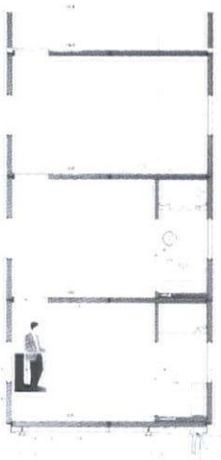
Side by side with traditional social structures, more and more individuals have made the conscious decision to live alone: they are the singles.

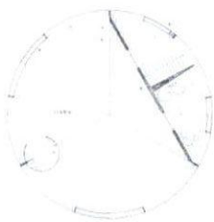
Constantly changing, they react to the marketplace of relationships and jobs. They represent a transitory class per se. *Viewed as a kind of modern nomad, they ask for a comfortable place in a foreign locality to meet their needs for individuality, for refuge, and for representation.*

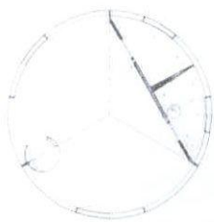
The starting point of both content and form of the housing complex is the configuration of a chess game. As an analogy of social processes, it comprises a maximum of independence of the single units as well as a communal context, which emanates from the inner logic of the complex.

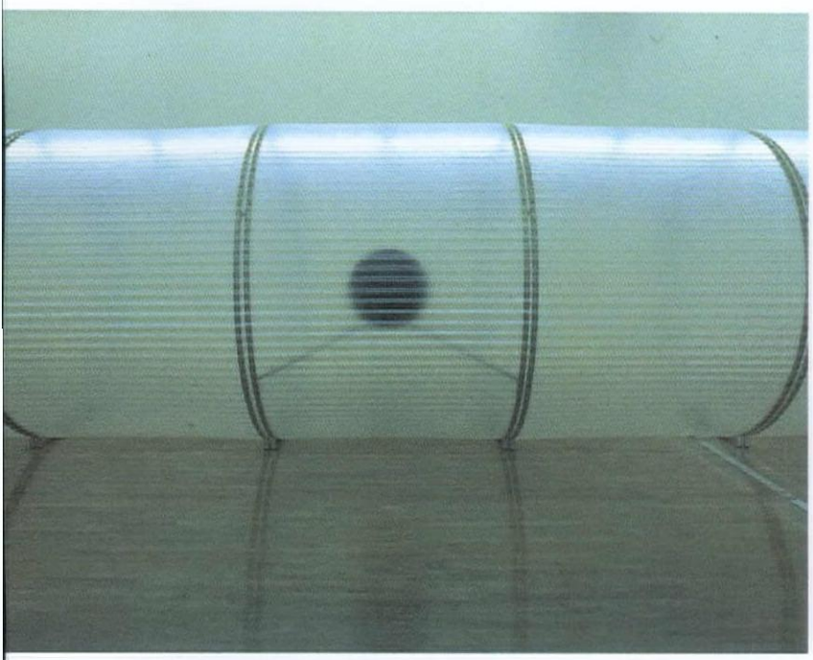
The houses can be dismantled and transported. Temporary use of plots of land answer to the lows of the market: no property as immobile asset and speculation object, but a residential container designed specifically with a limited stay in mind.

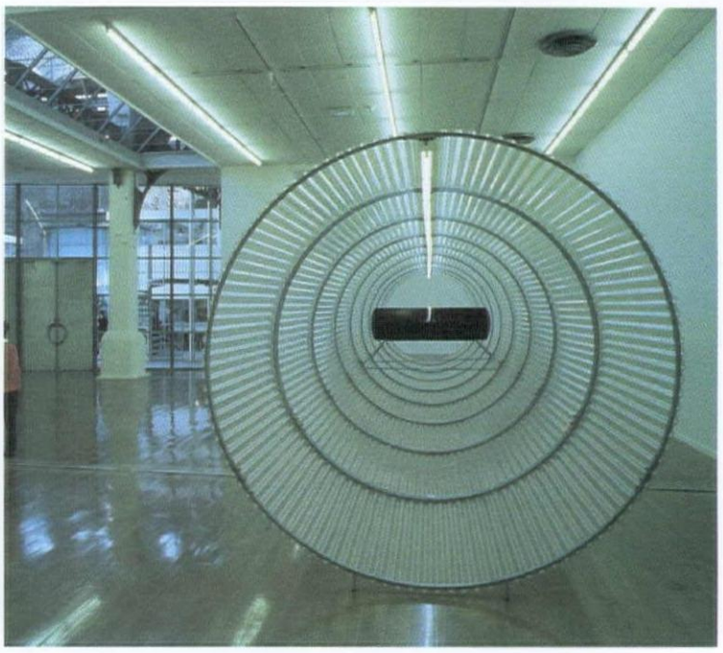
This is a transparent continuum with flexible margins, a product of activity and movement, of confrontation and adaptation.











THE GRAND PRIX, 1989
CNAC, Grenoble
Idea: O Hoerl
The translucent screen of the tunnel shrouds a black mass. The cylindrical threatening object rests on a metal structure. A monster with skeleton of steel and neon protects his egg, forbidding any access.

The object is intriguing. A bomb, a stone coffin or a shrine from another world, it jealously guards its enigma. A cold, sterile, black and gleaming container hoarding the products of secret scientific experiments, it leaves us prey to our own malaise and uncertainties.

in Vienna held a symposium on "Architecture – Teaching – Practice". Participants were Hejduk, Cook, Stirling, Grassi, Peichl, Pietilä, Hollein, and Holzbauer. Kristin Feireiss of the AEDES gallery had brought along a well-assorted gigantic show of studies – drawings and models, developed in the masters classes of architects at various universities.

The meeting was impressive. On the platform the grand masters fought their holy wars and on the walls of the sanctuary the pieces of their combatants were exhibited by section and class. The parade of the individual regiments could be smoothly reviewed. The discipline was good, the ranks were closed!

You gave me the chance to teach together with Evelyn van Veen's unit at the Bartlett in London – another rather remote London architectural school standing in the shadow of the AA. I hope that the recent installation of an entirely fresh and young teaching staff can do the trick. I, for my part, would certainly appreciate it if the largely celebrated "drawing diarrhoea" could stop. I think that sometimes drawings are a delicate compensation for rudimentary ideas and concepts. In front of the students I am dangerously disinterested in the nice drawing. Instead I like to challenge young architects to increase their mental work. My slogan for the 90s is: more reflection – less discipline.

All of you exhibit in foreign countries and two of you teach regularly in England. Does this affect the cultural element in your work?
Gabriela Seifert: We all like to exhibit abroad, but can even the most extensive travel give you more than a faint glimpse of a culture? Can you get an insight into the heart of a culture without living there for a long time?

In our work we want to be specific. We want to make statements. We have to understand our own situation before we move on to others. There's work. We do not feel competent to speak about anything but our own limited Middle-European situation and its rules. With close neighbours like England or France, you note quickly the differences and similarities but this does not mean much: it will be on the level of a comment, not a statement.

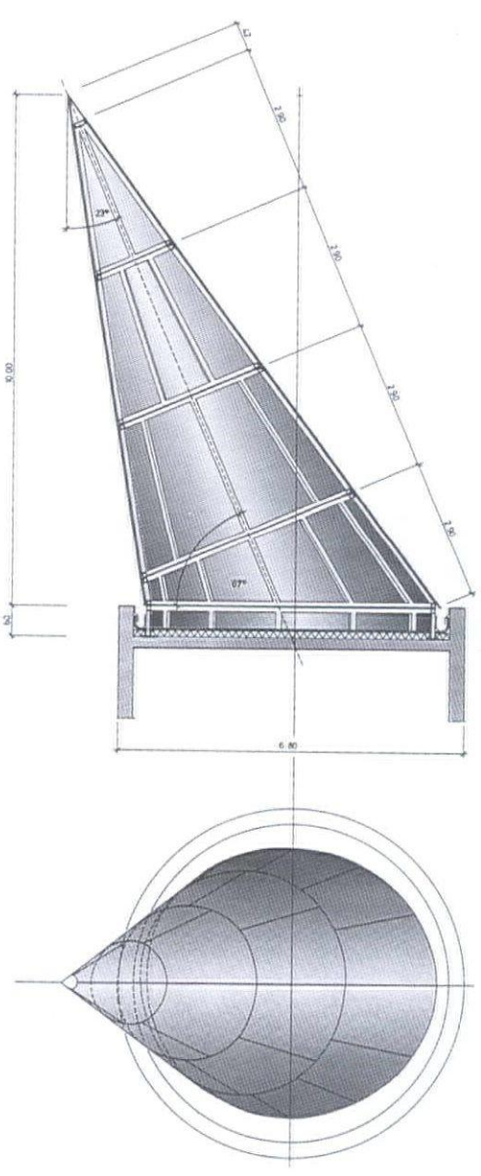
But we are concerned to make ourselves understood by others. So the symbolic fabric of the work – in most cases – is common knowledge; the material is simple and industrial. The rhetoric speaks about common human circumstances. We hope that somebody will be affected by the specific culture of our work. □

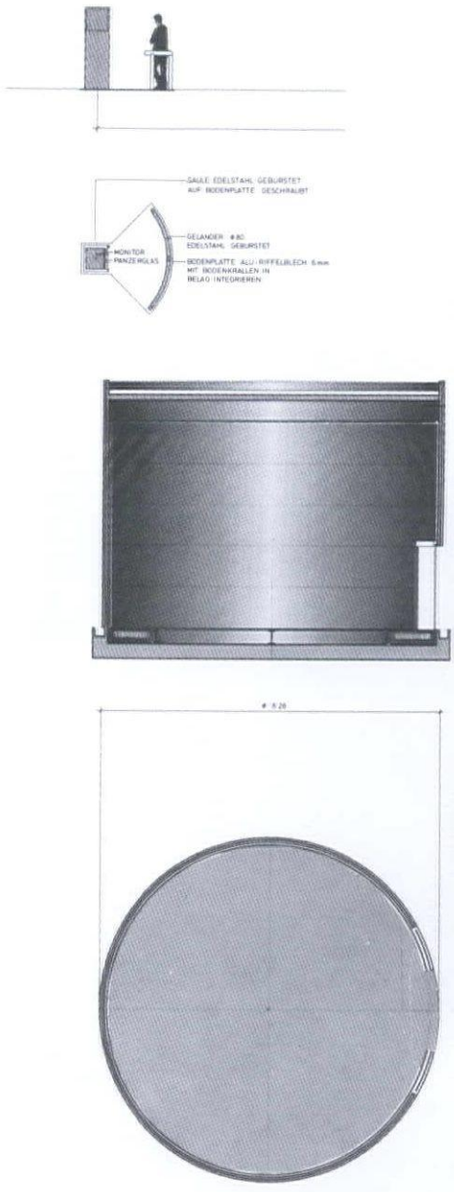
ART ON BUILDING, 1990

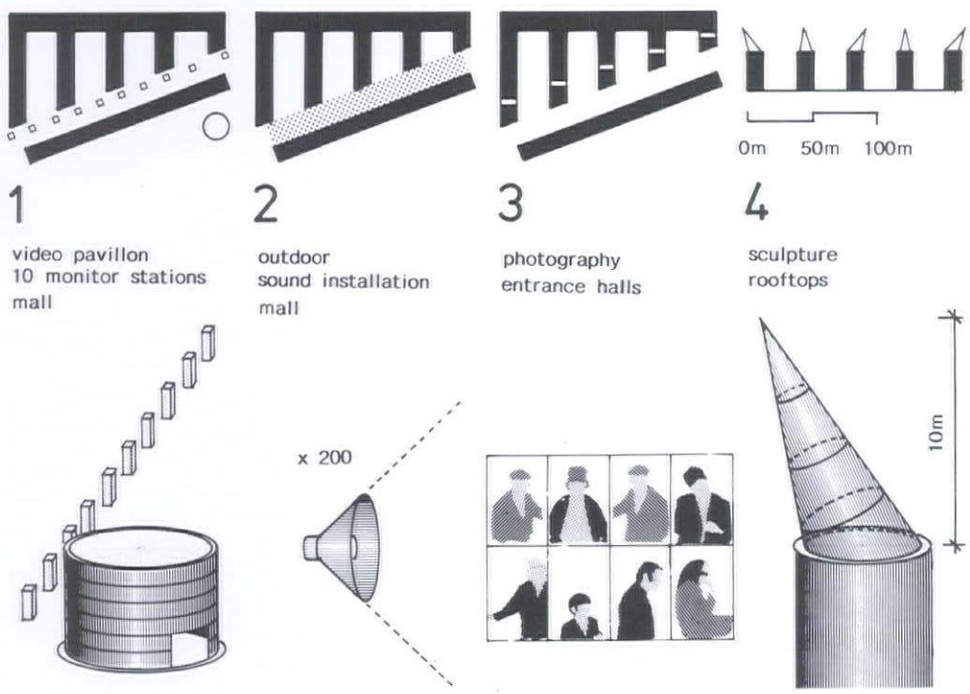
Frankfurt/Main

Idea: O Hoerl

The new Frankfurt revenue authorities complex is provided with a four-part art concept, which includes a video-forum installation as a main feature. Hardware: an exhibition pavilion and ten monitor stations in the public area of the complex. Software: a collection of videos by artists, developed over a three year period. There is also an outdoor sound installation that is 1:1 "transplantation" of acoustic spatial images taken from ecologically endangered nature spaces. Then there are photography studios of selected artists, whose work – demolishing the concern for the individual – fits on the interface between the authority and the public. Finally, on top of the building complex, a series of five conical coloured towers provide a landmark within the cityscape.



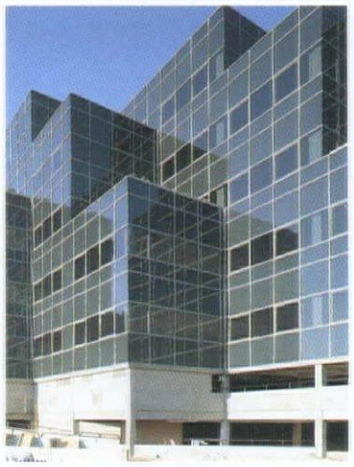




(Above left) Plastic sculptural "hats" on the building roofs; video monitor pavilion (above right).

A British initiative by a building engineer and architect has resulted in the Centre for Window and Cladding Technology at Bath University, dedicated to reversing the UK's decline in this sector of the international construction industry. Graham Vickers assesses its plans.

CLADDING FACES UP TO CHANGE



It is a pleasant irony that anyone searching for the place where the British cladding industry is urgently addressing the future will find it on the outskirts of nostalgic Bath. There, alongside the School of Architecture at Bath University, is the Centre for Window and Cladding Technology.

This centre holds the key to reversing a process of decline which has denied UK firms the most profitable jobs in the cladding sector in recent years. It is largely the result of a long collaboration between Ted Happold, professor of Building Engineering at Bath, and David Button, manager of Pilkington Glass Consultants and formerly an architect.

"If you see a good idea – steal it" is Happold's cheerfully declared motto, adding that you should of course acknowledge your source. The Bath centre's source was a technical institute founded at Rosenheim, near Munich, in the early 1980s.

Germany, with its massive post-war rebuilding programme, established Rosenheim in response to the problems posed by the widespread deterioration of timber windows. Later it embraced new technologies and was to become a major factor in the present domination of the German window industry.

German cladding exports to the UK account for much of the 40 per cent import penetration, which was one of the main indicators of the need for a British response.

Idea whose time has come

Born out of despair and established with not a little frustration, the Bath centre now looks to have the confidence of an idea whose time has come. It has a growing list of members built around a solid base of founding sponsors including the Aluminium Window Association, Ove Arup Partnership, The Conder Group, Deceunick, and the Glass and Glazing Federation.

Under its director, Stephen Ledbetter, its purpose is to support and refocus a UK industry which once thrived and then virtually collapsed under foreign competition.

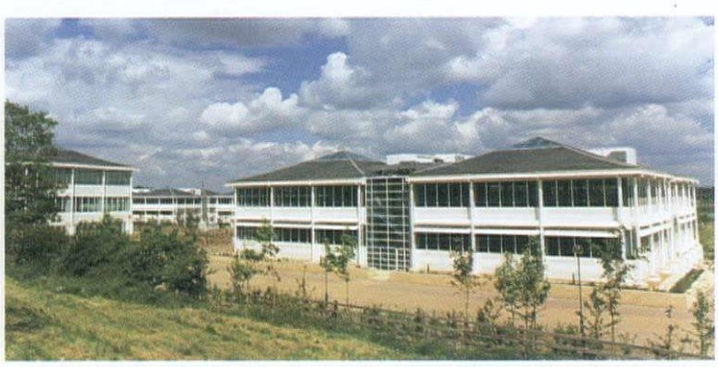
The means are research, resource and education funded by sponsors and the government. The process by which all this was established is a revealing one. David Button explains: "Ted and I started it off seven years ago, although we didn't originally conceive of doing something with the University – it was an idea within the Aluminium Window Association. Subsequently we spent a long time in the corridors of government power, of industry and of the professions."

The initial task was to marry some form of government funding with backing from the building industry. One of the fundamental difficulties they faced was the question of which government department perceived itself as the natural curator of this particular slice of British industry.

Happold recalls how after being handed round from department to department, they eventually found themselves back at the one where they had begun exactly one year before. He now seems rather philosophical about this.

"It was hard to start because it wasn't an accepted method," says Happold. "In the end we were split between the Department of the Environment and the Department of Trade and Industry. Now I think both understand that it is interactive, that to be interactive is the nature of technology."

Even so, government help has been limited, as Button explains. "The Department of the Environment said 'we can't fund a centre at Bath as such – but we could fund a research project'." The result was a



British curtain wall manufacturers are facing up to the innovation challenge. (Above) Ruberoid Architectural curtain walling on Edinburgh office development, Apex 8000; architects MAP. (Right) Northampton Business Park clad by Prince Cladding, part of the Condor Group; architects Hobbs.

research project which measured the differential between the UK industry and foreign competition. "That was the genesis of the centre's first year's research work," says Button. "From the focus which that provided, we predicted what would be the main areas of the UK industry requiring attention."

Standards, education and training, and a body of knowledge on the engineering of cladding were identified as priorities. "Isn't it incredible that there is no complete body of work on the skin of a building?" asks Button.

By clearly focussing the broad ambitions of Happold and Button, the study galvanised hitherto cautious members of the building industry into action.

Flooding in to assist

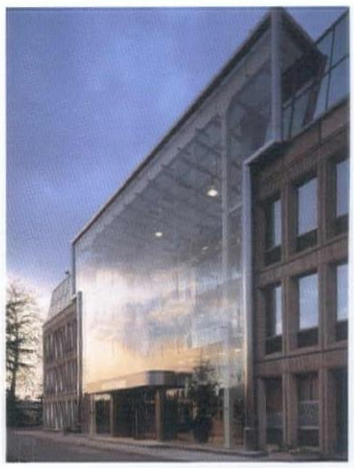
"We set up a committee structure around those three areas," says Button, "and then we set down a work programme. People then flooded in to assist us in those committees."

The founding sponsors each contributed £20,000, Pilkington making the first donation and challenging everyone else to put their money where their aspirations lay. Some 130 subsequent companies and organisations – each contribution £500 – make up the rest of the membership.

The mechanism having been found, Happold was able to re-state the basic objectives of the centre. "We can now lay down the state of the industry in the world – who's producing what, the type of environment they're producing it in, the money that flows from it and the demands that are made upon it," he says. "We need to understand the environment of the whole window and cladding industry and the education and training scene. Then we can define what the future needs are."

The man in charge of interpreting these broad requirements is centre director Stephen Ledbetter. A structural engineer by training, Ledbetter explains the centre's current philosophy and structure.

"There is a lot of input from members," he says. "Everything is governed by a steering committee currently drawn from the founding sponsors. Then we have three sub-committees: an educational training sub-committee, a research sub-committee and a standards sub-committee. These are the three ways in which we hope to advance knowledge and product."



The UK industry is exploring models for the future. (Left) Astrawall curtain walling from Stoakes Systems used on Tay House, Charing Cross, Glasgow; architects Holford Associates. (Above) Hertford Place office building, Rickmansworth, UK, features a glass wall supplied and installed by MAG Briggs Amasco; design and build by Beeson and Son.

Among the membership is a number of architectural firms, including Terry Farrell and Company, Building Design Partnership, Nicholas Grimshaw and Partners and the Richard Rogers Partnership.

This prompts the question of whether or not the window and cladding industry has ever previously been inclined to listen to architects who have frequently complained of meeting conservatism and caution from manufacturers. Can we expect to see that situation changing?

Tackling in-built conservatism

"It's early days yet," says Stephen Ledbetter. "Any such change would perhaps be premature. But our first piece of work – the comparative study of the UK industry and that of Europe, North America and Japan – resulted in our talking to architects around the world. They told me that an inbuilt conservatism and a take-it-or-leave-it attitude prevailed amongst manufacturers.

"So many of the ills ascribed to UK industry are repeated around the world. And yes, it *is* imperative to make some changes. But the changes have to come about not only from the manufacturers, but from the user."

In a worldwide survey of architectural practices, Ledbetter asked what research and development was undertaken on façades. "It seems that most of them work on the principle that if they get a bad deal from the manufacturer they just don't go back. In all the big practices around the world, it seemed there were no more than four or five people who would claim to understand curtain walling."

Ironically, one of the fundamental premises of setting up the UK centre – that Britain was trailing desperately in the field – was questioned on occasions during the research. "People in Japan were surprised to see me and Stephen Ledbetter researching," says Button. "They said 'we thought you'd come to sell something, because UK technology is so good!' This came as something of a surprise to us . . ."

Ledbetter also sees potential strength in one of the industry's current weaknesses. Although the UK cladding industry comprises various trade organisations representing equally varied contractors – all working to different standards – Ledbetter maintains that the British practice of sub-contracting *can* result in a better service than that offered in countries where more rigid practices are followed.

"Japan in particular tends to have fixed products," he says. "But a dispersed industry has obvious advantages. What you need is a governing body to oversee our very

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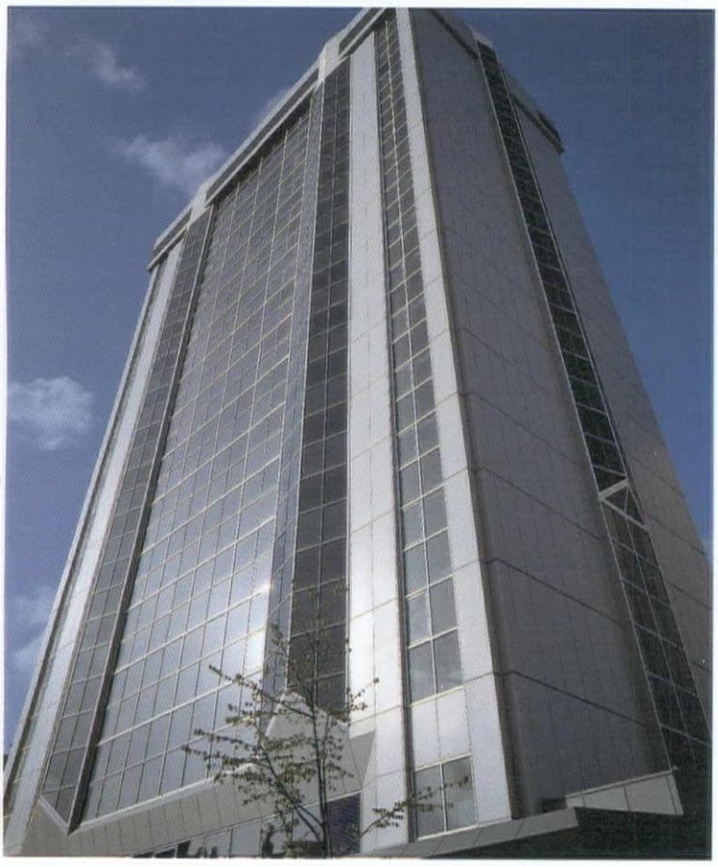
The next generation of buildings will make even more sophisticated demands on the building envelope. (Below) Astrawall by Stoakes Systems used for the Milanofiori complex, Milan, Italy, by architect Francisco Clerici. (Bottom) Refurbished Capital House on London's Edgware Road reclad in Frontier curtain-walling system from Tectonic. Architects Fairhurst.



stratified industry."

What is also needed is a new discipline to reflect the new approach to façades, perhaps even a new name. Ledbetter seems untroubled by labels however. "Whatever we call it, it's a complex interface between materials, engineering and aesthetics," he says, "and it needs great attention."

Interface more complex

This interface will become even more complex as the next generation of buildings makes ever more stringent design demands on the building envelope.

A more sophisticated use of natural daylight (controlling direct sunlight but accommodating diffused light), the development of electrochromic windows and aerogels, more electro-mechanical actuators, separate air vents in a facade – all these and more will play their part in a new generation of buildings which will seek to combine the best features of natural ventilation and air-conditioning, developing them with a new regard for energy efficiency.

Of course, as Ted Happold and David Button have discovered, radical proposals at the cutting edge of technical developments tend to take some time to be recognised let alone accepted. But after seven years or so, the brainchild of a building engineer and an architect has become a reality.

Happold comments: "Looking back, I would never have done this with an engineer. It had to be an architect. I think it's because architects live partly by getting others to provide information – they have to. By meeting David I discovered the problems of the industry.

Model for an industry

"Now at last we have a model of a centre of an industry at a university. And of course here we have a broader learning environment – laboratories, an energy monitoring group, a school of management, a centre for European studies – all in delightful surroundings.

"People from industry want to come here. So not only is this the first time that anybody's looked at education and training from the top and bottom of a major industry, it's probably also the first time that some of the manufacturers have actually met architects in a situation where they're both listening to the same piece of information at the same time. It's a holistic process."

David Button suggests that another advantage of the centre as a meeting place might be future conglomerate company bids for large international contracts. "Maybe a large glass company, a framing company, a design consultant and a research body. We're seeing this kind of thing happening more and more abroad," he explains.

Meanwhile, for other parts of the building industry, it may be that in the end the most valuable design lesson to emerge from the Centre for Window and Cladding Technology at Bath is one of how ailing sectors can, through vision, enterprise and determination, learn to reshape themselves. □

TAKE FIVE IN DETAIL

Architecture in Detail series

Mound Stand Lords Cricket Ground by Hopkins and Partners; Joseph Shops by Eva Jiricna; The Red House by Philip Webb; Renault Centre by Norman Foster; Financial Times Print Works by Nicholas Grimshaw.

London: ADT Press, 1991, £19.95 each.

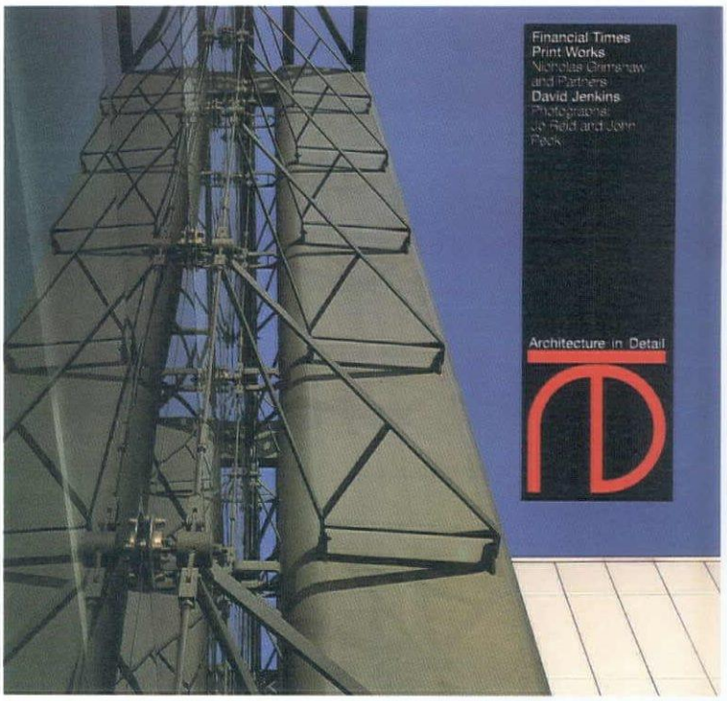
Review by Dennis Sharp

The first five volumes in this new series have a simple objective: to provide up-to-date monographs on individual buildings or "masterworks". They adopt a large square format and are structured in a common layout sequence. This sequence begins with an introductory essay on each building. Technical drawings and working details, most of them specially drawn, occupy a 16-page section in the book.

The success of what promises to be a lengthy publication programme is – if these first five titles are anything to go by – virtually guaranteed. There is nothing quite like it. The model for such a series is, however, fairly obvious. It derives from the standard architect's detail sheets which became a consistent and valuable feature in magazines such as the old *Architect and Building News, Architects' Journal* and *Detail*.

The popularity of the details led to a spin-off of separate anthologies. But they went out of production some years ago for a number of reasons. Nothing effectively replaced them. Now we have this new series which, through its editorial director Maritz Vandenberg, builds on this legacy. He was publications manager for many years with the Architectural Press, publishers of the *AJ*.

The series brings together the details and the working drawing. It links the information with black-and-white and colour photographs providing a unique and practical archive on single buildings. The well informed introductory essays do much to record the reputation of each building and the reception received by them in the media and among architects when they were first built. In some cases it also provides a "critical" commentary – although that is not exactly what was intended, it seems. It also clearly sets out the brief, and the structure's job history. The quality and range of the first five essays is exemplary.



The Jiricna title is the most popular in the series so far. It has been written by design journalist Jose Manser and incorporates, unlike other titles in the series, drawings prepared by the architect's own office. The one historical title is a study by its owner architect Ted Hollamby of the famous Phillip Webb (1831-1915) Red House.

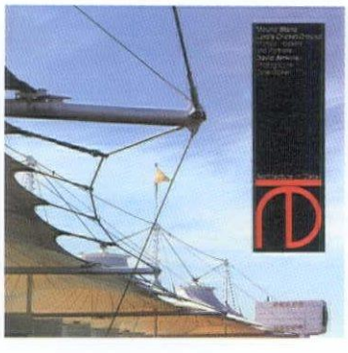
It is an odd volume in the series and it pursues a resolutely historical line. It has only a few details but nevertheless is a most welcome addition to the sparse amount of material on Webb and his celebrated house design. I am not sure, however, that I concur with the author's suggestion that the Bexleyheath house is only a "modest building".

The other three titles are exciting commentaries on British technological architects, extolling the design motivation in the separate essays as well as the hardware data. David Jenkins has written the texts for both the Grimshaw *Financial Times* Printing Works in London's Docklands and the superb and original Mound Stand for the MCC at Lord's Cricket Ground, in St John's Wood, London.

The final title in this first instalment has been carefully coordinated by the architectural theorist and critic Chris Abel, who now teaches at Nottingham University. He puts the in-depth critical gloss onto a series that could easily slip in its textural commentaries into platitudes and uncritical descriptions.

Thankfully, none of this first batch falls down on this matter. However, there is a further dimension to the whole project and that is the quality of illustration. Against the background of, say, Fatagawa's contemporary series this requires the utmost care.

The series editor has not shrunk from the economic good sense of getting the best possible illustrations. Richard Bryant, Alistair Hunter, Charlotte Wood, Dave Bower, Jo Reid with John Peck, and David Gilbert give the whole venture contemporary relevance with pictures which provide a feel for the building and information on its construction. □



GOLD STANDARD OF A PUBLIC ARCHITECT

Colin Stansfield Smith, county architect for Hampshire, is this year's recipient of the Royal Gold Medal of the Royal Institute of British Architects. Professor Geoffrey Broadbent of Portsmouth Polytechnic assesses his wide-ranging and productive career.

Most previous Royal Gold Medallists have been high style form-givers such as Lutyens, Voysey, Le Corbusier and Mies van der Rohe; or, latterly, High-Technicians such as Foster, Rogers and Piano. Colin Stansfield Smith offers splendid forms too but, as county architect for Hampshire, with a strong sense of social commitment.

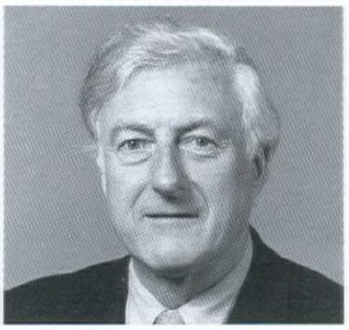
Hampshire is one of the 50 or so administrative regions into which England is divided between central government in London and the individual cities. It is the very heartland of rural England, with lovely, picturesque villages, rolling landscapes and such cities as Basingstoke, Portsmouth, Southampton and Winchester. The latter, once the capital of England, is home to Hampshire County Council.

Given such a splendid heritage it is hardly surprising that conservation loomed large in the scheme of things when Stansfield Smith arrived at Winchester in 1973. Such work gave his office the credibility to act as a design centre for all departments in the county.

Some of them had serious problems because central government had pressured the English counties in the 1950s into using prefabricated systems. Hampshire's had been SCOLA, a light steel-frame system with floor-to-ceiling windows and flat roofs.

Stansfield Smith and his team inherited hundreds of such buildings; stark SCOLA boxes plonked everywhere from the suburbs of Hampshire's cities to her most enchanting villages. They were far too hot in the summer, far too cold in the winter. Already by the early 70s their woodwork was rotting, their flat roofs leaking, and so on. So what could be done? If the materials rotted then use more durable ones; if the flat roofs leaked then put on pitched ones instead.

Design had been easy with SCOLA. You drew a circulation diagram and put walls round it. Since the roof was flat you added more where the plan stuck out and left gaps where the plan stuck in.



But Hampshire's new pitched roofs with ridges down their centre lines demanded strictly rectangular plans. And so was born "the discipline of the roof". Flat roofs too had meant that all the internal spaces were "clamped" between floor and false ceiling as horizontal planes. But pitches offer usable volumes within the roof; space into which rooms can be projected upwards.

Spatial themes explored

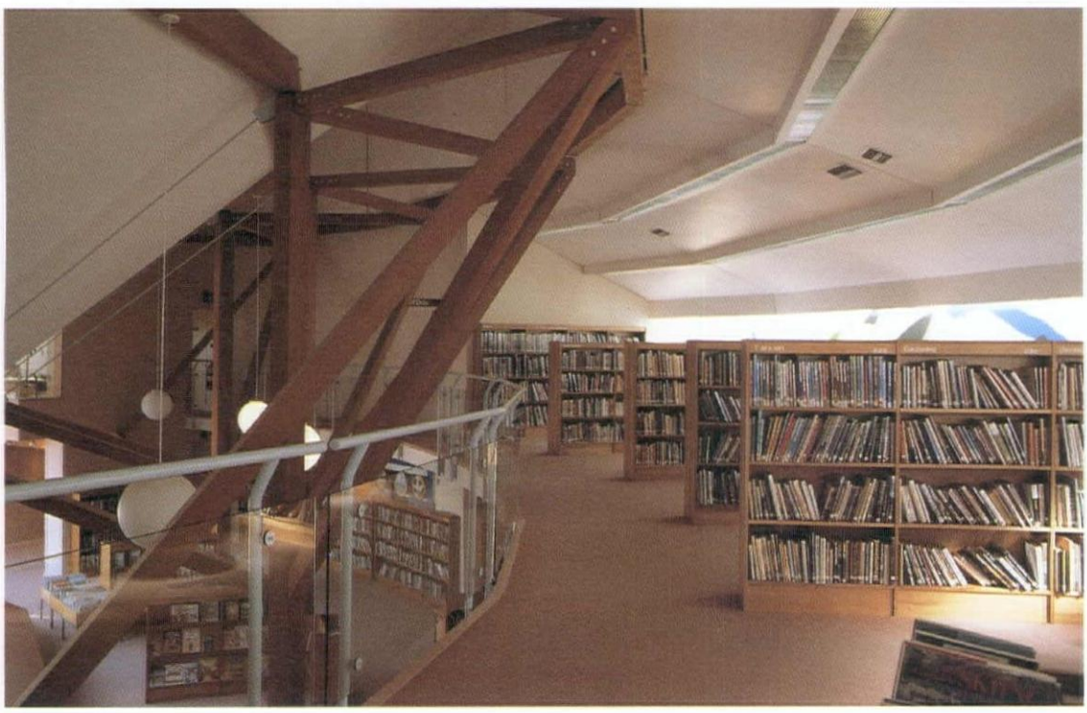
So Stansfield Smith and his team brought *architecture* – the three-dimensional "sculpting" of space – back into what had been the most mundane and utilitarian of building types.

Such themes were explored in a series of early schools such as Fort Hill near Baskingstoke (1978). Simple SCOLA boxes would have been too brutal on this Iron Age site and of all Hampshire's regional architecture none was more school-like in scale and form than the great medieval barns at Basing House and Lynchpit. So why not group barn-like forms around open courtyards and blend them into the landscape with earthworks like those of the Fort?

Then there was St. Francis Special School at Fareham (1978). There had been tensions in earlier school design between those who wanted open planning to encourage "team teaching" and those who preferred closed, individual classrooms so any class could sing without disturbing the others or read without in turn being disturbed.

Some of the children at St Francis were wheelchair-bound, so why not plan a central route for

Colin Stansfield Smith (above) not only reviews most projects as they pass through the office, but also insists on having design work on his own drawing board, such as the semi-circular Chandler's Ford Library (below).



them, with ramps, so the act of circulating would become part of their therapy? Planning around a central route allowed for each room to be open or closed as needed. And so another Hampshire theme – the circulation route – was born.

The first of the great "barn" schools was Four Lanes at Chineham (1982) where Templeton and Lower planned the major spaces down the centre of the plan rising up and into the roof, placing smaller rooms around the edges where the eaves of the "barn" sweep down to domestic, even child-scale level.

There were worries that such large central spaces might be difficult to heat but graduates from the Portsmouth School had brought with them energy studies. Mervyn Perkins' final year project had been an energy-conserving school with a central conservatory where the air would warm up in the sun. This, modified, was built as Newland Primary School at Yateley (1979). It won many prizes with its mix of a bright central space and snug little corners where children could hide.

When Derek Poole came as deputy to Stansfield Smith, he brought in researchers from Cambridge and Cardiff. Thus a further Hampshire theme developed: the energy-conserving section. Heat rises up into the ridge in summer and out through open windows. And with south-facing windows, winter sun warms the air up there which can then be blown down into the classrooms.

Energy-conserving variations

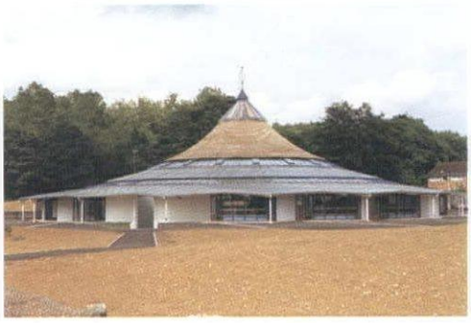
So the Hampshire team worked out many energy-conserving variations of the Chineham section, planned as long rectangular "sheds" such as Hulbert Middle School (1982) and Hatch Warren (1984). Others were planned around straight-line, stepped or curving malls as at Crestwood School, Eastleigh (1982), Bosmere Middle School at Havant (1983), Elson Infant School at Gosport (1984). And they were even circular with tent-like roofs such as Burnham Copse at Tadley (1985) and Stoke Park at Bishopstoke (1989).

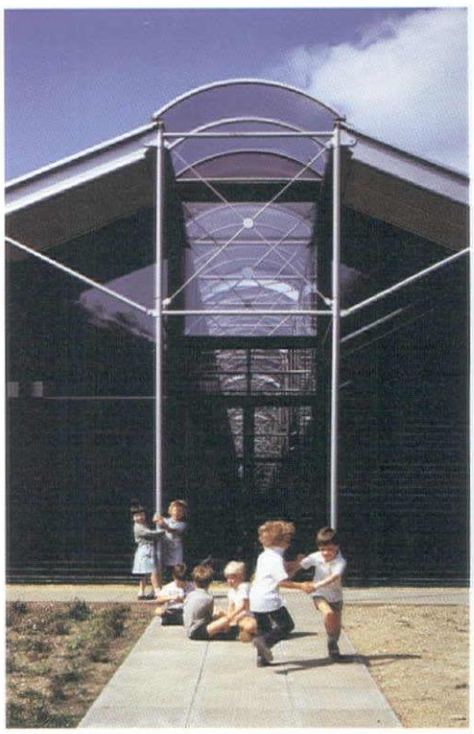
Crestwood has perhaps the grandest of the Hampshire malls and Bosmere the most sophisticated of the energy systems. The energy philosophy was extended at Farnborough Technical College (1986) where teaching and other accommodation is strung along a veritable Crystal Palace of a High Tech energy-collecting mall.

So Stansfield Smith has pursued a pluralist approach: appoint good people and let them get on with it. The office's output includes the lamented David White's High Tech "shed" of a Sports Centre at Ringwood and his experiment in partial climate control for Boyatt Wood Hostel at Eastleigh. There, the wheelchair-bound live in a street of "houses" with gardens behind them under a Victorian Railway Station roof shed.

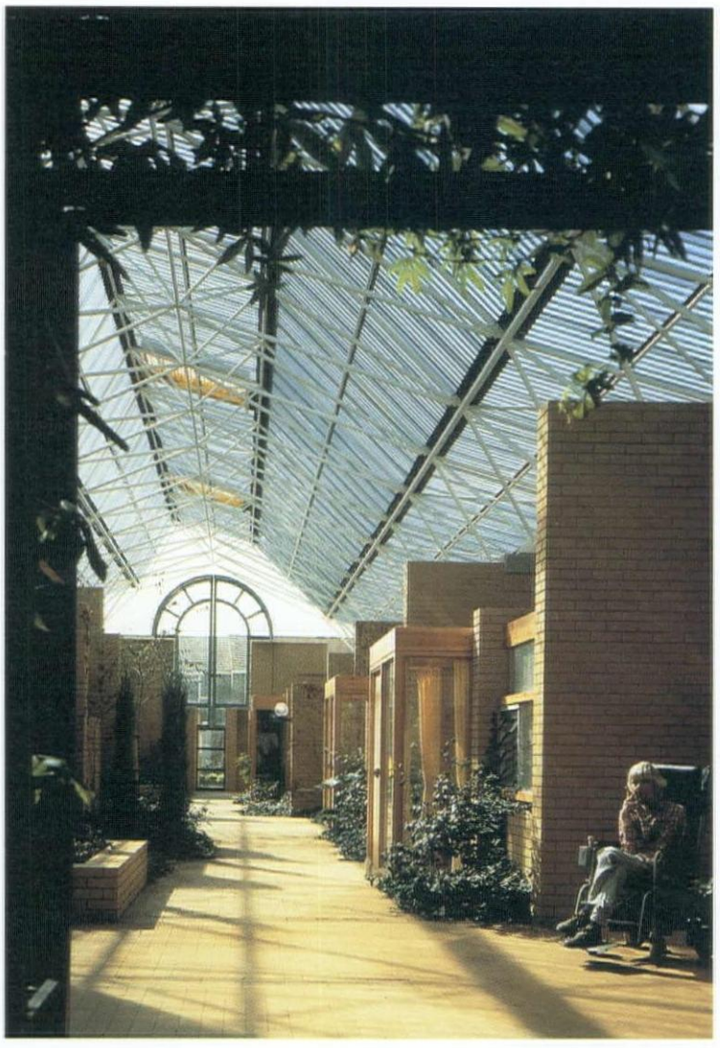
But unlike most other architects in such a senior position, Stansfield Smith insists on drawing. His watercolours are quite exquisite and so are his sketch designs. Often he'll visit a new site with the job architect and prepare initial sketches. He'll offer studio crits as the job progresses and take a personal interest in up to 250 jobs.

But he always likes to have a job on his own drawing board including such variations on the mall as





Crestwood School at Eastleigh, 1982 (above), has the grandest of all the Hampshire "malls" – a social space which has been used for everything from great public festivals to private wedding receptions; Stoke Park at Bishopstoke, 1989 (left), one of many energy-conserving variations by the Hampshire team; Velmead at Fleet, 1987 (below), rejects Michael Hopkins' High Tech Teflon school but retains his plan covered by pitched roofs rising to a central top-lit "street".



(Above) John Darling Mall, Eastleigh; (below) Fort Hill School Basingstoke. The latter was designed for a sensitive site, an Iron Age fort, so the architects tried to make a "Hampshire" building by using barn-like forms, grouped around courtyards and blended into the site by earth banks and other landscaping.

the semi-circular Chandler's Ford Library, its roof supported by an avenue of timber trees. He made room for a mall of social spaces too in his Police Headquarters at Netley by the "creative demolition" of redundant buildings to form a central courtyard within a robust Victorian asylum.

Stansfield Smith sees this kind of creative demolition as increasingly important since his work now includes not just design but the management of Hampshire's vast estate. As pupil numbers decrease so school buildings become redundant. So, at Bridgemary, unloved and unwanted buildings were demolished to make way for landscaped spaces enclosed by clusters of trees, high walls and decorative gates, justified on security grounds.

Increasingly he sees the space between buildings as even more important then the buildings themselves. Despite many qualities, most Hampshire schools are as solitary as Modern Movement pavilions.

By the mid 1980s Stansfield Smith felt that bureaucratic pressures – and the science of energy conservation – were diminishing Hampshire's architecture as art. So he brought in private consultants to "enrich the mix": Ted Cullinan to "humanise" SCOLA schools (1984, 1987); Robert Adam to build a Classical Basilica of a Library at Borden (1985): Michael Hopkins, a High Tech, Teflon-tended school, Velmead at Fleet (1985-87); and Richard Macormack – the RIBA's new President – Post Modern Classical county offices, Town End House at Havant (1989).

Elegant Hopkins shed

Some of this "art" was expensive. Hopkins' tent proved too much even for Hampshire's enlightened education committee. The school as built is an elegant High Tech "shed" with a high, top-lit, narrow central "street".

The general organisation was repeated, in-house, by Dave Morris for the Queen's Inclosure School at Havant (1987-90), but with curved aluminium "vaults" in place of Velmead's sloping roofs. Like other Hampshire schools, Queen's Inclosure has won many prizes.

Given the RIBA's recent record, Stansfield Smith attributes his Gold Medal to the "seal of approval" he has given to High Tech. But clearly his strength is a wider "pluralism". Not just an "anything goes" stylistic pluralism but a pluralism of approaches to architecture – as an art, as a science, and as a social service. It is a pluralism which gives me tremendous pleasure as he succeeds me as Professor of Architectural Design at the Portsmouth School of Architecture. It is his capacity to integrate all these things that makes Stansfield Smith outstanding, indeed unique as a RIBA Gold Medallist in recent times. □

TOWERING BEYOND REASON

Pierre Vago warns against the use of technology for its own sake as architectural follies reach skywards out of all logical context.

What strange madness drives man to build things taller and yet taller? Technique enables us to produce these fantasies, which are no longer even justified, as was Gustave Eiffel's 300 metre tower a century ago, as a *tour de force*. Some of the most celebrated architects seem to be dogged by the Babel complex.

Though very particular conditions caused certain US firms to build publicity-oriented skyscrapers to overtake their neighbours, there is nothing to justify a project like that for an economically idiotic 420 metre tower which will impose itself on the panorama of Paris like a chimney, dwarfing the handsome arch that crowns the site at *la Défense*. What necessity, what logic corresponds to this will to go ever higher?

Granted, in this high-tech century, no tower risks a collapse like that of the Tower of Babel, the ancient Babylon. (There has of course been the collapse in these last few months of an entirely different megalomaniac project, attempted in the same region by a dictator haunted by the memory of Salah al-Din, his fellow-countryman.)

Of the Tower of Babel we know only the picture painted by Brueghel. It seems to have inspired the architects who dreamed of building on one of the most famous sites of *la Doulce France*, near the Château of Chambord, built for François I at the beginning of the sixteenth century, a sort of pyramid (or truncated cone?), to shelter the Loire Valley Disneyland, whose cultural claims are but a thin disguise for the commercial concerns of its promoters.

Once more, we ought to recall the SOS put out by the International Academy of Architecture, and published in our last issue.

Nobody is less hostile than myself to the architectural appropriation of the most advanced technologies – but on condition that they correspond to a need. Technology is neither a god, nor a taboo, a panacea, or a prescription, no more than large scale pre-fabrication, the out-dated fashion called Post-Modernism or the new fashion christened Deconstructivism.

It is in the logical, almost humble use of a technique appropriate to the solution that we find the greatness of a creative artist as sensitive as Félix Candela (profiled in this issue). This is how we serve the truth – the truth of which my dear teacher Auguste Perret said: "It is by the splendour of the Truth that a building achieves beauty."

Working on an egg

My friend Andre Bruyère ought to be happy. For him, a building in the form of an egg has been an *idée fixe*, a long-standing preoccupation. In 1977, with Jean Prouvè collaborating on the structural side, he had developed a very detailed design which he hoped to execute in New York. He even published a book about it (*L'Oeuf/The Egg*, bilingual French/English, published by Albin Michel, Paris 1978).

Now we hear that the architects at Future Systems, at the invitation of Ove Arup and his engineers, have put forward an egg-shaped office building proposed for the centre of London.

Lying on its side, it's different from Bruyère's, which stood on its end. What fate awaits this "re-invention"? □

INTERNATIONAL ACADEMY OF ARCHITECTURE

World Architecture is the official magazine of the International Academy of Architecture which was set up in 1987 to stimulate development of architectural theory, criticism and creativity, and to initiate advanced studies of post-graduate qualification training of young architects.

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The Academy engages in a wide range of research, design and training activities. It organises conferences, seminars and exhibitions, and takes part in joint projects with international firms and organisations of various countries.

If you would like to learn more about the activities of the Academy, please contact: Edith Kraichkova, International Academy of Architecture, 2 Rouski Boulevard, 1000 Sofia, Bulgaria. Tel: +2-873863. Fax: +2-871313.

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Denys Lasdun
Major profile on a master of Modernism

Richard Meier
Plans for his Barcelona Museum of Contemporary Art

Bruno Zevi
The architectural critic discusses light in architecture

Nicholas Grimshaw
The acceptable face of High Tech at the Seville Expo

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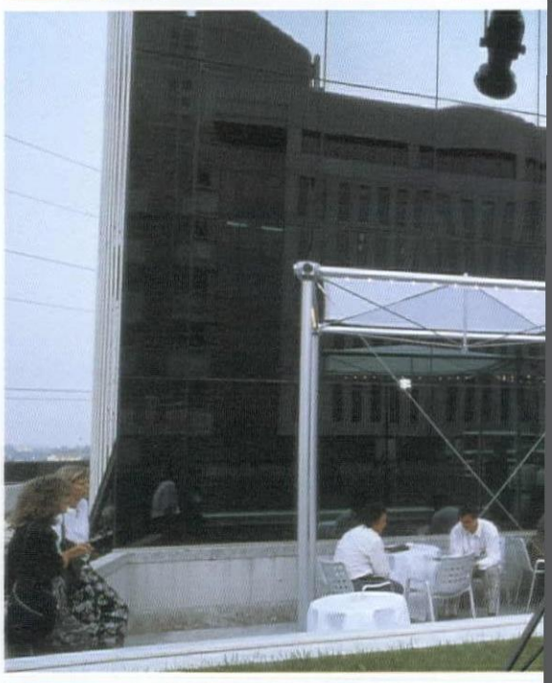

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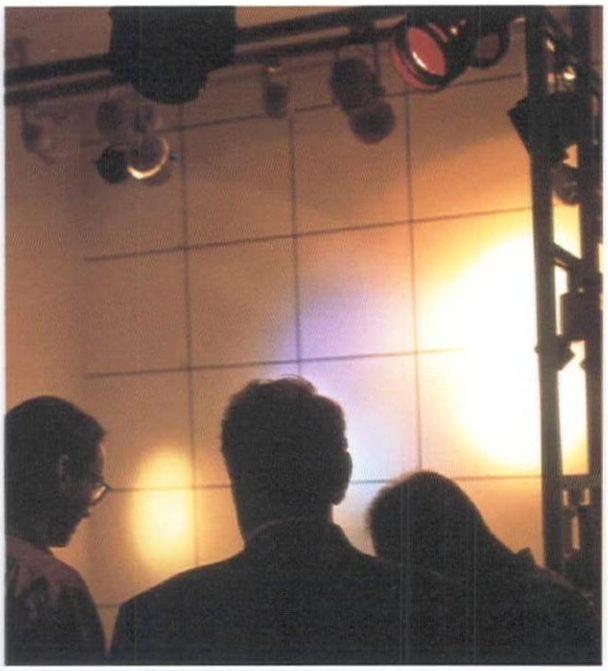

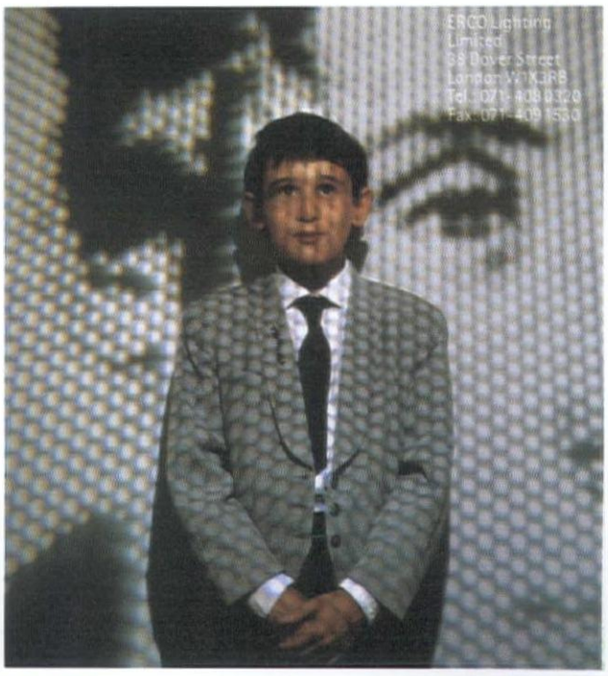

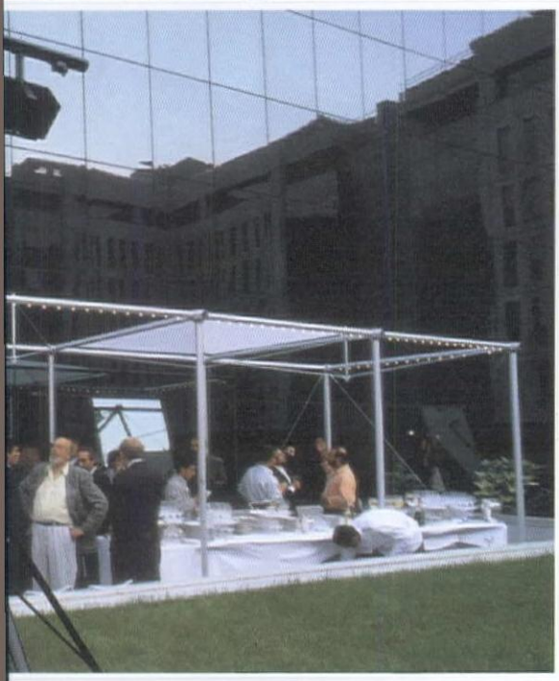

Photos: Rudi Meisel/Visum, Frieder Blickle/Bilderberg

ve have long realised with good ideas ing no bounds, there eople all over the with whom we share mon language. they architects or ng designers, interior designers or engineers, sellers or buyers, men or women.

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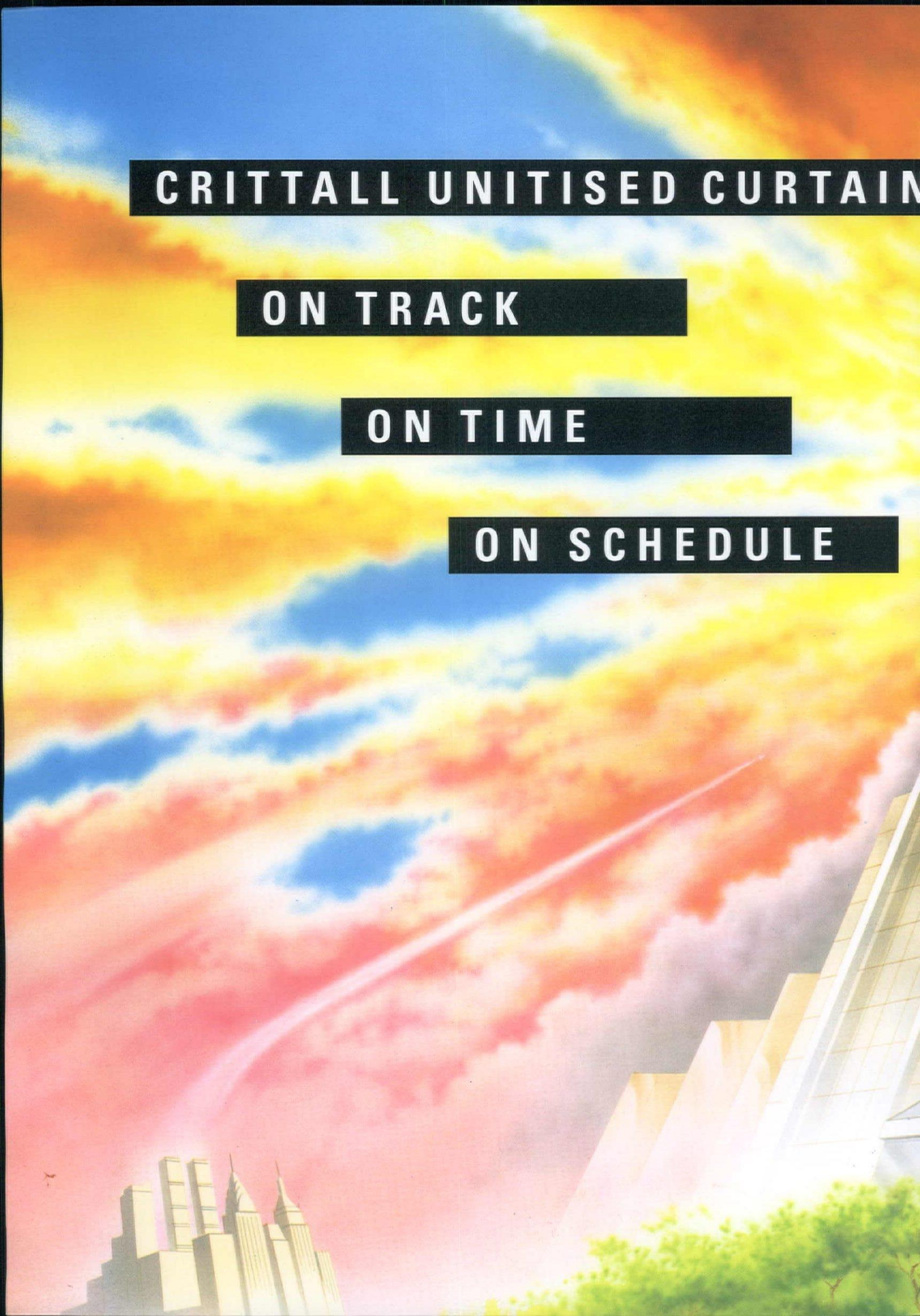
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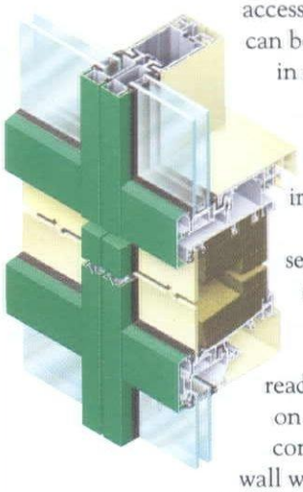

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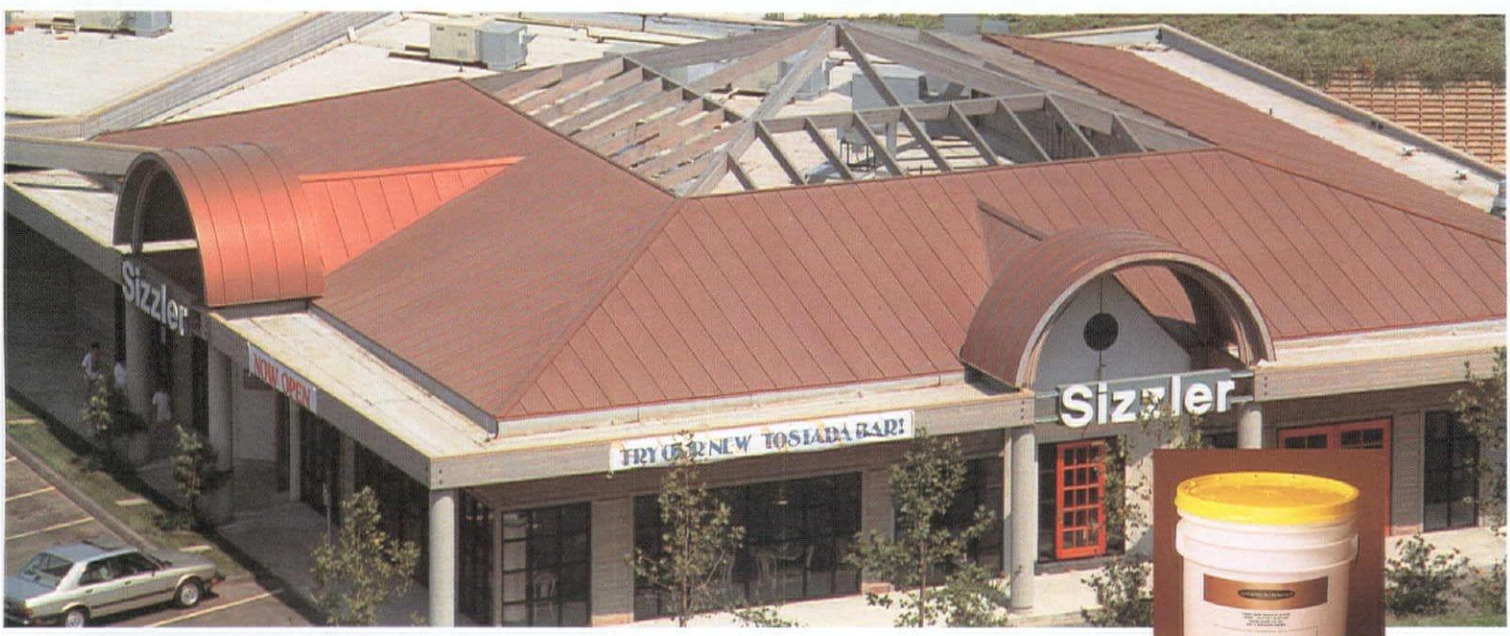

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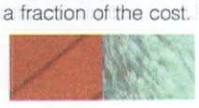

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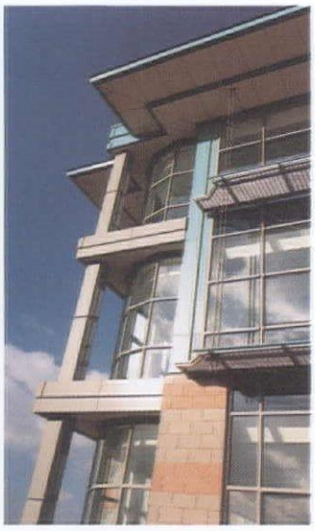

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H

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A FIRM GRASP ARCHITECTURAL IRONMONGERY

European trade harmonisation and professional initiatives to upgrade quality mean more sophisticated challenges for the architectural ironmonger. As an introduction to Product Update, World Architecture looks at the prospects for the UK industry in Europe.

Architectural ironmongers in the UK have just ended their annual conference in Torquay on the South Coast where they learned (if they didn't know already) that the UK construction industry is experiencing its biggest slump for more than 50 years.

Even though building hardware represents less than 0.5 per cent of the contract value of a building, it has become – and continues to be – an increasingly important and sophisticated element in the building project; particularly when security, disabled fittings and the like are taken into account.

UK architectural ironmongers not only stock the traditional lines – door and window hardware and the more sophisticated equipment for access and egress control; they also provide architects with a scheduling and specification service.

It is this close relationship with architects which separates the UK architectural ironmonger from his mainland European equivalent of building hardware supplier. In the UK, architectural ironmongers are represented by the Guild of Architectural Ironmongers. The nearest equivalent representative organisation would be the USA's Door and Hardware Institute.

With the pending arrival of the Single European Market, (which officially comes into being on January 1 1993), the Guild has been taking an active interest in the formation of the new Eurocodes for building hardware which will apply throughout all member countries.

Indeed, Graham Shirville, managing director of London-based architectural ironmongers, G & S Allgood, is the convenor (chairman) of the CEN (Comite European Normalisation) Working Group 4 charged with the task of formulating the new standards. Under Shirville thee are some 15 task groups looking at a host of different product groups from locks to door closers. Draft standards on all areas are expected to be published before the year end.

HOPPE door and window handles in both brass and aluminium

June this year saw the publication of the European Community's Construction Industry Products Directive to which all construction products must conform if they are to be sold in member countries, other than the country of origin. Products which do conform will carry an EC marking, and to ensure that products meet the stringent requirements many will have to be independently tested.

This has resulted in the establishment of approved, independent test houses in the UK which specialise in testing a whole range of architectural ironmongery products in advance of the post-1992 European marketplace.

More market knowledge

Architectural ironmongery represents a relatively small part of the overall construction industry (turnover in the UK is estimated to be no more than £500m). Nevertheless, legislation in the field of fire/life safety and the increasing use of disabled fittings and security devices has meant that the UK architectural ironmonger has become more knowledgeable in a wide range of sophisticated products, many of which are now electro-mechanical or electronic.

Though manufacturers of hardware in the UK have traditionally been separated from the merchant (selling) sector, in recent years the division between the two has become increasingly blurred as some merchants have started to stock and sell lines exclusive to them.

Blurring the divide

Newman Tonks, the UK's largest manufacturer of architectural ironmongery products blurred the divide even further when in 1989 it acquired two of the country's largest merchant chains. It combined these with some others under the operating name of Thomas Laidlaw. This company along with some other 250 merchant and manufacturing concerns forms the bulk of the UK's architectural ironmongery industry.

Mainland European manufacturers too have not been slow to recognise the importance of this structured industry where the merchant/seller plays an important role in product specification. Many well known names have now become entrenched in the UK market either through distributors or their own satellite operations. Such names include Assa, Dorma, HOPPE, Adams-Rite, HEWI and Abloy to name but a few.

While UK manufacturers have acquired companies on the European mainland, this has been predominantly led by the larger manufacturers. The majority of firms rely more on direct export to existing EC markets and beyond. Indeed the ending of the Gulf conflict has already brought signs that orders will pick up in that troubled region.

The lack of a real equivalent organisation to the Guild of Architectural Ironmongers on mainland Europe has come about because most architectural ironmongery tends to be specified by the architect. Manufacturers on the continent also supply more product to the door and window manufacturers who fit the components and supply the end product as complete sets with the door and hardware already fitted.

Although this trend is developing in the UK, particularly in the housing market, there is still strong resistance from the commercial and industrial sectors where performance and design criteria remain important factors in the architect's finished scheme.

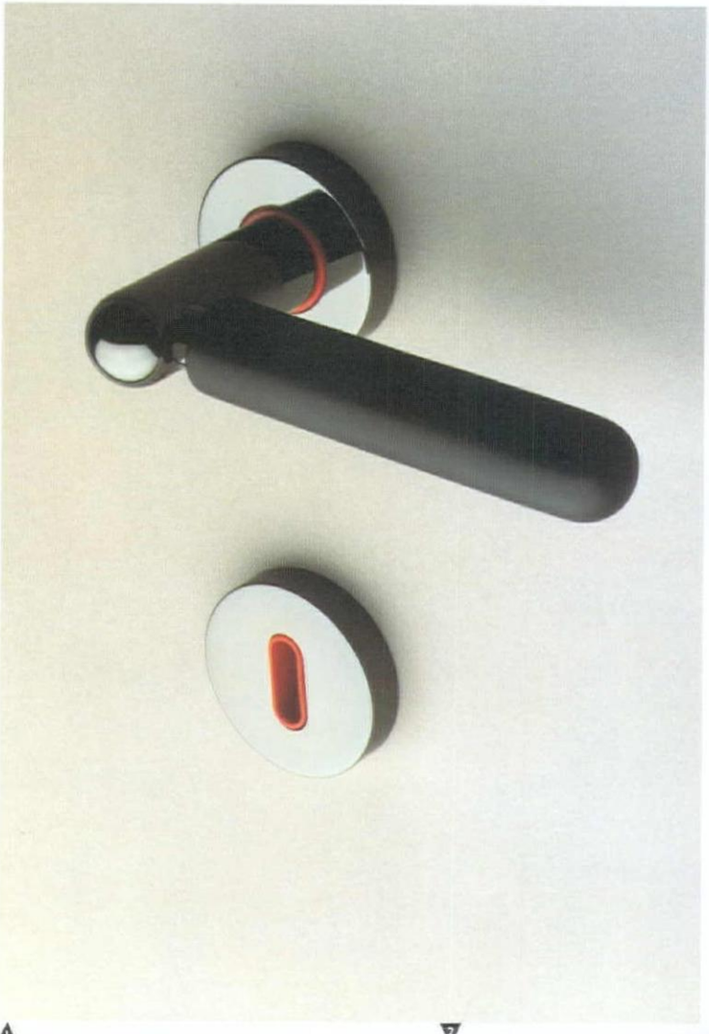
With the UK in recession and the construction markets expecting to show only a gradual improvement from the end of 1991 onwards, many architectural ironmongers are concerned that the slow recovery will begin to have an impact on their businesses from the end of 1991 onwards since the products they supply come at the end of the building cycle.

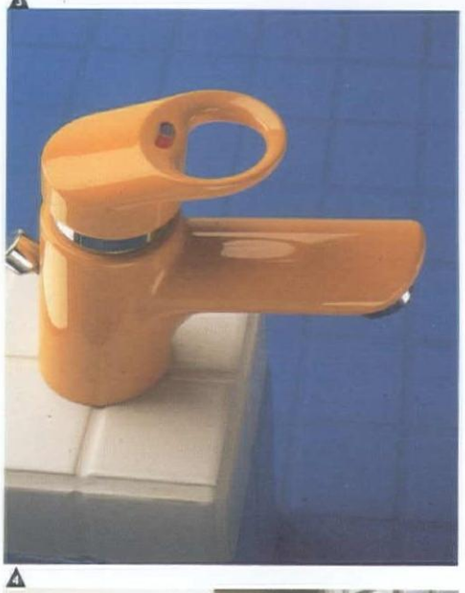
Meeting at their annual conference, they heard speaker after speaker explain the effects of recession on the construction industry as well as the economy.

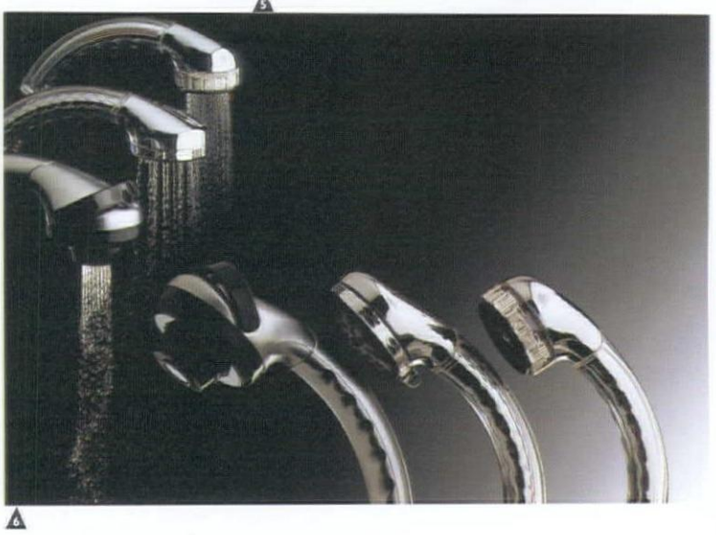
But while the short term may look bleak, UK architectural ironmongers are well placed in the long term to influence trends in the wider European market due to their understanding of quite complex products and their partnership with architects. □

A HANDLE ON CHANGE

A survey of new international developments in architectural Ironmongery.







1
The linear simplicity and compactness of Giuliana makes this door handle equally well suited to traditional or modern settings. Designed by Sergio Mazza and Giuliana Gramigna and available from Olivari, Via G Matteotti 140, 28021 Borgomanero (NO), Italy. Tel: 39322 844001.

2
Featuring a distinctively European design, the Illusions collection of bathroom products are made from solid brass and come in three finishes. The Chicago Faucet Company, 2100 South Clearwater Drive, Des Plaines, IL 60018, USA. Tel: 708 803-5000.

3
Leggott's Rapport lever is described as a subtle modification to the widely specified safety lever. W&R Leggott, Silens, East Parade, Bradford, BD1 5HA, UK. Tel: 0274 392716.

4
The graceful Diva single lever mixer is available in three finishes: chromium plated/polished brass; velvet chromium plated; and velvet chromium plated/polished brass. Rubinetterie Rapetti, 1-46043 Castiglione della Stiviere (MN), Italy. Tel: (0376) 631061.

5
Initially designed in 1970, the stainless steel D-line product range manufactured by Carl F Petersen has been consistently improved and enhanced by leading Danish architect Knud Holscher. UK distributor: Elementer. Carl F Petersen, GL Koegevej 65, DK2500, Valby, Denmark. Tel: 45 36 44 11 38.

6
Modern shower system Relexa from Friedrich Grohe, Armaturenfabrik GmbH+ Co, Haupstr. 137, 5870 Hemer, Germany. Tel: 02372/53-1.

7
Designed to be multi-functional, Piramide is appropriate for a number of different settings. The use of traditional materials such as brass in various finishes, zirconium rubber and chrome gives the product range classical elegance. Frascio Giacinto, 25071 Agnosine (Brescia), Via S Andrea 5, Italy.
Tel: 0365/866 385-6.

8
Three new pull handles have been added to the Reflex range from G&S Allgood: an L-shaped quarter circle and a straight handle. All are designed with curved underside for a better hand grip.
G&S Allgood Group, Caterville House, 297 Euston Road, London NW1 3AQ, UK.
Tel: 071 387 9951.

9
The Heritage Brass Collection, a comprehensive range of door and window furniture and co-ordinating fittings, from M Marcus, Unit 7, Blackbrook Industrial Estate, Peartree Lane, Dudley, West Midlands DY2 0XW, UK.
Tel: 0384 457900.

10, 11
Resilient and attractive nylon door furniture (left) and wall handrail and balustrade (right) part of the complete range all available in 13 colours, from HEWI (UK), Scimitar Close, Gillingham Business Park, Gillingham, Kent ME8 0RN, UK.
Tel: 0634 377688.

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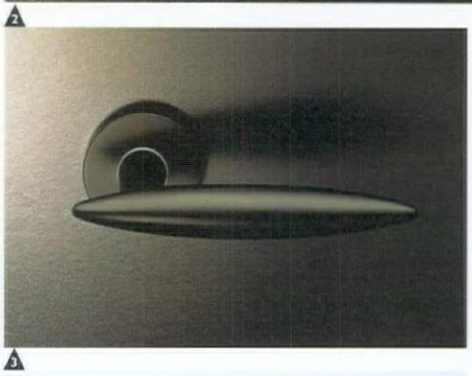

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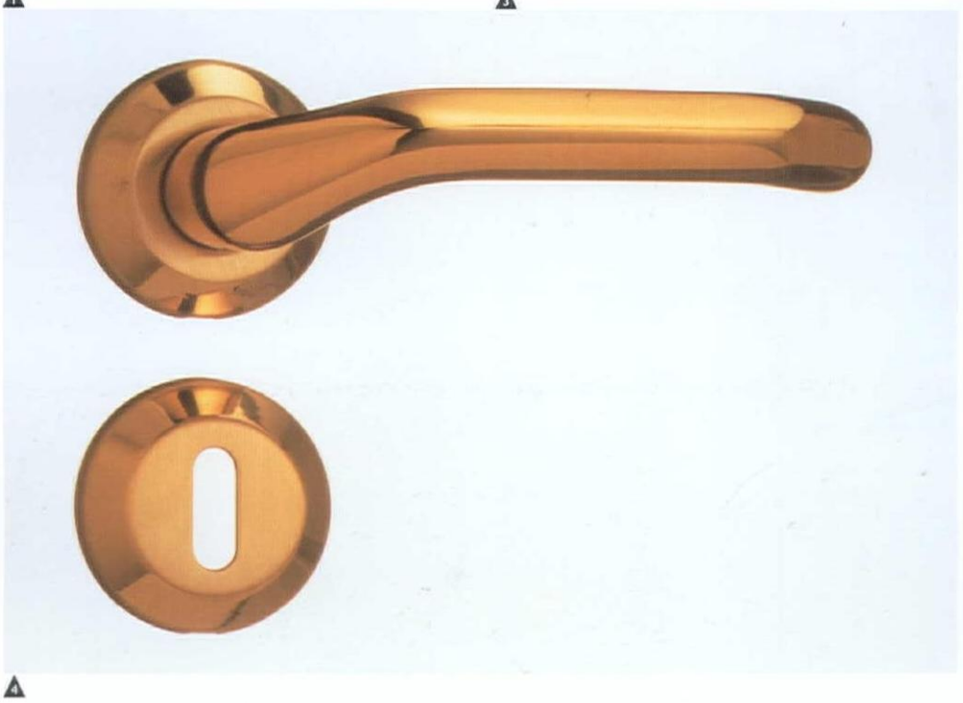

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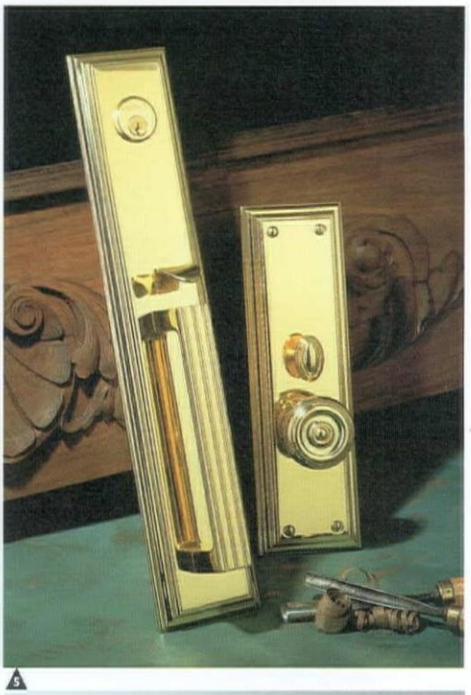

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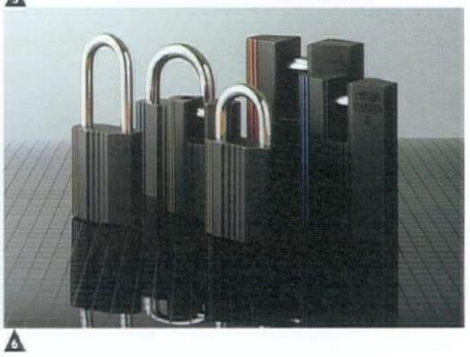


6

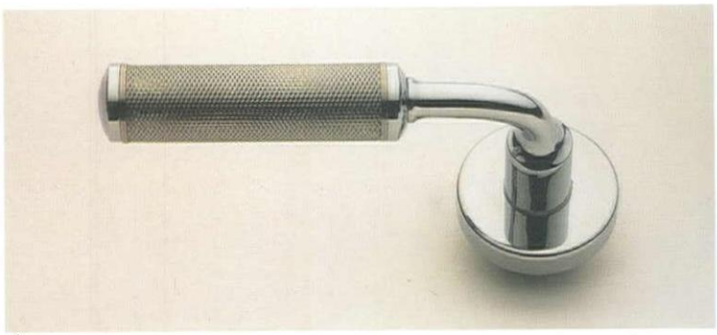
1
Elegantly designed single handle tap mixer from Rubinetterie Stella, 20131 Milano, Via Camerini 8, Italy. Tel: (02) 284 11 44.

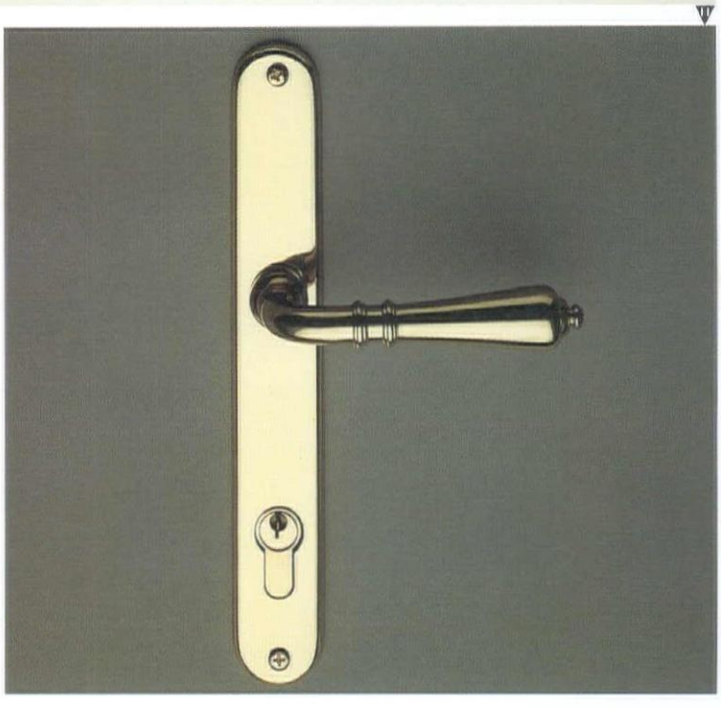
2, 3
Libra (top), designed by Studio Kairos, and Pegaso (centre), designed by Alberto Meda, is manufactured in forged brass and is available in gold plate, chrome or black matt. Colombo Design Globe SRL, Via Rossini, 44-20038 Seregno (MI), Italy. Tel: 0362 326320.

4
Sober and elegant in design, the Satu series is available from Mandelli, 20045 Desana Brianza, Via Rivabella 90, Milano, Italy. Tel: 0362 949755.

5
Classic-looking door handle sets from the Baldwin Hardware Corporation, 841 E. Wyomissing Blvd. Box 15048, Reading, PA 19612, USA. Tel: (215) 777-7811.

6
Designed to be both effective and aesthetically pleasing, these new padlocks from ASSA conform with all known and proposed European standards and meet varying building security requirements. ASSA, 75 Sumner Road, Croydon, Surrey CR0 3LN, UK. Tel: 081 688 5191.





7, 8
Designed in Italy, the Salice Paolo range of door furniture from John Planck is available in a wide variety of models and finishes. Ariada (top) comes in polished chrome. Scilla (below) is available in chrome and black pearl. John Planck, 3 Southern House, Anthony's Way, Medway City Estate, Strood, Rochester. Kent ME2 4DN, UK. Tel: 0634 720077.

9
As with all Normbau handicap products, this adaptable shower seat is reinforced with a steel core and is made of nylon for maximum comfort, resisting heat and cold. Available in 12 different colours from Newman Tonks Inc, 805 North Buckman Street, PO Box 548, Sheperdsville, KY 40165, USA. Tel: (800) 826-5792.

10
Designed to complement rather than detract from the clean lines of modern doors, this 8400 mortice latch operates as logically as it looks. Adams Rite, Unit 6, Moreton Industrial Estate, London Road, Swanley, Kent BR8 8TZ, UK. Tel: 0322 669211.

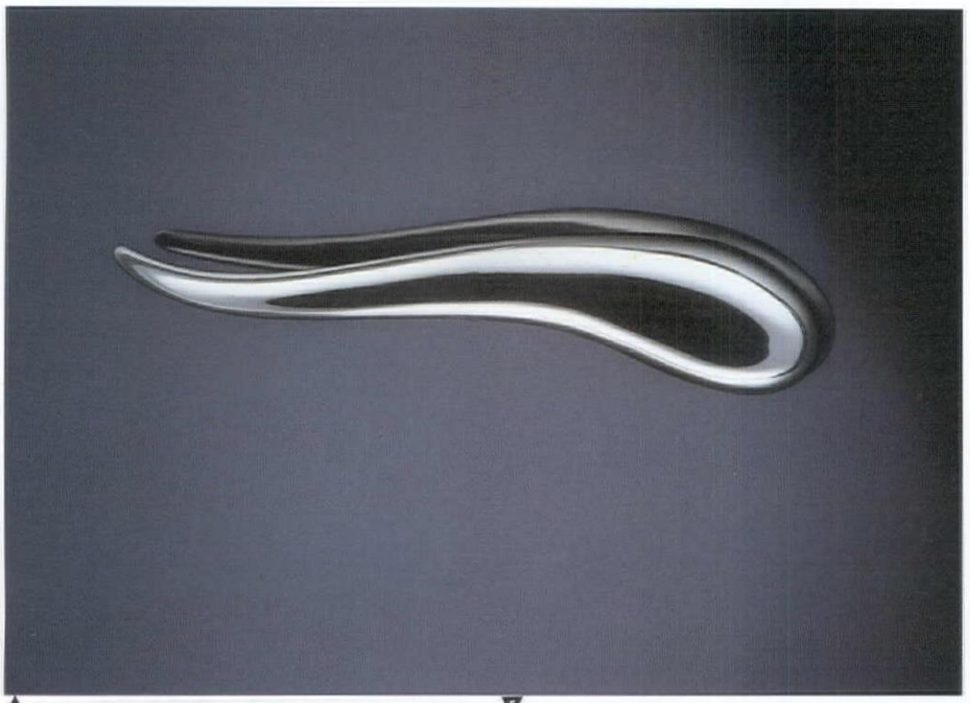
11
Omnia offers a programme of narrow bucket mortise locksets with solid brass trim. They are suitable for French doors, patio doors or indeed any door with a narrow stile. Eleven designs are offered with four finishes. Omnia Industries Inc, Cedar Grove, New Jersey 07009, USA. Tel: (201) 239 7272.

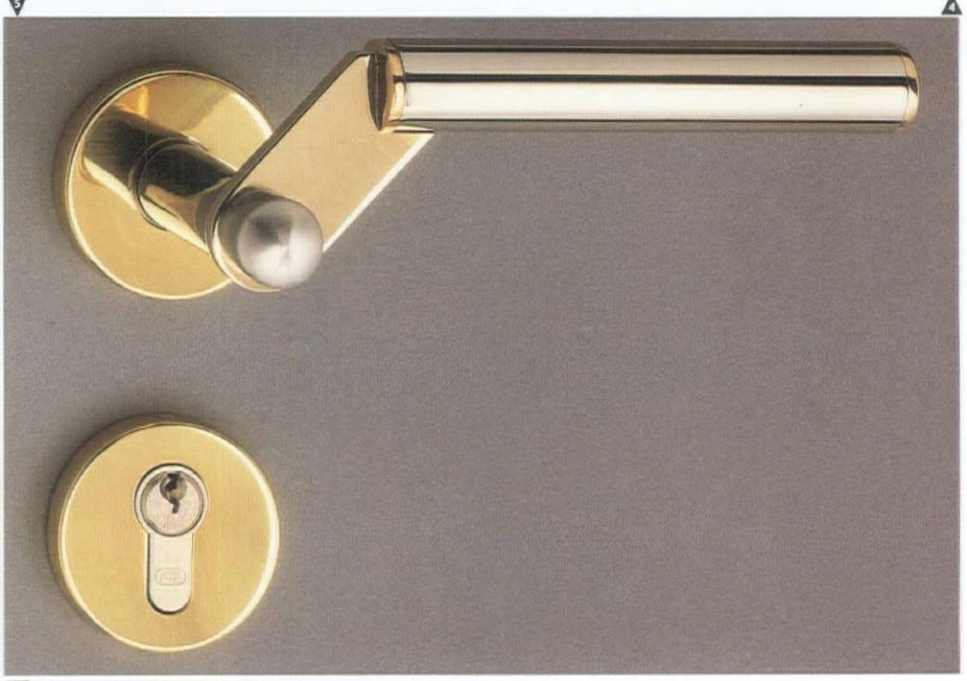
1, 2
APRIPI (top left), designed by Philippe Starck, and Sinn (centre left) designed by Hannes Wettstein; two lyrical and sculptural door handle designs from Kleis, Divisione Di RDS, Via Cavalieri di Malta 6, 35038 Torreglia Padova, Italy. Tel: 049 5211553.

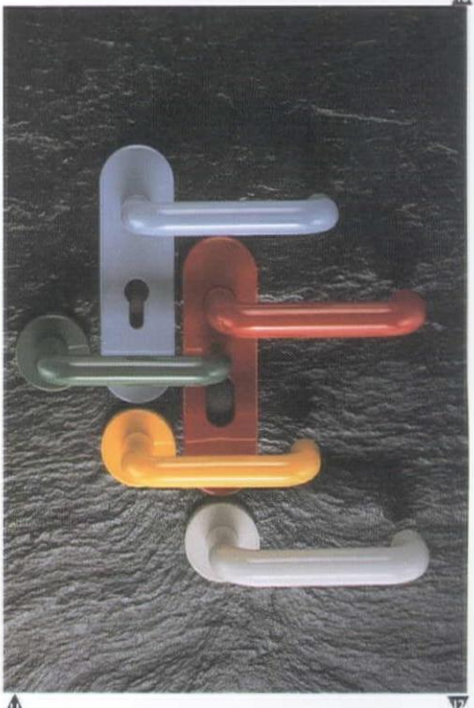
3
Made in Denmark, Randi-Line products are based on four lever handle shapes produced in stainless steel or brass. UK distributor: Thomas Laidlaw Architectural Hardware Division, Cheshire. Randi Fabrikerne, Mirabellevej 2, Postbar 2028, DK-8900 Randers, Denmark. Tel: 86 42 75 22.

4, 5
Coloured door closers (top right) and Ogro door furniture (centre right) from Dorma, designed and manufactured in Germany in a wide choice of designs and finishes. Dorma, Breckerfelder Strasse 42, D-5828 Ennepetal 14, Germany. Tel: 49 23 33/793-0.

6
The contemporary look of Kohler's Bravura faucet line is inspired by avante garde design. The line includes faucets for lavatories, baths, showers and bidets. Kohler Company, Kohler, Winsconsin, 53044, USA. Tel: 414-457 4441.





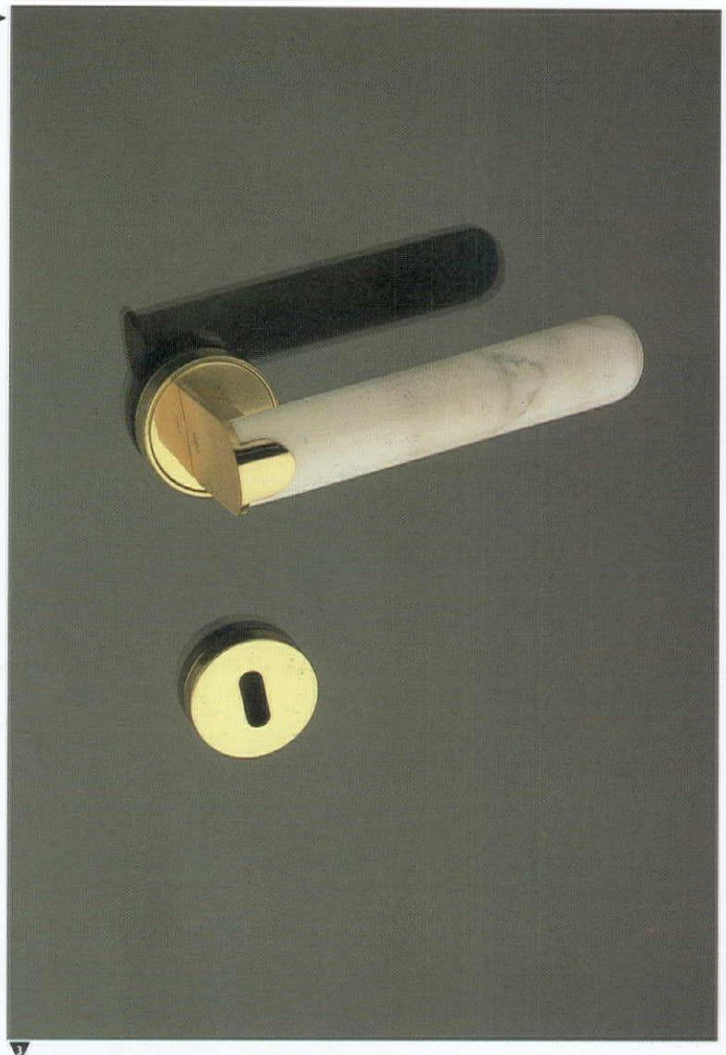


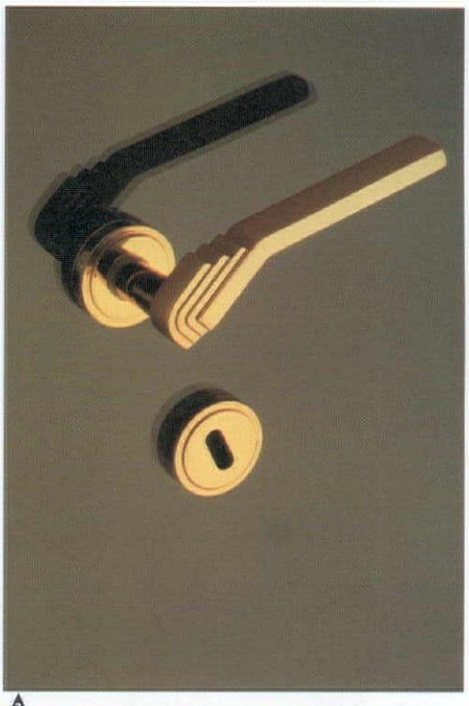
7, 8, 9
Three products exemplifying the FSB design approach: (top left) elegant lever handle designed in mid-1920s Vienna by the Austrian philosopher Ludwig Wittgenstein; (top centre) door furniture designed by Swiss architect Mario Botta; and (above) a stainless steel handle designed by English furniture designer Jasper Morrison. FSB Design Hardware, 26-27 The Bell Centre, Newton Road, Crawley, West Sussex, RH10 2TU. Tel: 0293 538300.

10
Medium duty cylindrical lock from Best Lock Corporation machined from solid brass or bronze. Best Lock Corporation, PO Box 50444, Indianapolis, Indiana 46250, USA. Tel: (317) 849 2250.

11
Arcus is a co-ordinated range of nylon hardware offering a selection of lever handles, pull handles, bathroom accessories, fittings for the disabled and balustrading. Thomas Laidlaw, Pennine House, Carrs Road, Cheadle, Cheshire, SK8 2EE, UK. Tel: 061 491 4343.

12
Sloan's sensor-operated Optima ESD -90 soap dispenser offers total hands-free operation in any lavatory setting. Sloan Valve Company, 10500 Seymour Avenue, Franklin Park, Illinois 60131-1259, USA. Tel: 708 671 4300.





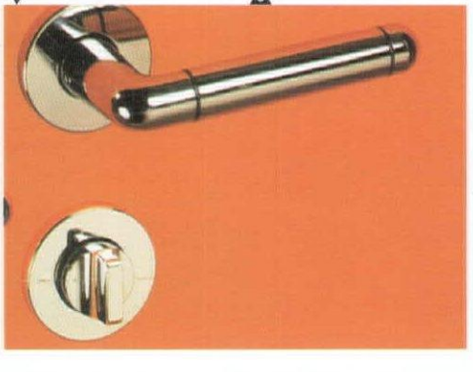
1, 2
Stylish products from VCR International. (Top left) Fusital Series Otto F, designed by Gianfranco Frattini, available in a briarwood and a marble version. (Top right) Fusital Series Quattro S, designed by Sottsass Associates, available in polished brass and black. VCR International, Via Concordia 16, 20055 Renate, Milano, Italy. Tel: 39-362 982260.

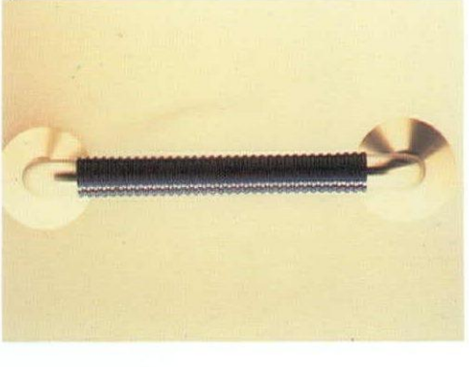
3
The Linea Constrasto range of fittings with concealed fixing offer nine different permutations of brass, chrome and colour. Hamilton Litestat , Unit G, Quarry Industrial Estate, Mere, Wilts BA12 6LA, UK. Tel: 0747 860088.

4
Deco range of taps, part of an entire Art Deco-styled programme of sanitaryware and accessories from Cesame, Via Cernaia 11, 20121 Milan, Italy. Tel: 39-2-657-1818.

5
From the French-made Signature line of architectural hardware by Bezault. UK distributor: Handles of Norwich. Bezault, 49160 Longue, France. Tel: (33) 41 53 21 00.

6, 7
The versatile and practical Context range designed by FM Design of London for Josiah Parkes and Sons, Union Works, Gower Street, Willenhall, West Midlands WV13 1JX, UK. Tel: 0902 366931.



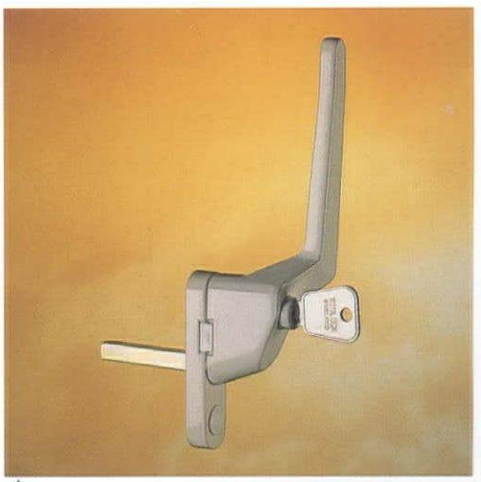


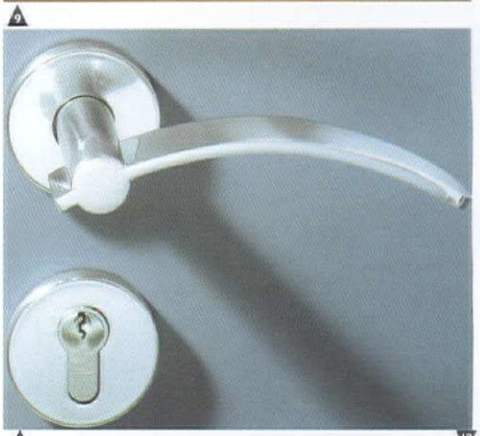
8
Inspirational Jugenstil polished lever handle from NV Vervloet-Faes, Waversesteenweg 169-175, Chaussee de Wavre 169-175, 1050 Brussels, Belgium. Tel: 02 511 4670.

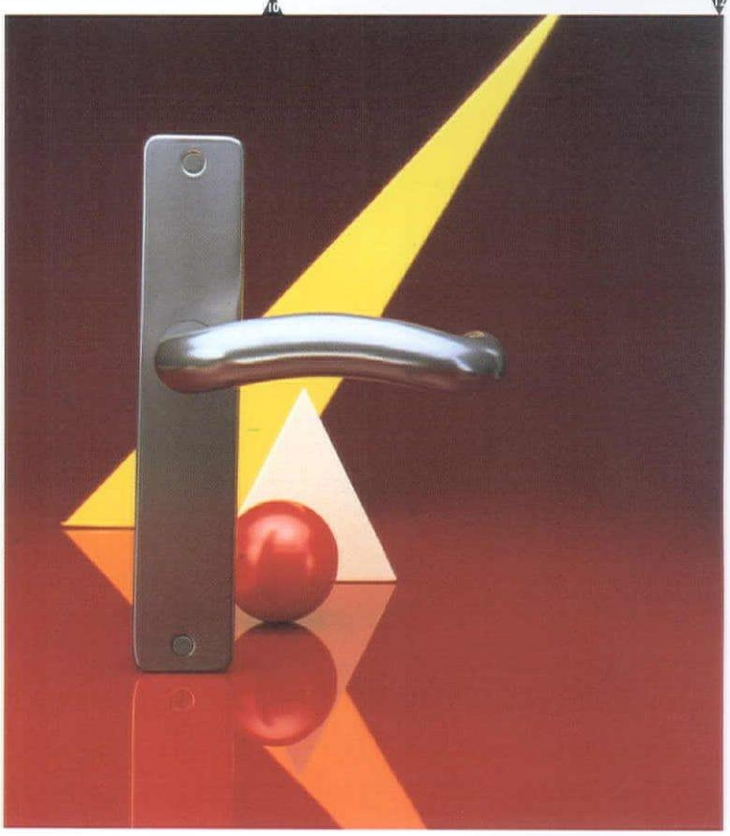
9
A new addition to the Stronghold window handle range from Winlock Security, Halesfield 8, Telford, Shropshire TF7 4ES, UK. Tel: 0952 680178.

10
Elegant stainless steel lever handle from Vieler International, D-5860 Iserlohn, Postfach 7655, Germany. Tel: 0-23 74-52-0.

11, 12
New product lines from Dryad Simplan: (left) stainless steel door furniture and handrail, (right) the K60 lever handle, available in silver anodised aluminium and 13 nylon-coated colours. Dryad Simplan, Omega House, Blackbird Road, Leicester LE4 0AJ, UK. Tel: (0533) 538844.







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