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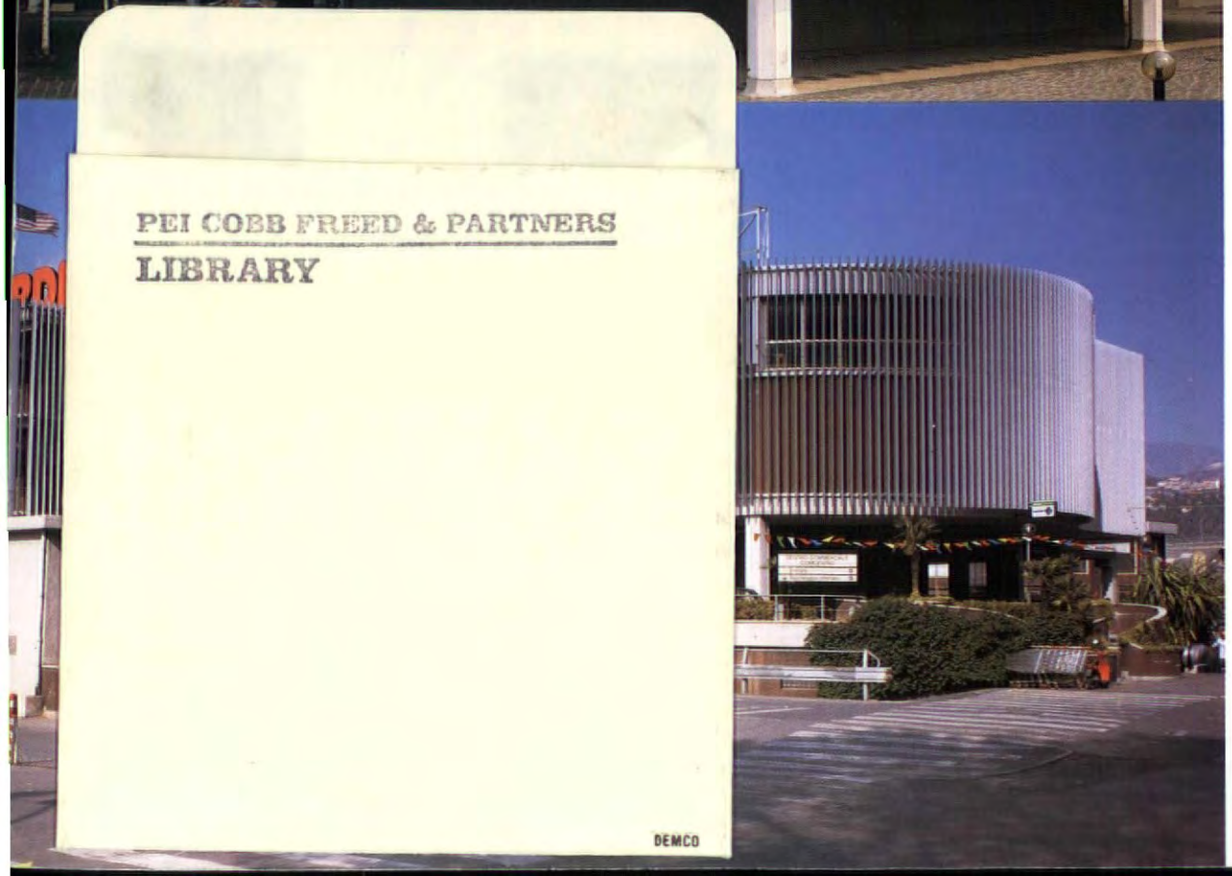

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THE INDEPENDENT MAGAZINE OF THE INTERNATIONAL ACADEMY OF ARCHITECTURE (IAA) NUMBER 20

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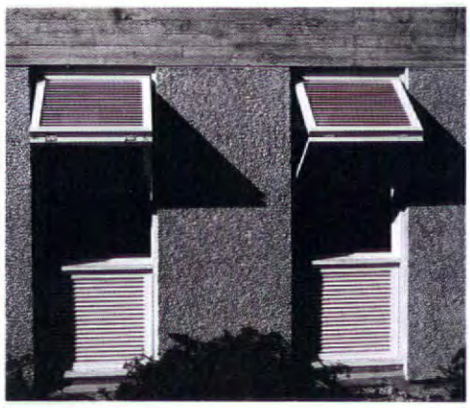
Cover: Pierre Vago, Auguste Perret and architects of the RIA at the Victor Emmanuel monument in Rome 1933



Vago windows

Cranfield technology

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Young architects

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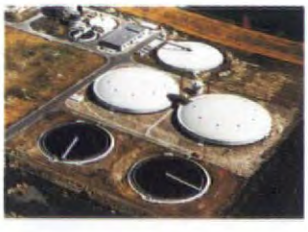
A spacer fabric, only 2 cm thick, filled with sand, reduces the noise down to one twentieth on a major building site in Wiesbaden.



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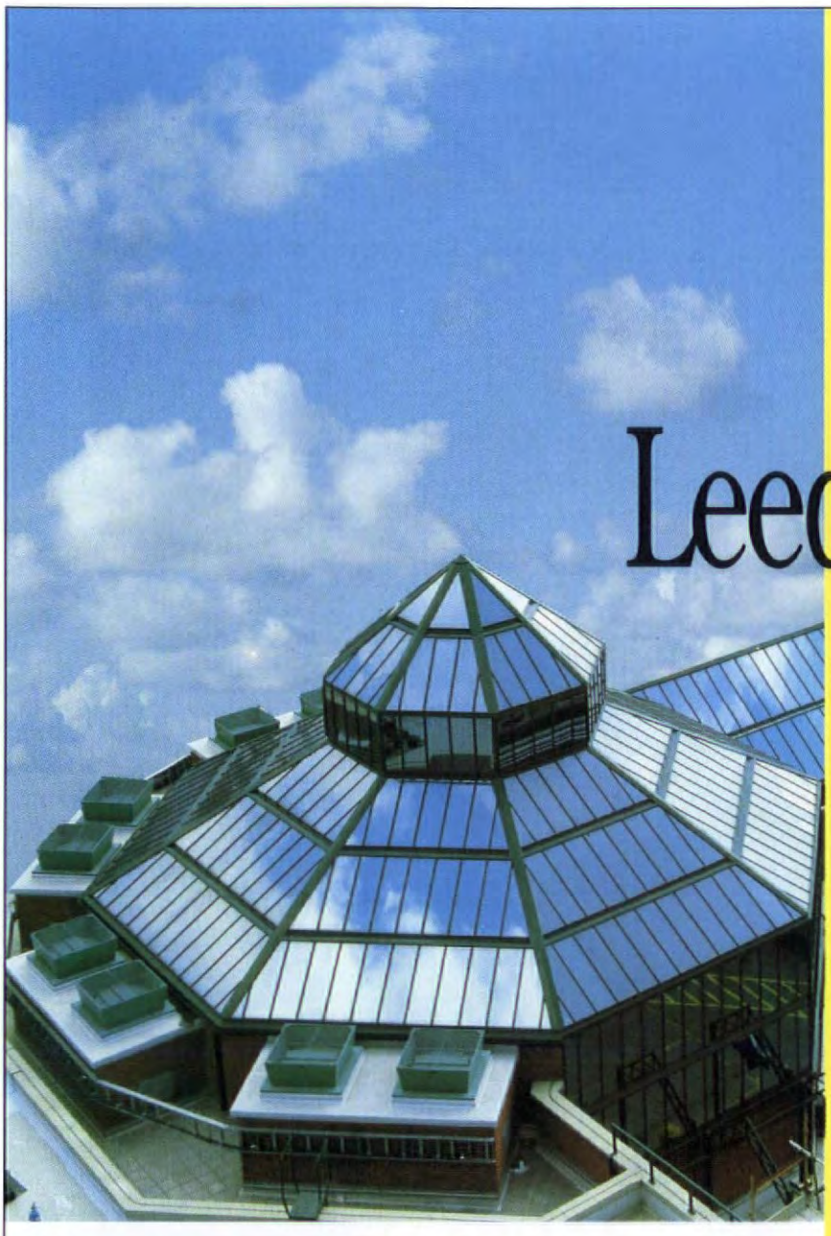

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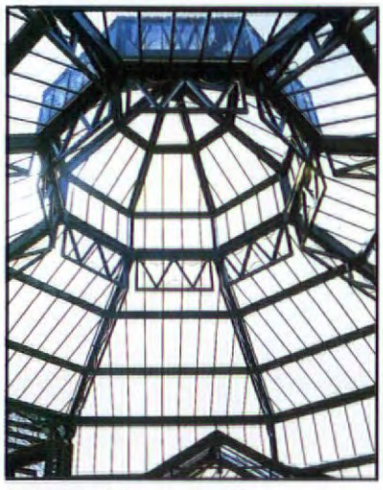
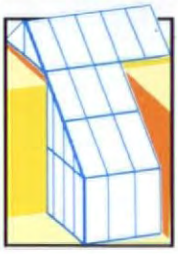


Schofield Centre, Leeds.
Architects:
Crampin & Pring.



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A detail of the fixing: The 5000 kG heavy fabric Membrane connected and tensioned with steelwires to its curved steel supports.

Constructive specifications with regard to the membrane.

Bieri Membranbau AG. the manufacturer of this structure which is designed for the 700 Year celebration of the "Eedgenoßenschaft of Helvetica".
Designed by the world famous Architect Mario Botta.

This construction with its steel-tubular supports, in combination with a cover of fabric, is extremely interesting specially due to its location at "Castle Grande in Bellinzona".

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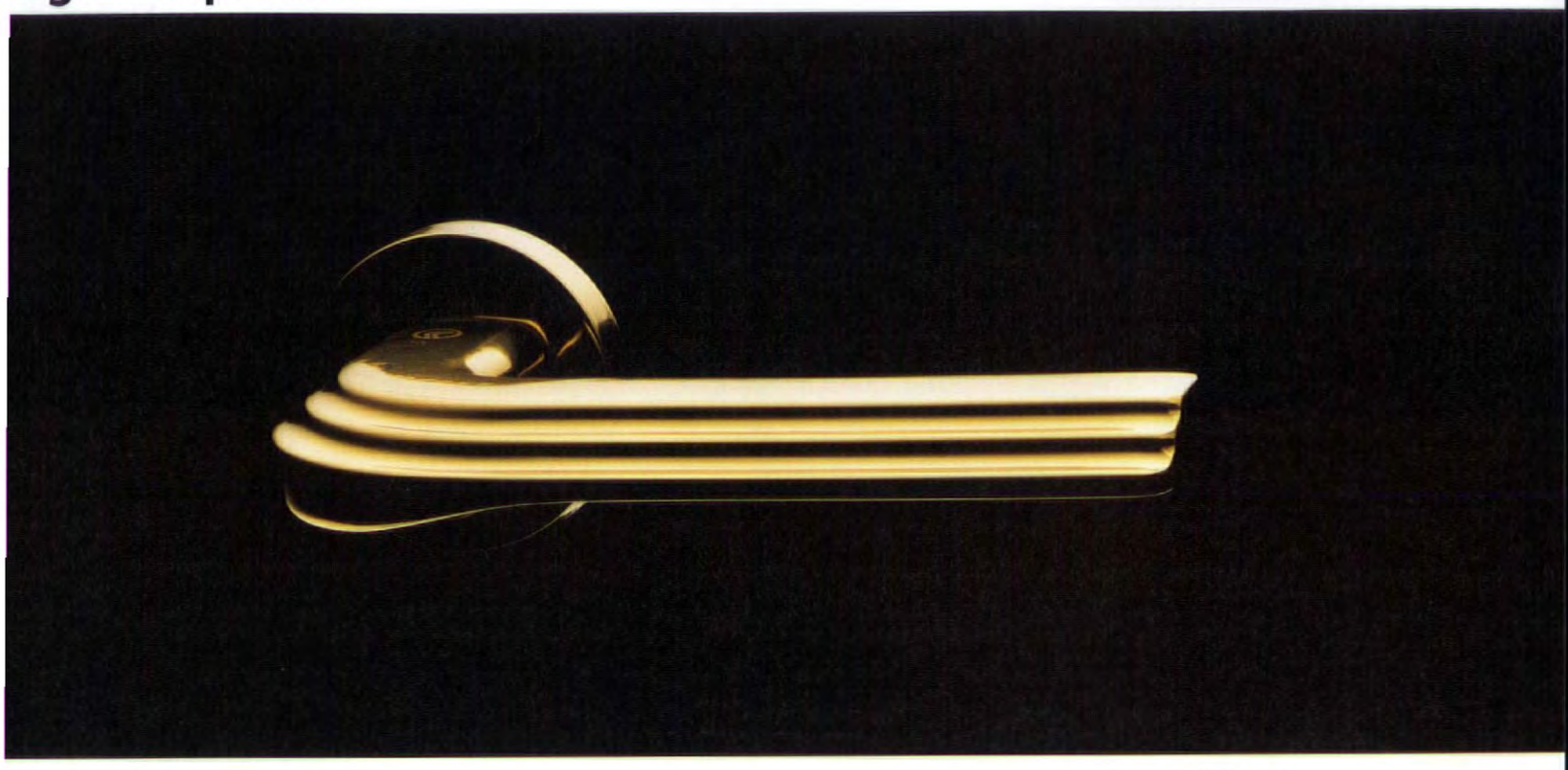
Lighted profile.

Cini Boeri



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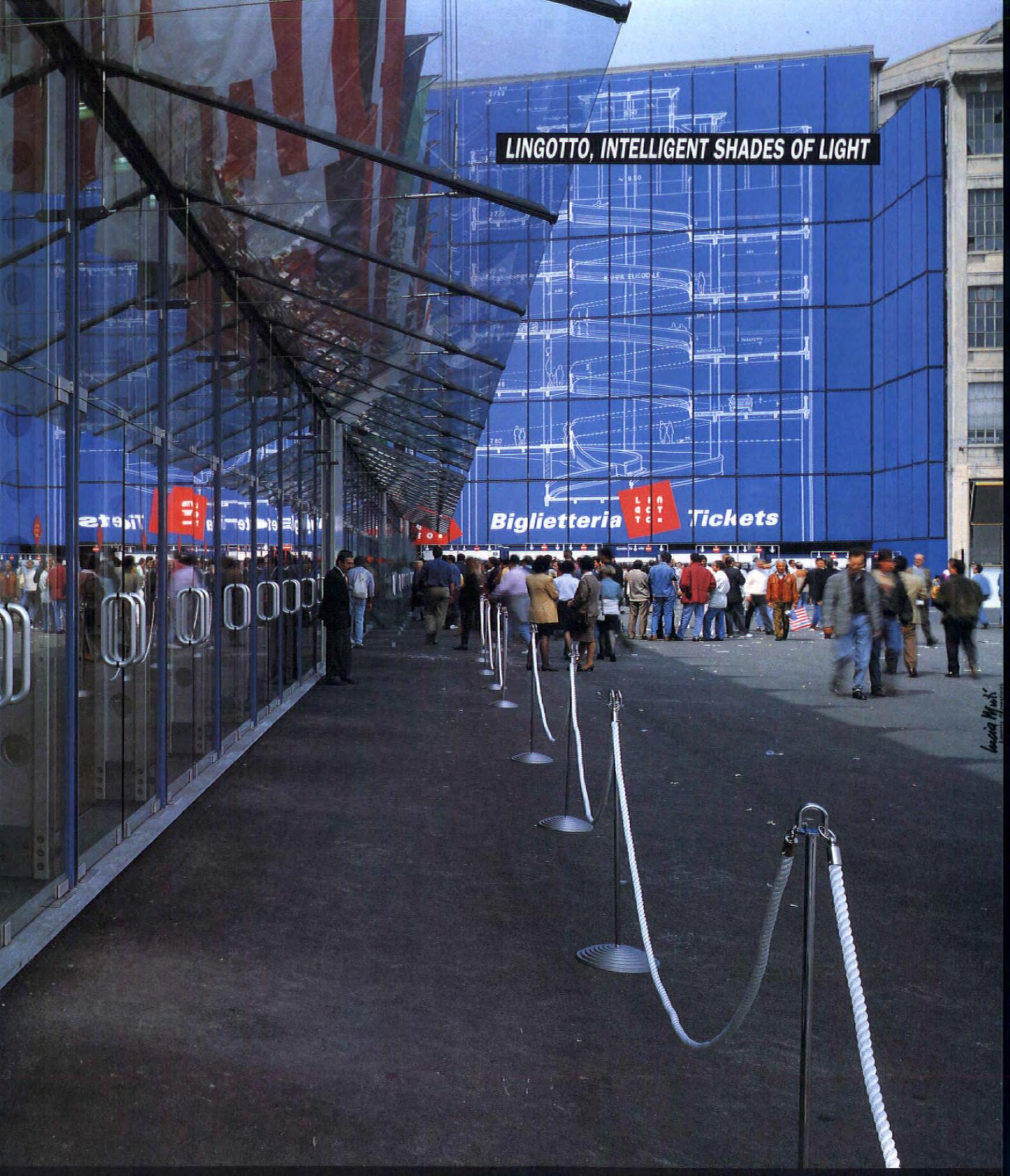

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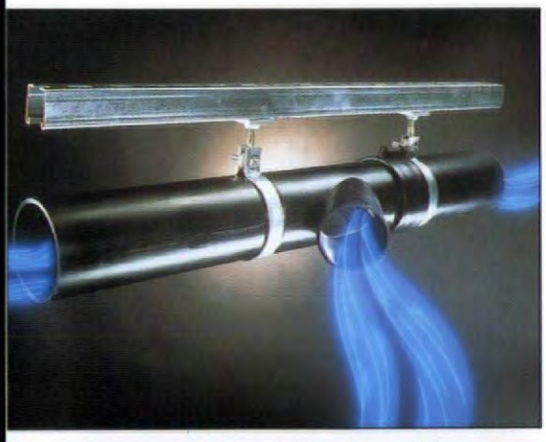

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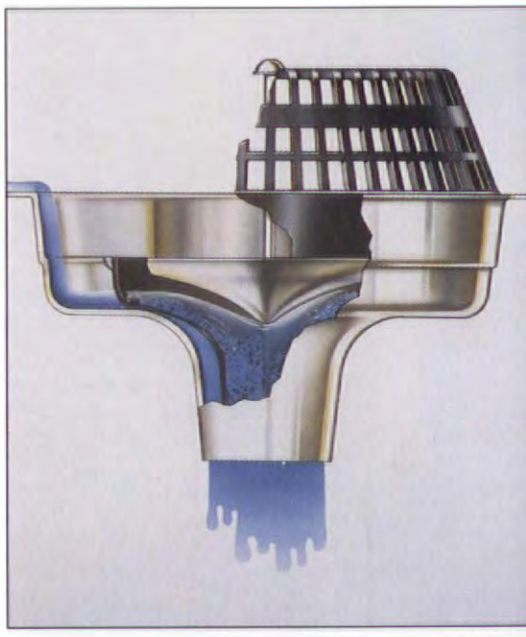

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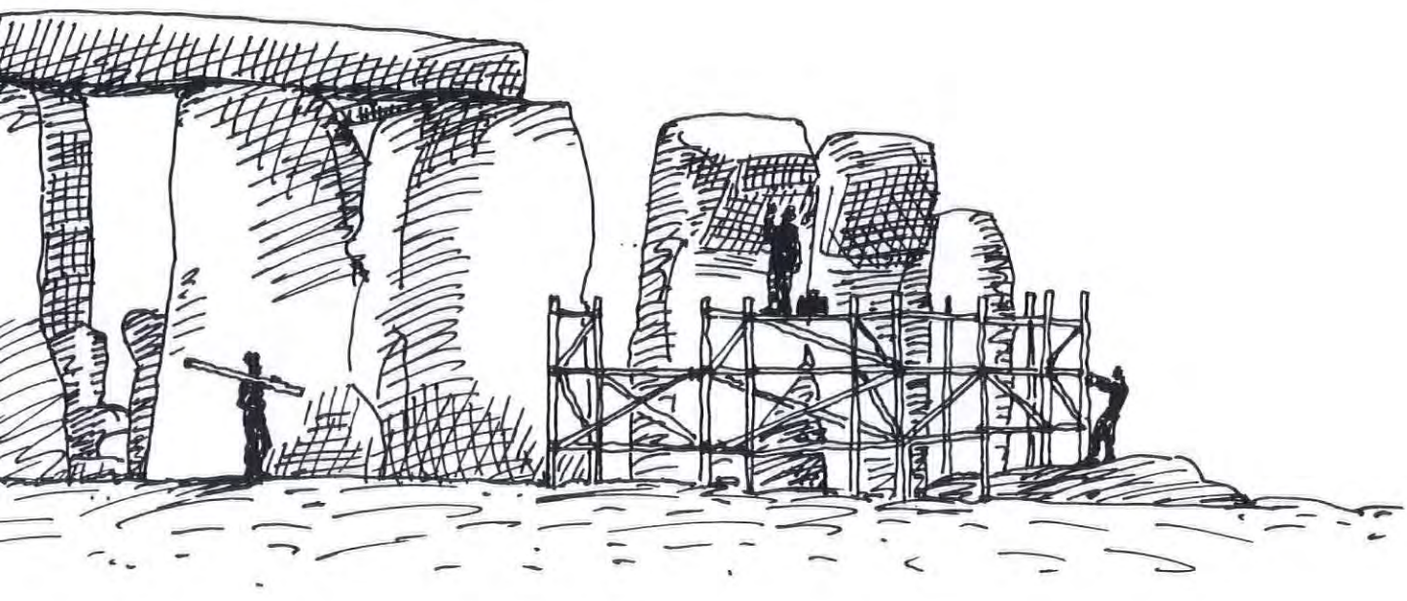

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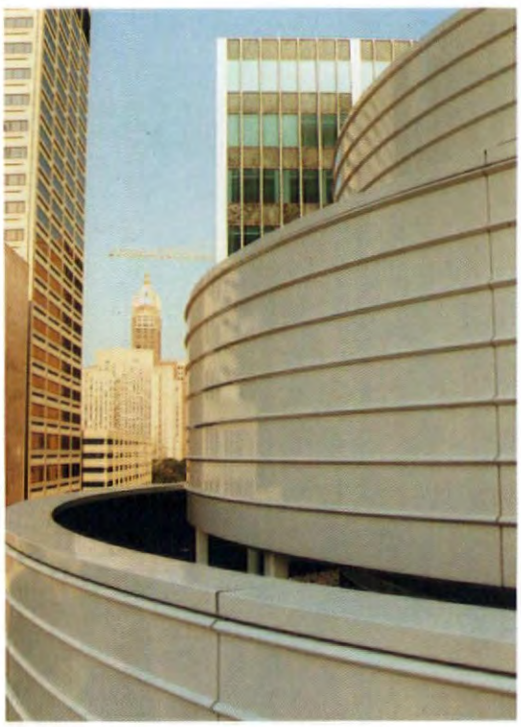

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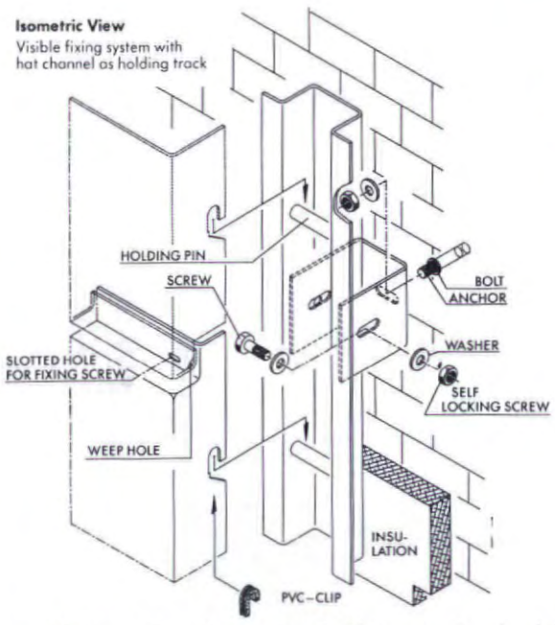

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Architect:	Solomon Cordwell Buenz Assoc.
General Contractor:	Schal Assoc.
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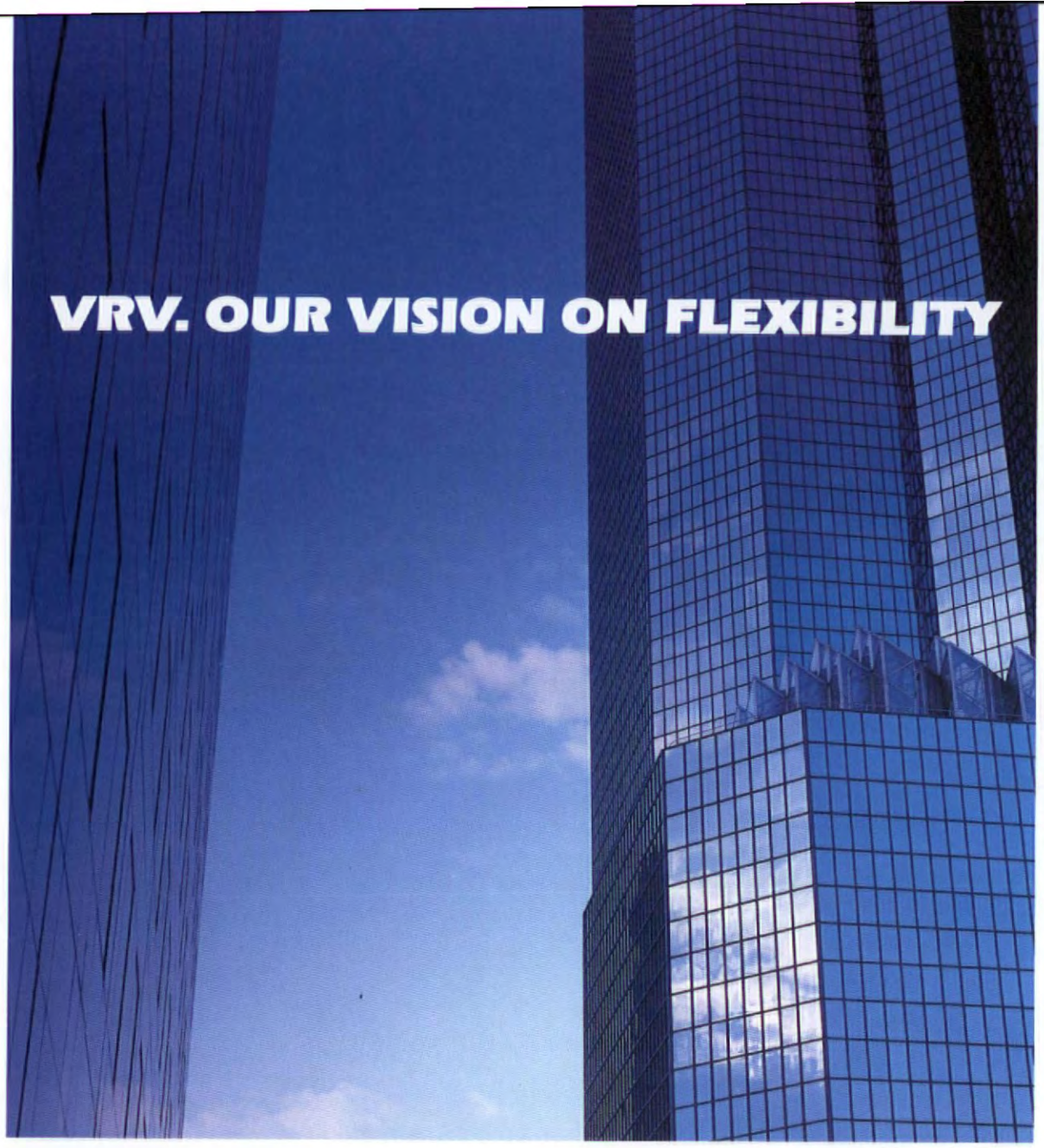

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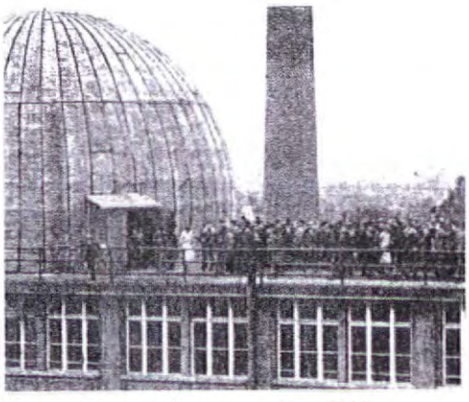
WORLD ARCHITECTURE



The world's first planetarium, Jena 1924

Learning from the past

In an age that waits with bated breath for the next reactionary Royal pronouncement on the subject of architecture, it is refreshing to turn to the past, not in a spirit of ignorant veneration, but in search of lessons, or systems of analogies, that can give guidance for the future. This is the real purpose of the collective memory of history: the way it continues to earn its keep in the Modern world. For, like accurate weather forecasting, seeing into the technological future is as much as matter of keeping accurate records as it is of making wild guesses as to how things will turn out.

A not so simple example will make this paradox clear. Readers will remember the argument that once raged about what exactly it was that distinguished High-Tech architecture from Modern architecture; and also the contingent argument about the identity of the first ever High-Tech building. Neither of these arguments was ever really concluded, although it is probably fair to say that what ended up as the majority position on the first is that High-Tech architecture dramatises structure while Modern architecture expressed function. The non-conclusion to the second argument was more enlightening: by and large the trend-spotters who concerned themselves with this question ended up in one of two camps; a "historical" Crystal Palace group, and a non-historical Reliance Controls group. To the first, High-Tech architecture was no more than a return to the ideals of Victorian engineering circa 1851: to the second, it was something entirely new invented in the 1960s in Belsize Park and Aberdare Gardens.

The difference between these two positions illuminates the whole question of learning from the past. For the more we look into them, the more sceptical we must become. Upon examination, the Crystal Palace of 1851 turns out to owe more than a little to earlier greenhouse structures whose dates creep backwards towards the end of the eighteenth century. But in the same way the pioneering role of Reliance Controls also begins to disintegrate under comparison with Mies van der Rohe's Farnsworth house (1953); the Skylon and the Dome of Discovery (1951); Bertram Goldberg and Gilmer Black's mast-supported ice cream parlour of 1939; the cable-stayed fabric pavilion designed by Le Corbusier for the Paris Exhibition of 1937; Buckminster Fuller's Dymaxion house of 1927, and so on back to the Nissen hut of 1916, Gustave Eiffel's 1879 airship hanger at Chalais Meudon, Sheerness Boat Store (1860), the Crystal Palace itself and - probably not even finally - the astonishing air-supported structures proposed by Jean-Baptiste Meusnier as early as 1784!

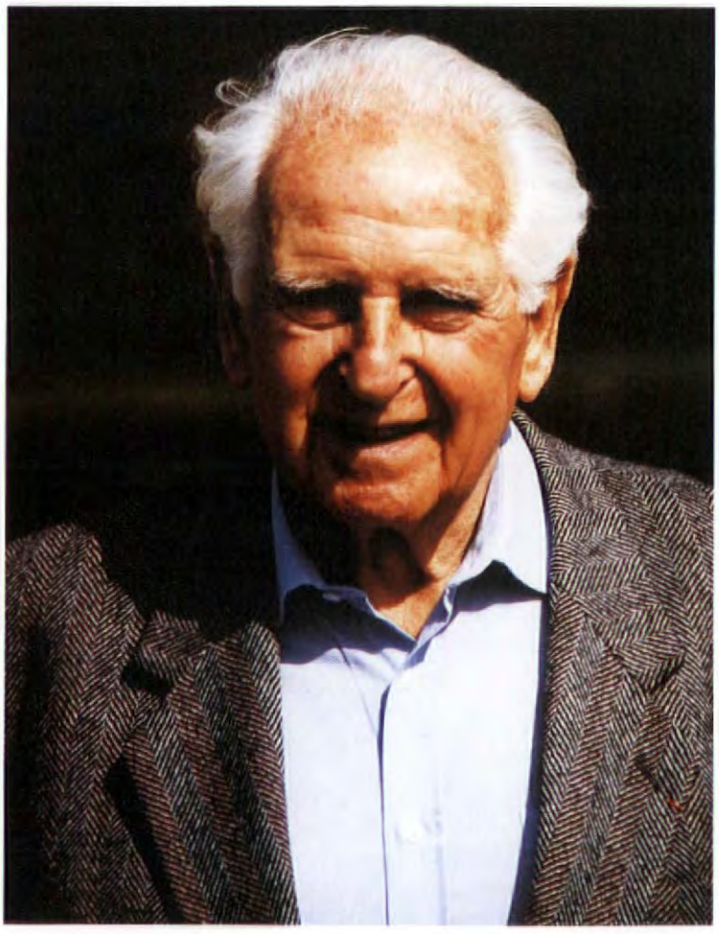
All of these buildings and projects have more than a passing claim to be considered High-Tech architecture, yet some of them miss the two popularly accepted dates by as much as a century. The melancholy truth appears to be that learning from the past in architecture first means learning what the past is, before making pronouncements about its meaning.

Martin Pawley

THE DOG AND THE SKELETON

MEMORIES OF LE CORBUSIER AND AUGUSTE PERRET

During his long life Pierre Vago made the acquaintance of many of the great Modern architects of the twentieth century. From the avant-garde of the 1930s to the young firebrands who overthrew the Beaux-Arts educational system in 1968, he met and remembers them all. His reminiscences of Le Corbusier (1887-1965) and Auguste Perret (1874-1954) embody his judgment upon the era dominated by the Modern Movement in Europe.



Pierre Vago at Noisy-sur-Ecole, 1992

"Le Corbusier was the greatest phenomenon of this century in architecture, there can be no doubt about that. I first met him in 1929 in Paris when he was 42 years old. I went to him to seek advice about my career in architecture. He knew the name of my father who was an architect in Hungary and he received me courteously. At that time he already had a considerable reputation in avant-garde circles and had many unpaid assistants from different countries working in his office. Even on that first occasion I remember forming the impression that he must have earned little or nothing from the practice of architecture. At the time his office was already working on the first volume of the *Oeuvre Complet* which was to grow to a complete bibliography of his works over the years. By contrast his architectural projects at that time were so small and his manner of conducting them so time-consuming that this must have swallowed up everything he earned in fees. I believe he survived and became influential because of the success of his magazines and his books, notably *L'Esprit Nouveau*, published with Amédée Ozenfant between 1920 and 1925, and of course his best known work *Vers une Architecture*, which was first published in 1923 and was enormously successful. When the first translation of this book was made into English in 1927, thirteen editions had already appeared in French. The book was translated into many other languages as well, and it remains in print to this day, as do many others of his works like *Urbanisme* and *L'Art decoratif d'Aujourd'hui*.

"Apart from the isolated prewar buildings, his real architectural career only began after 1945, and in a sense it was the creation of one man, the post-war minister for reconstruction, Eugène

Claudius-Petit. He was the first politician with authority and access to huge funds to take Le Corbusier's immense plans for urban redevelopment and prefabrication seriously. With the support of Claudius-Petit, his revolutionary town plan for Saint Dié, the original project for five monster Marseilles Unités, and other large scale post-war projects captured the attention of the world. He went on to collaborate in the design of the United Nations building in New York and to commence huge projects like Ahmedebad and Chandigarh where, however magnificent the public buildings, the limitations of his vision became plain in the uncontrolled and cancerous growth of the shanty towns around them, and the failure to achieve any relationship between such majestic structures as Courts of Justice and the Parliament building and the phenomenon of mass urbanism that he had claimed to be able to control.

Before the war and the advent of Claudius-Petit, in the uncertain architectural climate of the 1930s, I can only say that he always seemed to me to be like a small dog, in a state of permanent aggression. He was exalted, so to speak, by a conception of himself as a man with a mission that seemed to us form time to time to be faintly ridiculous. Yet we saw even then that he was a man of tremendous energy and determination who could not be ignored. There is no doubt that his courage in attacking the whole profession at that time was what broke the power of the academies and institutions. He was like a Panzer Division. He broke down the corrupt and obsolete competition system, wiped out the customs of thought built up over centuries and began a new era of creativity in architecture.

"But this much being said, as time lends perspective to all his writings and his works, I see him more and more as a man who was always wrong. While he was alive he would brook no criticism, not even the mildest, and yet we now know that his certainty was not proof against the fallibility of all individuals. Confronted by the enormous unfolding forces of the twentieth century, he failed just as completely as more modest architectural thinkers failed. Despite his majestic plans for the motor car, so dramatic-seeming in his 1922 *Ville Contemporaine*, he still underestimated the rate at which its use would grow. In 1947 he still assumed one car for every five families, 50 years later there are frequently two cars per family. He was not alone in being wrong about this, but that does not make him right. His conception of urbanism, radical though it was, could not succeed.

"In his architecture, as well as his thinking, there was failure too. There was to my mind often a discordance between use and form, a strictly formalistic, plastic pursuit of shapes without concern for internal spaces. How to build something never interested him. Only that it should appear so and so. The massive columns of the Unité in Marseilles are false in their dimensions, so are the massive beams. So is the construction beneath the skin of Ronchamp false. But, as with all architects of great reputation, his most fervent admirers never saw his buildings. Like Mies van der Rohe's original Barcelona Pavilion, the buildings of Le Corbusier were admired through books, magazines and exhibitions. In a way they were the propaganda achievement of photographers and of his own his skill as a writer and publisher.

"Le Corbusier had another means of spreading his influence too. From the very beginning he understood that he had to create groups and organisations that would propagate his ideas. Organisations like CIAM (Congrès Internationaux d'Architecture Moderne) and CIRPAC (Comité Internationale pour la Résolution des Problèmes de l'Architecture Contemporaine) fell under his sway and this led directly to the publication of influential manifesto documents like the 1933 Athens Charter, of which he was the principal author, which called for a single type of urban housing based upon the apartment block set in parkland that he had advocated for some time. The influence of Le Corbusier over CIAM lasted from its very first meeting in 1928 until its disintegration in 1956. In a way he became the Pope of all these groups and organisations, hypnotised as they were by his limitless confidence and his immense reputation.

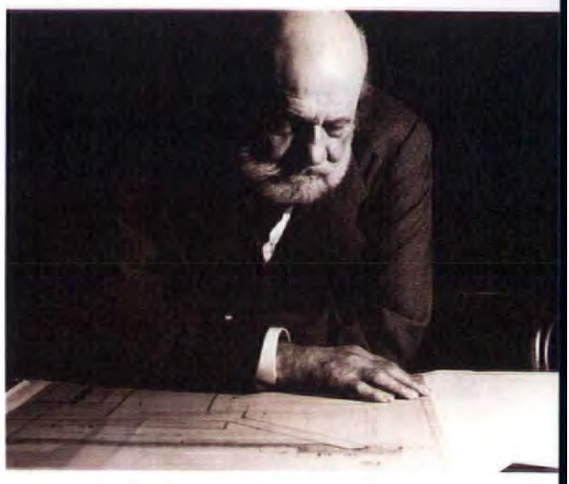
"But just as my misgivings about the correctness of Le Corbusier's thinking have grown with the passage of time, I must also own to an increase in my admiration for the leading figure of an older generation in whom I earlier lost faith. In my view, as a guide to the predicament of architecture today, 30 sentences of Auguste Perret are equal to five books by Le Corbusier. And yet Perret was not conservative. He too was an innovator and a pioneer. Like Le Corbusier, he faced continual battles with building control authorities. In 1903 his famous Paris reinforced concrete house in the Rue Franklin was refused a mortgage because the material was"untried", and the same house was cited seven years later by Le Corbusier when he tried to convince German architects of the importance of concrete construction.

"I remember this innovative Perret with warm admiration as my employer and my instructor at the Ecole Speciale d'Architecture in Paris; but I remember him too, years later in 1946, when I became a member of his "Groupe Perret", charged with rebuilding the destroyed centre of the port of Le Havre. Instead of starting from scratch he proposed that we use a plan for the reconstruction of Porte Maillot in Paris that he had drawn up before the war. The group wavered but I was the only one to resign over this.

"Perret always believed that the structural framework of a building had the same importance as the skeleton of an animal. He saw it as the very foundation of architecture. I remember once, when we were looking at one of his projects, that I could see that he was unhappy with its pronounced horizontality. I tried to put his unease into words."

"Perhaps it is to do with life," I said. "Man is vertical, death is horizontal." After a silence he looked at me approvingly. "Vago," he said, "you have put your finger on it." □

(Top) Auguste Perret
(Bottom) Le Corbusier



PIERRE VAGO: A LIFE

Appointed editor of L'Architecture d'Aujourd'hui *in March 1931 at the age of 20, when he was still an unqualified student, Pierre Vago remained with the magazine until he retired from the chairmanship of its editorial board nearly 40 years later. By that time he was internationally renowned as an architect, as secretary general of the UIA, as a historian and as a critic. His dual career in journalism and architecture kept him at the heart of the Modern Movement from its rise to its fall.*

Pierre Vago with his mother Ghita Lenart 1912 and with his father Joseph 1915.

Pierre Vago was born in Budapest, one of the twin capitals of the now extinct Empire of Austria Hungary, on the 30th of August 1910. He was the son of Joseph Vago, a famous Hungarian architect, and Ghita Lenart, an opera singer of equal renown. Although not considered a functionalist architect, Joseph Vago's buildings during the last decades of the Empire displayed a structural rationalism and a predilection for plain, undecorated surfaces that marked him out from the mass of his contemporaries. Such structures as the Oradea Mare police barracks of 1912, and the Villa Grunwald of 1914 revealed a discipline and restraint unusual in an age given over to excess in complexity and decoration, and led to his being cited by later historians as an influential precursor of the Modern Movement.

Born in 1877, Joseph was at the height of his powers when the Austro Hungarian Empire was dismembered by the victorious Allies at the end of the Great War. With Hungary reduced by the 1919 Treaty of Trianon to little more than a city-state with a population of 10 million he, along with many of the Hungarian intelligentsia, elected to leave the country in pursuit of opportunities elsewhere. His wife's reputation abroad being greater than his own, the family moved to Rome where they lived in straightened circumstances. At the age of eight Pierre Vago was sent to an Italian school under a system which remitted all fees for those above a certain level of academic achievement. Determined to aid his struggling parents, he succeeded in remaining above this level throughout his school days. His mother too was successful as a tutor of aspiring opera singers. Only Joseph failed in exile. A convert to Socialism and Marxism he loathed the Italian Fascist regime of Benito Mussolini. From his emigration until his death in France in 1947 he rose to prominence in architecture only once: when, along with Corbusier and seven others, he was declared a first prize winner in the infamous League of Nations competition of 1927. Unlike Le Corbusier he was also subsequently selected as one of the four who were asked to combine their designs into the compromise structure finally built 10 years later. To this prestigious building on the shores of Lake Leman, now taken over by the United Nations, he contributed the plan.

Despite his father's lack of success in the post-war world, at the age of 14 Pierre Vago resolved to become an architect himself. Four years later, in pursuit of this ambition, he travelled to Paris, the centre of political freedom, culture and creativity in inter-war Europe, to begin his training. He arrived alone in the great city in 1928 with no more than 500 francs to his name. Finding a bed in an Italian student hostel he commenced a new life.

In 1928 the Ecole Nationale Superieure des Beaux-Arts in Paris was considered to be the finest school of architecture in the world, attracting students from all countries in far greater numbers than its handful of ateliers could ever absorb. Owing its origins to the pre-Revolutionary Royal School of the Seventeenth century, the Beaux-Arts operated according to an ancient system of privilege, with an admissions process that would be considered intolerable today. Twice a year up to 1,000 would-be students were allowed to compete for a place: of this number perhaps 100 French applicants would be admitted, plus 15 from abroad. This system, which remained in operation until 1968, was considered to require at least three attempts at entry before a place could be secured. From then on, working in an archi-

(Below) Architects of the RIA grouped before the Victor Emmanuel monument in Rome, 1933. From left to right in the front row: Monique Vago; Pierre Vago; unknown; Joseph Vago (side view); Arturo Calzabini (president of the Italian Society of Architects); Auguste Perret, Albert Laprade. Also visible in the photograph are Jean Ginsberg, Georges Appia and Fernand Fenzy. Fenzy was later shot by the Germans for resistance activities in occupied France.

tects' office during the day and working on student projects at night, the most determined and gifted could expect to graduate in seven or eight years. Vago's contemporary, the famous Albert Laprade, took 12 years to qualify. Thousands dropped out and never finished at all. One of the most famous of them was the great pioneer of reinforced concrete architecture, Auguste Perret, who subsequently became the patron of a Beaux-Arts atelier despite this handicap and numbered among his students the young Erno Goldfinger.

A year after he had arrived in Paris, Vago had had enough of the Beaux-Arts. Even today at a distance of 60 years he still finds it difficult to speak of the profanity, the pornography, the bullying and grotesque rituals that accompanied student life in the grand buildings of the Rue Bonaparte. In desperation he traded on his father's reputation: he sought the advice of four well known architects.

Visiting the office of Le Corbusier, who had never attended any architectural school himself, he was advised to do likewise. "Don't waste your time studying under fools," Jeanneret urged, "work in their offices and travel, then make you own way in the world." Vago looked about him at the assistants working for no pay in Le Corbusier's office and felt a twinge of doubt. Thanking the most radical of architects for his time and advice, he left.

Vago's next port of call was the more fashionable Modernist Michel Roux-Spitz, a graduate of the Beaux-Arts who offered the opposite advice. "The profanity and savagery of the school really is appalling," he agreed, "but you must submit to it in order to qualify. There is no other way. Any other course will merely result in wasting time."

After Roux-Spitz, Vago called upon Henri Sauvage, architect of the much admired Maison à Gradins, with its influential descending levels. Sauvage suggested that Vago abandon the Beaux-Arts forthwith and enrol at the Ecole Special d'Architecture, which offered a four year, full-time course. Though considered inferior in reputation to the Beaux-Arts this more conventional school was rising in importance. At that time Rob Mallet Stevens, architect of a number of admired apartment houses and commercial buildings in Paris, was among the tutors. He was soon to be joined by Perret himself, unseated from his Beaux-Arts *patronat* by traditionalist hostility.

The great concrete pioneer Auguste Perret was Vago's last interview. In a way his advice was similar to that of Le Corbusier. "I became an architect in spite of the Ecole des Beaux-Arts," he told Vago, "and I never obtained a diploma. My masters are the great theoreticians, Viollet-le-Duc and Guadet. I advise you to read their books."

In the end Vago accepted Sauvage's advice and enrolled at the Ecole Speciale, a decision he was never to regret. The only problem that confronted him was how to survive in Paris whilst attending school full time. Recalling this period at a distance of 60 years, Vago's account of his early life in Paris is one of absolute penury. Not until he graduated and began his military service could he afford the price of a cinema ticket or a cup of coffee. For years as a student he lived in squalid hotels, in hostels, and finally in a servants' room in Auteuil. His daily budget for food was 1 franc 95 centimes, and he carefully measured sausages and loaves before deciding which one to buy. Sometimes he actually fainted from hunger at his drawing board. He owed his life to a part-time job washing-up in a student cafeteria, where the staff were allowed to eat free once a day.

As he slowly found his feet in the architectural underworld of Paris during the Great Depression, Vago obtained draughting work from time to time. He also took an audacious step that was to have a profound influence on the course of his life. He wrote to the Italian magazine *La Festa* offering to act as their Paris architecture correspondent so that he could obtain a press card. Then in 1931, having established himself as a journalist, he met André Bloc, a man who was for many years to be the managing director and business brain behind *L'Architecture d'Aujourd'hui*. Bloc was an engineer who edited and published a trade journal for the rubber industry called *La Revue Generale du Caoutchouc*. In November 1930, in collaboration with the late Eugene Cahen, the owner of a Modern furniture shop, and Julius Posener, a student-journalist who wrote for the Berlin magazine *Bauwelt* in the same way as Vago wrote for *Festa*, Bloc had launched a new architectural magazine.

The first suggested title for what was to become *L'Architecture d'Aujourd'hui* had been *Construire*, but this later proved to belong to another publisher and had to be relinquished. So too was the title *L'Architecture Moderne* which at that time was judged by Cahen, Bloc and Posener to be a meaningless term, signifying nothing more than "contemporary architecture". Instead the name *L'Architecture d'Aujourd'hui* – "The Architecture of Today" – was siezed upon and, although inevitably shortened in popular discourse to "AA", it remains with the magazine to this day.

The November 1930 issue of the magazine was of striking appearance, quite different from its established competitors *L'Architecte* and *La Construction Moderne*. The creation of graphic designer Ernest Nathan, its cover consisted of a broad diagonal white stripe on a silver background with the title in red on a black rectangular field. Nathan had designed a special "constructivist" typeface to go with the magazine, and the title and the number

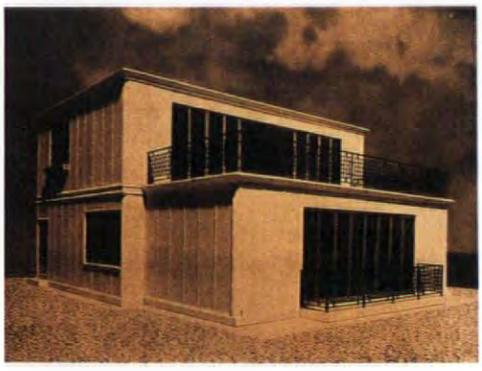
(Left) Evolution of cover design of L'Architecture d'Aujourd'hui *1930/1932/1935.*
(Below left) Prefabricated all-steel house designed for Grames metal company in 1934.

of the issue, were boldly printed in this on the cover. This striking design, Nathan's typeface, and the innovation of metal spiral binding, were all quickly abandoned, but they helped to establish the unique identity of the magazine.

L'Architecture d'Aujourd'hui was an instant success. Selling at 12 francs (about half a day's pay for an employed architect) the 1,600 copies of the first issue were swiftly sold – although many were bought by advertisers. As Vago recalls today, the early issues of the magazine were "really very bad". Only the graphic design was first class. The contents consisted of pictures of building sites, summaries of the contents of other magazines, reports of meetings, puffs for materials producers and indiscriminate photographs of buildings. Nonetheless the publishers ecstatically reported in issue number two:

"Un succes éclatant a salue le premier numero de notre revue. Cela nous encourage a faire mieux encore et a developper notre effort. Nous prions tous nos amis, les membres de notre Comité et les autres, de trouver ici l'expression de nos tres vifs remerciements. Nous comptons sur leur concours a tous pour nous permèttre d'apporter a nos lecteurs une documentation abondante, accompagnée de photographies nombreuses et bien selectionnées."

To be sure there were always the seeds of better things. From the very beginning André Bloc and his colleagues had assembled a prestigious editorial advisory committee whose members included nearly all the authorities Vago had previously consulted about his career – Perret, Sauvage, Roux-Spitz and Mallet-Stevens – as well as other luminaries like Victor Bourgeois and the young Berthold Lubetkin. Then, starting with Posener, who was ambitiously styled "central European correspondent", a network of foreign contributors was set up to cover the Soviet Union, the United States, Italy and Poland, and later Britain and Japan.



Early in 1931 Pierre Vago joined this organisation as an unpaid editorial assistant and reporter. By March he had become "Redacteur", and by September "Redacteur en chef". Before he had even completed his studies at the Ecole Speciale, Pierre Vago was the editor of an architectural magazine that employed his own father as its Hungarian correspondent. Concerned at his youthful appearance, he quickly grew a beard in order to appear older when dealing with established architects. An indication of the progressive quality of his thinking can be gauged from this editorial published in November 1932.

Against the "new formalism"

It is over a year since we first took up the fight against what we refer to as "new formalism".

By "formalism" we understand the overriding preoccupation with form and appearance at the expense of logic, economy and statics. Formalism can be said to be present when form becomes the main objective, when it is taken as the basis of architectural creativity and considered to be its central issue. Formalists talk about facades, cubes, windows and pilotis and forget that their buildings are not intended to provide impressive photographic material or a "good return", but are for people to live and work in. In our opinion, architects should not be working to achieve a utopian ideal for a minority which enjoys privileges of material wealth or intellectual ability, but to satisfy the pressing material and spiritual needs of the general populace.

We believe that all architectural projects should be based on logical planning and economy of construction. But these principles alone are not enough. Art is an expression of society, and architecture is social art par excellence. The architect's work should therefore express the ideas, aspirations and emotions of his time and social milieu. He should not seek to achieve a harmony which lies beyond the material circumstances of a given situation, but rather the complete satisfaction of its requirements, using the modern scientific and technological methods that are at his disposal.

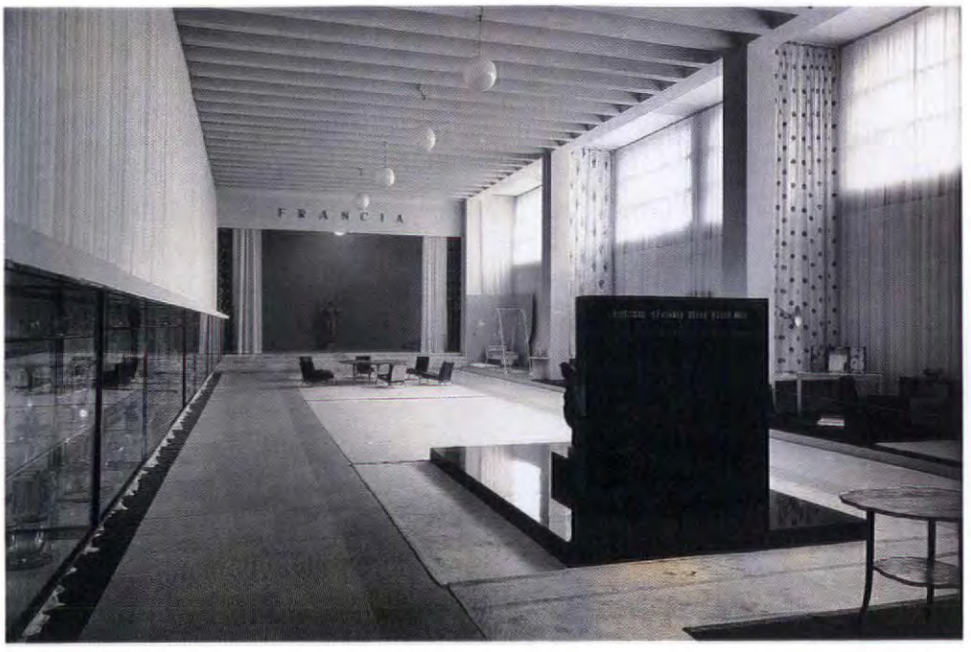
Pierre Vago. L'Architecture d'Aujourd'hui, *November 1932.*

In the years that followed, under the dynamic leadership of André Bloc and with the energetic policy pursued by Vago, the magazine went from strength to strength, even though its staff continued to be unpaid. Circulation steadily increased, reaching 5,000 within five years. Vago saw that competitions, lectures, conferences and exhibitions all stimulated interest in the magazines that sponsored them so he threw himself into the task of organising such events. In 1932 he launched *Reunions Internationales d'Architectes*, an organisation that arranged Modern architectural tours to foreign lands and made personal contacts with progressive architects in the countries that were visited. The first *Reunion* was a visit to the USSR in September 1932; the second to Mussolini's Italy "for the opposite point of view" the year after. In 1935 RIA visited Hungary, Austria and Czechoslovakia, being notably impressed with the work of the Czech shoe magnate Tomas Bata, whose Modern city of Zlin was not only designed according to a vertical and horizontal planning module, but boasted the first supermarket in Europe. In 1937 the RIA Reunion took place in Paris on the occasion of the World Exposition. Held in conjunction with CIAM the keynote speaker was Le Corbusier.

By the outbreak of war in 1939 the circulation of *L'Architecture d'Aujourd'hui* had risen to 10,000 and Bloc and Vago were publishing twelve 160-page issues a year. But in 1940 catastrophe befell France and publication ceased with the German occupation. Drafted into the navy in August 1939, Vago spent the period of the phoney war ostensibly as a member of the crew of the submarine chaser *Chasseur II*, but actually as an intelligence officer keeping watch on blockade runners using the Spanish port of San Sebastian. Ashore in unoccupied Vichy France when the armistice was signed, he was ordered to report to Toulon for demobilisation. Two years later *Chasseur II* was sunk at anchor by American aircraft.

The rest of Vago's war was spent clandestinely, working for the Gaullists to organise resistance to the Germany occupation from his base in Marseilles. Such work was dangerous and Vago almost

(Right) Interior of French pavilion at 1936 Milan Triennale showing 40m glass display case, fabrics and furniture.
(Below) Pierre Vago's apartment in Paris, 1933-1950. The fitted furniture survives in his house at Noisy-sur-Ecole.



paid the price. In 1943, through the action of an informer, he was arrested by the Gestapo and imprisoned for six months before being released for lack of evidence. Then, in 1944, he went underground and fought with the Maquis. In August he re-entered Paris in a jeep belonging to the British Army and returned to the offices in Boulogne to endeavour to restart the magazine. Against all the odds, with crippling shortages of everything that was necessary, including paper, *L'Architecture d'Aujourd'hui* published three issues in 1945. In the first of these Vago's leader outlined the task confronting the architectural profession at that apocalyptic time.

The end of an era

All around us ports have been destroyed, bridges blown up, dams breached, stations devastated and industries reduced to heaps of rubble. Entire districts have disappeared, towns have been wiped out, reservoirs emptied, equipment stolen, the workforce deported, land laid waste, and the nation weakened.

Just as the catastrophe was vast, so is the task of rebuilding our society. But we also have a vast fund of determination and faith. Designers and construction companies, architects and urban planners, workers and technicians, manufacturers and entrepreneurs, we are all fiercely determined to resurrect France from the ruins. Nor are we daunted by the enormity of the task, but rather stimulated by the prospect of such a vast undertaking. Such unprecedented destruction offers unprecedented opportunities. France will fulfil the expectations of other nations with ideas which are clear sighted, constructive, generous and universal, solutions which are logical, ingenious, sensitive and of a high standard, and an Art which achieves a perfect harmony between Time and Place and which is the faithful expression of a civilisation which will rise from the ruins of a crumbing world.

This is the end of an era and the beginning of a new age: the age of Construction and the age of Architects. But will we be equal to this glorious task?

Until the end of the Second World War, Pierre Vago's journalistic career almost completely overshadowed his career as an architect, but there were some early works of importance. In 1933 he was asked by the Grames Steel Company to design a prefabricated house made entirely of steel. A prototype of this house was made and exhibited at the 1934 Exposition de l'Habitation in Paris, but it was never put into production. Then in 1936 he designed the interior of the French pavilion at the Milan Triennale. Representing a drastic departure from tradition in its austere severity, Vago's large, clear volume was dominated by an immense, naturally-lit glass display case running 40 metres down one side. The exhibits contained within the pavilion were sparse and confined to modern furniture, fabrics and glassware. The following year he contributed a small building, the "Club des Architectes" that was built on the banks of the Seine for the 1937 Paris World Exposition.

After the war Pierre Vago opened an office at 17 Quai Voltaire, a house that had formerly been the atelier of the painter Ingres, and later played host to Richard Wagner and Oscar Wilde. The particular direction in which his career as an architect developed can be traced to two seminal events: a lecture he gave in Vanves in 1946 entitled "What should be the form of the Catholic Church of today?" – and his departure in 1948 from the "Groupe Perret" designated by the French Ministry of Reconstruction to rebuild the destroyed centre of the port of Le Havre.

The first of these events – which drew heavily on two special issues of *L'Architecture d'Aujourd'hui* devoted to church design, one published before the war and one after it – enabled Vago to argue persuasively that Modern architecture was the only authentic style for the post-war church to adopt. The crisis of faith consequent upon the war and its atrocities called for a break with the church architecture of the past, towards something more expressive of "modesty, humility, simplicity and truth." Vago demonstrated that these were precisely the virtues of the new architecture of the Modern movement and, in consequence, began many years of association with the Dominican order that were to produce a number of church buildings and lead to this great commission to design the underground basilica at Lourdes.

The second event marked the parting of the ways between Vago and the man who had most influenced his career up to that time. While he remained on good terms with Perret, Vago went his own way after 1948. This separation marked the beginning of a new and broader direction in his own career as a planner and architect, commencing with reconstruction projects that he himself directed for the cities of Arles and Le Mans and leading ultimately to major building projects in Paris, Berlin, Lille, Israel and Egypt. In all these works we can see the concerns he so ably articulated in the introduction to a special issue of *L'Architecture d'Aujourd'hui* published in September 1946.

Today, urban development is the central issue of the modern French renaissance. It is the focal point for all our activities, concerns, difficulties and hopes. It would not be exaggerating to say that, although it is dependent upon numerous factors, urban development will play an important part in determining the future of France.

It goes without saying that when we use the expression "urban development", we are not using it in the mundane sense to refer to the widening of streets, the refurbishment of public squares, the planning of road networks for new urban projects, or the strategic siting of an historic monument.

Urban development is something very different. It involves the development of national territory, the rational exploitation of our natural resources, the modern organisation of our industrial infrastructure, of our roads and communications and transport systems and the structure of our agricultural system.

Urban development also involves the study of population concentration, the ways in which populations have developed, and the harmonious organisation of its component units.

It involves determining the structure of the framework which will enable these units and groups of units to live and develop under the best possible con-

ditions, providing them with a social infrastructure worthy of our time, and creating the most favourable conditions for individual development.

The problem of urban expansion and the redundancy of ancient structures was for men of Vago's generation the central ground upon which theory and practice were forced to meet. The Modern movement had grown up with the promise of solutions to the crisis of the ancient city in the Modern world, and lived long enough to see those solutions at best cast into doubt, at worst dismissed as little more than vandalism. It was the conversion of this tentative rejection into an attack upon all contemporary doctrines of planning and design that characterised the architectural element of the great student upheavals of 1968: a global rejection by the young of the very basis of the powerful organisational thinking that had created the new architecture and, since 1945, had entrenched it within government, commerce and industry, culture and habitation across the world. In the decade that followed 1968 this grand conception, viewed nowadays as an historical phenomenon called "the Modern project", so totally fell from grace that the new architecture and new urbanism that had changed the face of the world's cities sank to a level of total public rejection epitomised by the dynamiting of Modern housing projects and the addition of pitched roofs and other historical features to otherwise Modern buildings.

In some ways, as Vago now sees it, a reaction of this kind against Modernism was inevitable, almost a Newtonian phenomenon. "We built as much in 30 years as had previously been built in 30 centuries", he says, "Inevitably much of it was ill-considered and of poor quality." But in other ways Vago could not follow the new directions of anti-doctrinal thought into the semiological and deconstructivist directions presaged in the new French philosophy and Sociology that burst upon the world in 1968. For him the principles that had evolved in the preceding 30 years through experiment were not immutable, but neither were they expendable.

Vago had ceased to be editor of *L'Architecture d'Aujourd'hui* in 1950, but he had remained chairman of the editorial board, a powerful voice in the thinking that dominated the magazine's editorial policy. And the magazine itself had become increasingly the most important single voice in French architecture. By 1960 its circulation had already topped 15,000 and eight years later it reached close to 20,000 subscribers every two months. Because of this, in 1968, in the aftermath of the May riots, with the Ecole des Beaux-Arts taken over by students and under siege, its gates closed and plastered with notices advertising demonstrations, hunger strikes and demands that imprisoned students and staff should be released, he was invited to address a body of militant students of architecture at the school he had so cordially detested when he had been a student there himself 30 years before.

The encounter was historic but not edifying. At 58 years of age Vago was at the height of his powers as an architect and as an architectural politician. Nowhere was there a man more able to present to an intimidating large and noisy audience the case of the older generation, revolutionaries themselves in the past, now cast in the new and unaccustomed role of reactionaries. But nowhere other than the student mob of Paris was there an audience with greater confidence in its immunity to such thinking.

Soon the interruptions and objections to Vago's reasoned presentation slowed and then prevented the flow of his thoughts. A period of short exchanges began which culminated in the expression of the view of many from the floor that Vago's conception of what might be achieved by architecture and planning was impossible without a revolutionary transformation of society first.

"This breakdown is our opportunity to transform society," insisted one voice.

"No, it is not," said Vago. "It is your opportunity to change the system of architectural education from the corrupt and obsolete Beaux-Arts system into something that is more useful to society."

"No! It is society that must be changed, not architecture," shouted his interlocutor to many cheers.

"No it is not, "said Vago in turn. "Your position today is exactly like that of the first arrivals at the scene of a car crash. Is it not better that you should be trained doctors able to help the injured, than that you should be able only to call for someone else who can?"

But the students were no longer listening. After 20 minutes Vago was obliged to abandon his talk. He left the hall to boos and catcalls. Shortly afterwards he and the whole editorial board of *L'Architecture d'Aujourd'hui* resigned. The event marked the end of his long association with the magazine except for one postscript. In 1970 he requested of the new editor permission to produce an issue of the magazine devoted to the whole question of the role of theory, doctrine and principle in what was already rapidly becoming the post-Modern world in which we live today. In September 1971 Vago's last issue of the magazine appeared. His leader was titled "Doctrines" and it summed up his vision of the possibilities of the architecture to which he had devoted his life.

To deny the value of all doctrine in the name of supposed realism, to make a dogma out of the impossibility of grasping a reality which is too fluid, too mobile, too changeable – these are themselves, whether one likes it or not, philosophical concepts. One can argue for "art for all", "art in everything" in opposition to the theory of art for art's sake – but that is still setting up one doctrine in opposition to another.

As soon as one formulates principles, as soon as one sets them in opposition to other principles, actively or passively, explicitly or confusedly, one starts to do philosophy, to initiate a theory, to proclaim a doctrine.

Architecture is one of the most complex forms of humans activity. As a form of artistic expression, it is akin to music and poetry. As a science, it derives from mathematics. As a technology, it is shaped by and makes use of the ever wider range of possibilities created by the inventive minds of researchers and inventors. As the organiser of the spaces in which all the activities of individual and collective life take place, the creator of our physical environment, architecture is both action and witness...

Today we live in chaos. Architecture is an isolated blossom, an exception, a lucky chance, a diversion. It is natural that it should be so: the failure of all attempts to crystallize a moment of definition of a system of rules and forms proves it.

Yet there are principles, rules and laws. The search for those principles, for what in them is fixed and what is variable, is useful and necessary, for today and for tomorrow. In this dialectic search, we must start from the situation in which humanity finds itself. It is from there that we will arrive at the possible present...

Let us not fall into the (unintentional) trap formed by those visions of supposed "cities of tomorrow" which are merely a caricature of the most hateful aspects of the present: inhuman anthills for robots, buried in underground silos or hung on suspension cables, miniature cells mass-produced and mass-assembled in ever larger batches, subject only to the laws of productivity and profitability, for a human race whose insane uncontrolled growth is accepted as a fatality, and thermonuclear destruction as a solution.

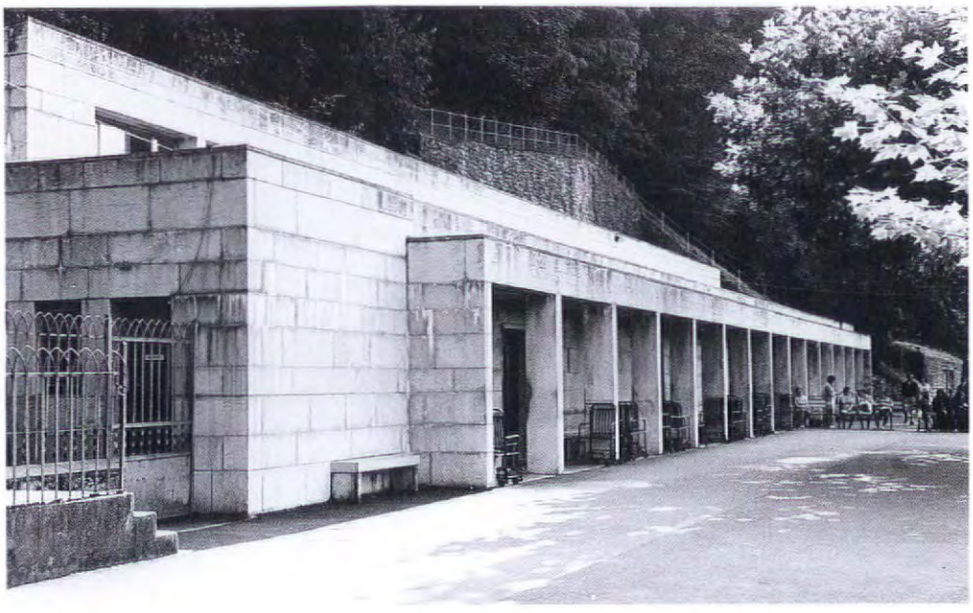
The golden tree of Life is made up of beginnings and perpetual Becoming. Let us have faith in humanity, in its intelligence, in its capacity for poetic imagination and aesthetic sensibility. It has never had so many possibilities to create happiness. It has never had so many possibilities to create an Architecture.

Pierre Vago. L'Architecture d'Aujourd'hui, *October 1971.* □

PROJECTS

Buildings at Lourdes, Pyrenees 1955-72

The grotto at Lourdes achieved celebrity as a result of the miracle that took place there in 1858 when 14-year old Bernadette Soubirous saw an apparition of the Virgin Mary there while collecting firewood. Since then it has increasingly become a place of pilgrimage for the sick. Pierre Vago's work at Lourdes came about as a result of his earlier work for the church. In 1951 he was invited to consider the problem of overcrowding at the miracle site because attendances had reached five million pilgrims a year and the existing facilities were entirely inadequate. After three years he was appointed chief architect. He produced a development plan and designed several buildings over the next 20 years. He resigned his consultancy on his retirement.



Pilgrims' Baths, Lourdes 1955

The first building designed by Vago for the miracle site, this uncompromisingly modern in situ concrete structure clad in stone set the stage for what was to follow. It replaced a mock-Gothic original that was demolished to make way for it. Each portal in the facade gives onto a separate bath and healing accommodation with private recuperation rooms with balconies above.

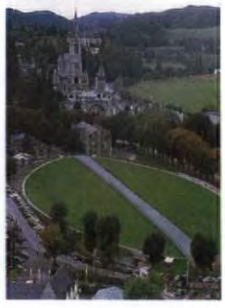
The Museum of Lourdes 1957

This delicately angled structure with its exposed aggregate, precast concrete panel walls and cantilevered entrance porch, was one of the architect's most elegant additions to the Lourdes complex. All windows were confined to the rear and end walls of the building to give the main facade a strength and repose that is still impressive today.

Hospice of St Bernadette, Lourdes 1977

Pierre Vago's last building at the miracle site, the Hospice of Saint Bernadette follows the same angled plan form and cladding system as the Museum of 20 years earlier, but with much greater emphasis on sunlight, modulated by adjustable blinds, and external views and a far more complex arrangement of levels. Capable of receiving 330 pilgrims disabled by sickness for visits of up to four days, the building is located on a sloping site which has been cut and filled so that the accommodation – arranged on four floors – incorporates direct vehicle access for ambulances or for emergency evacuation in the event of fire on all but the topmost floor.

H. Baranger, Paris

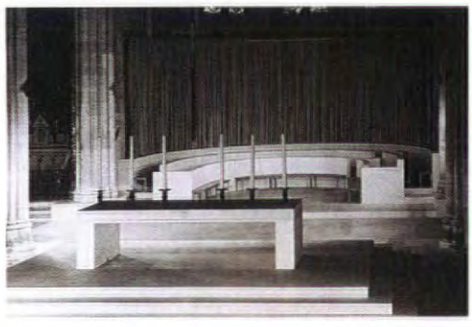


The Underground Basilica at Lourdes 1956-58

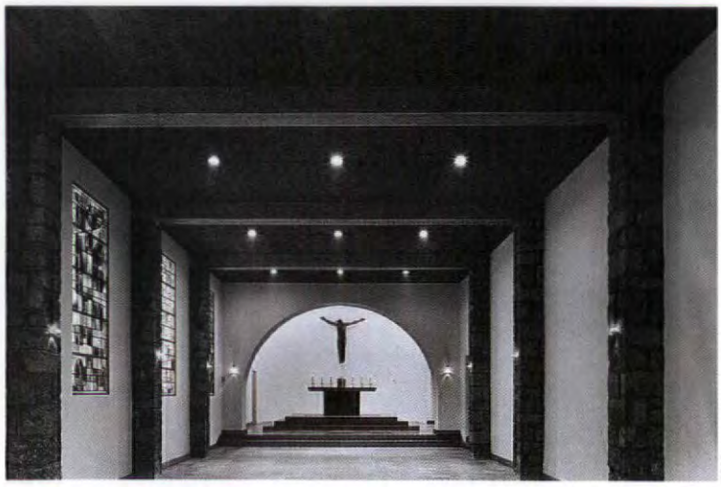
Pierre Vago's best-known work, this enormous underground concrete structure capable of accommodating 25,000 persons – the largest Catholic church in the world apart from Saint Peter's in Rome – takes the form of a giant 200 x 60 metre ellipse, artificially lit apart from a narrow slit of perimeter daylighting. Vago's insistence that the structure be placed underground so as not to obstruct the limited amount of open space at the miracle site led to an exacting building programme that required the completion of the entire operation in 18 months. Two engineers were approached for designs – Pier Luigi Nervi and Eugene Freyssinet – and the latter was chosen because of the lightness and economy of his dramatic 100 m span prestressed structure. The great basilica was one of Freyssinet's last commissions before his death in 1962.

Modernisation of the Choir at St Michael, Marseille 1949 Refurbishment of the Convent of Monteils, Aveyron 1949

These two refurbishments were the Vago's first ecclesiastical works following his lectures on the application of Modern ideas to church architecture. At St Michael's (right) he remodelled the choir of a late nineteenth century church, providing a simpler, more austere interior and his first island altar, permitting the priest to face the congregation in defiance of tradition. The rehabilitation of the burned out Dominican convent at Monteils (far right and below) in the same year enabled him to incorporate new cloisters and a redesigned chapel with stained glass windows by Dingier and an island altar with a rotating tabernacle.



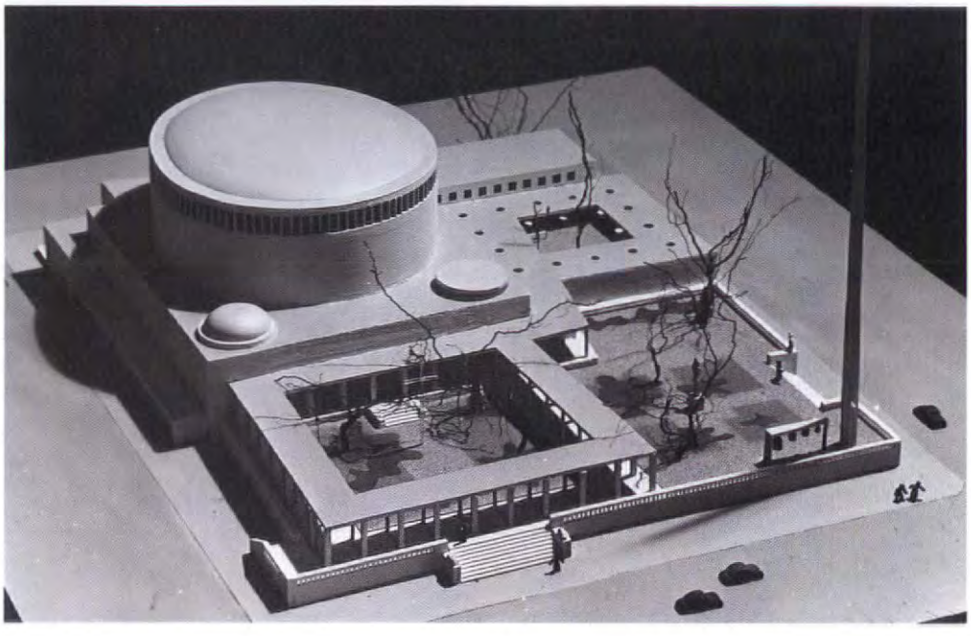
YAN

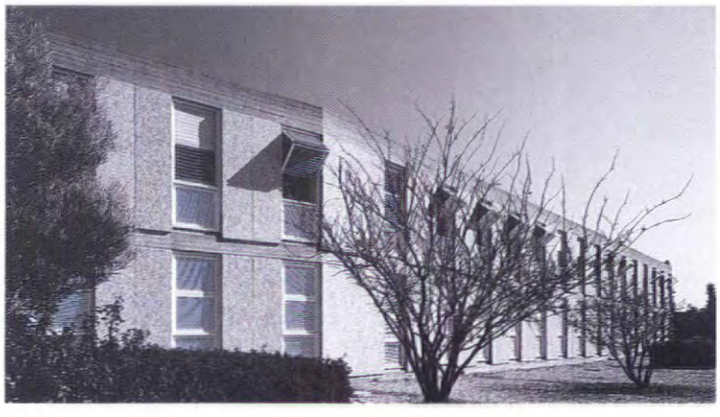


YAN

Project for the Church of St Thérèse, Le Mans 1949 Church at Salies-du-Salat, Toulouse 1962

The original design for the Church of Saint Thérèse (right) was Vago's first attempt at a circular church embodying the new altar arrangement endorsed by the post-war progressive forces in the Catholic Church. In addition to the island altar this scheme embodied unique functional elements including a system of ground level church bells whose sound was to have been electronically amplified and broadcast from loud speakers at the top of a concrete mast. This design was rejected by the Bishop after comparison with a gasometer and the church was completed in a more conventional guise until 1956. However Vago revived the original design in modified form 12 years later for a new church at Salies-du-Salat (top) where all his innovations were included.

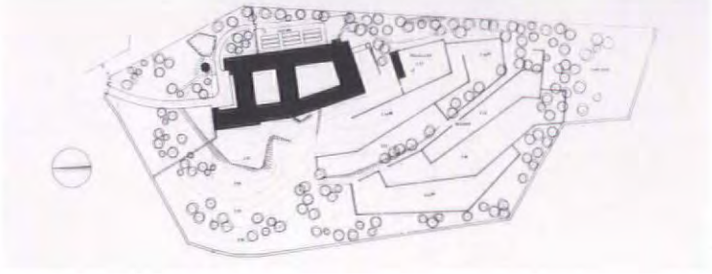


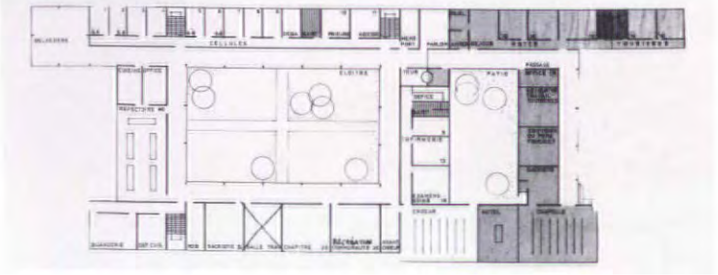


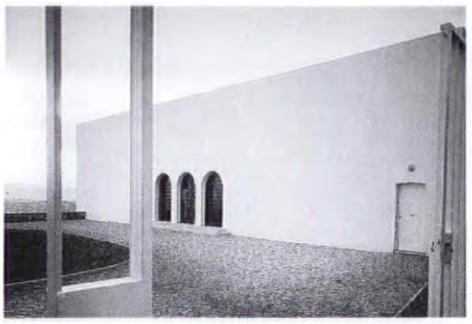
Hector A Paiucco, arch.

Convent of St Claire at Nazareth 1965-67

This later religious building provides for a small community of no more than 30 persons leading a virtually self-supporting existence surrounded by kitchen gardens and a small poultry farm. Of in-situ and precast concrete construction, with exposed-aggregate storey-height precast outer wall panels, the building stands on a sloping site cut and filled so that part is two storeys in height. Vago says of its double cloistered courtyard plan with corridors; "It works like a machine." And through the simplicity and clarity of its design this remark can be clearly understood. Though inexpensive, the building is carefully detailed. Noteworthy is the ingenious three-level window / ventilator / shade detail that is repeated throughout its living accommodation. This comprises fixed and lifting louvred metal screens to provide shade, with sliding windows behind that retract into the cavity wall system.







Governor's Residence, Bank of Algeria, El-Biar 1949

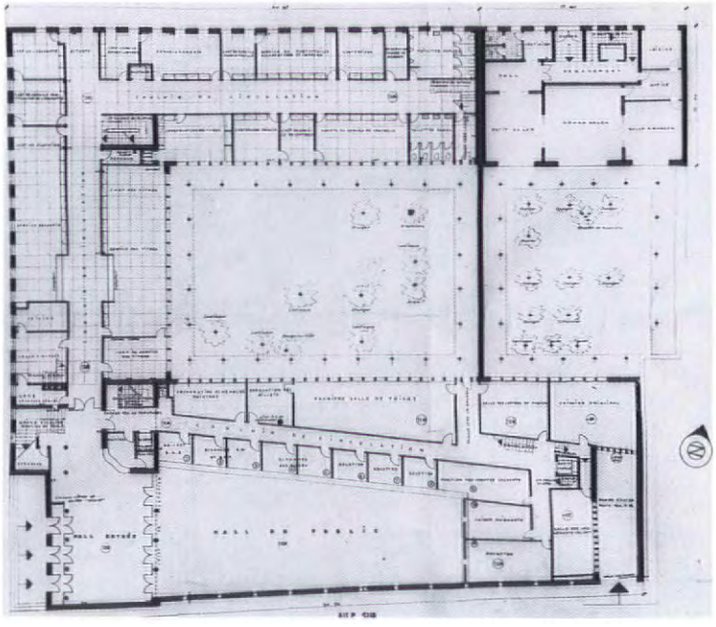
Through a prewar connection Vago was able to carry out a small works project for the Bank of Algeria in 1949. In due course this led to further commissions and he became architect to the bank until Algeria attained independence. The house built for the governor of the bank at El-Biar displayed a unique combination of Modern and traditional North African elements. A walled residence overlooking El-Biar from rising ground on the landward side, the house is built around a heavily shaded central courtyard, its plain white walls and arched openings achieve the serene simplicity of a de Chirico painting. The interior and furnishings are uncompromisingly Modern with few Arab decorative elements.

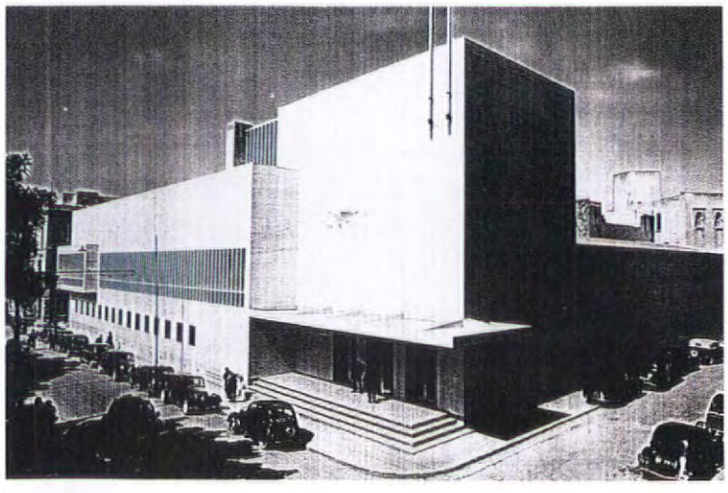
Bank of Algeria, Sousse 1949

A fine neo-classic structure in concrete with stone facings, this was the first complete bank designed by Vago. The undecorated attenuated columns of the portico are worthy of note.

Central Bank of Tunisia, Tunis 1953

This large bank building encloses two inner courtyards containing 100-year-old palm trees which were carefully preserved. The undecorated stone cladding of the building, together with its narrow, deeply recessed windows show the degree of climatic adjustment achieved within the Modern canon. After independence the building became the headquarters of a government department.





Two Houses at Hydra, Algiers 1954

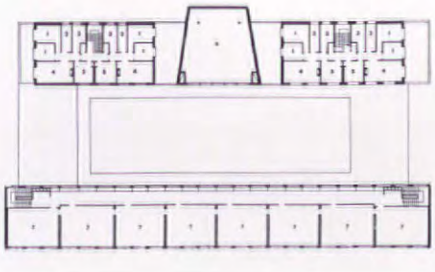
Vago's last buildings in North Africa were these two rendered concrete villas with balconies and deeply recessed windows. The interiors of the two houses were designed by Jaques Dumond.

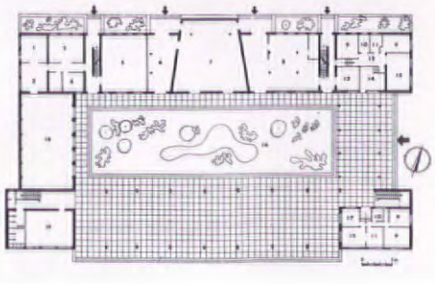
Les Sablons Master Plan, Le Mans 1954 (Executed 1961-71)

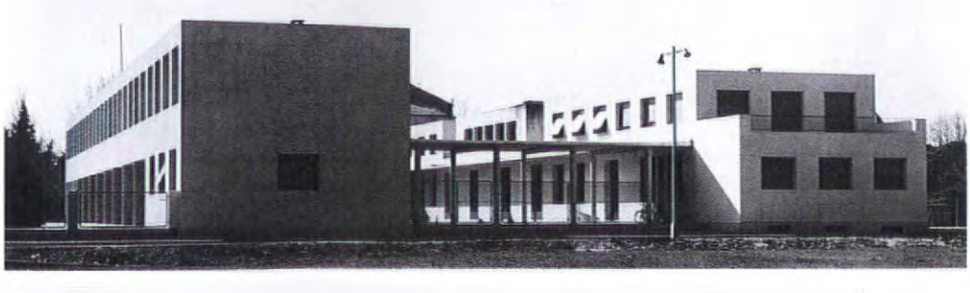
This project to create a new town for 25,000 persons on previously flooded land on the outskirts of Le Mans was planned by Pierre Vago and executed by more than 20 architects over a period of 10 years. Considerable earth moving work was undertaken to recover and landscape the large site from the flood plain and create a lake by damming the river. The development consisted of mixed density high and low rise housing for low and middle income families, with district heating, schools, shops and community services all built at the same time. In later years the excellent overall planning, good buildings and well wooded environment made the area increasingly attractive to higher income tenants. Subsequently a large hotel was built to serve the site.

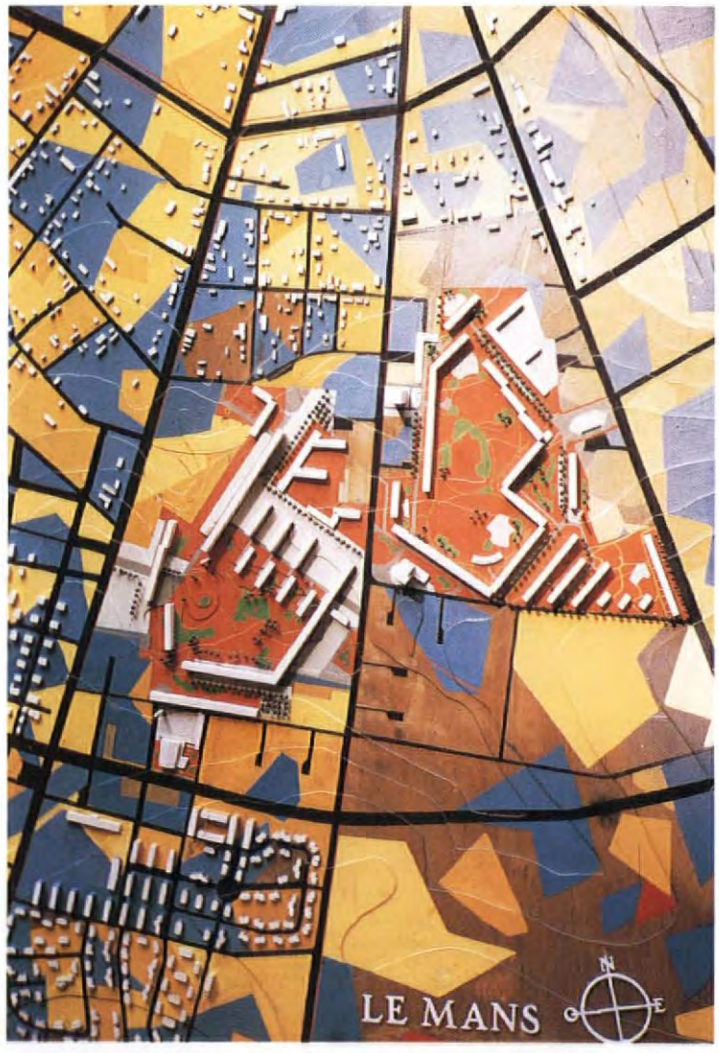
Reconstruction of Arles and Lavera 1948-52
School at Tarascon 1948

The redevelopment of the war-damaged area on the north bank of the Rhone adjacent to a new bridge over the river at Arles was master planned and designed by Vago for the municipality. The buildings included 300 houses and shops, a new public square and a church (right). The architect also rebuilt a damaged residential district at Lavera and built a new school (bottom) at Tarascon near-by. The uncompromisingly Modern appearance of the school, with its pilotis and horizontal fenestration, attracted much opposition but the project was successfully completed and became popular.



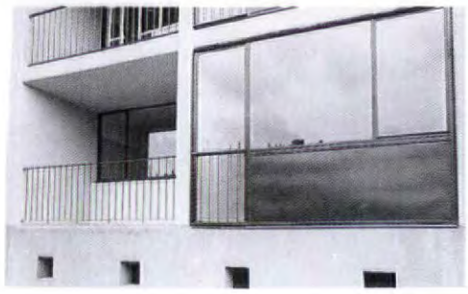






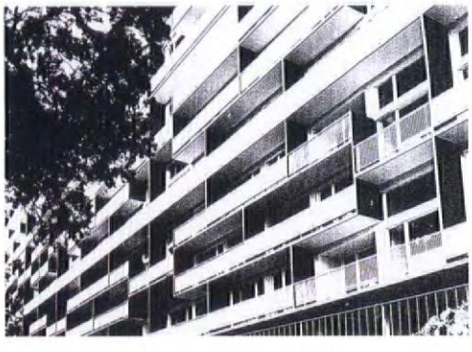
Le Ronceray Estate, Le Mans 1954

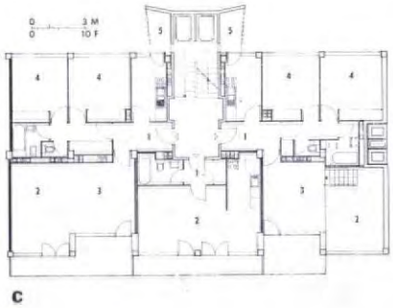
Described by Vago as "the cheapest buildings I ever designed in my life", the 1,050 apartment units and shopping centre at Le Ronceray were laid out on a sloping site with long articulated rows of apartments enclosing green public areas with mature trees. Using concrete construction, inset GRC panels which took only 24 hours to harden, and only three types of window, the four storey apartment blocks were designed to achieve the maximum possible facade modelling by the use of recessed balconies, flush windows and grilled permanent ventilation apertures.



Residence du Parc, Le Mans 1960-62

This eight storey reinforced concrete maisonette and apartment block was designed to incorporate the wide variety of unit plans first explored in Berlin. The highly modelled facade reflects different apartment layouts inside as well as the existence of double height living rooms looking out onto balconies.





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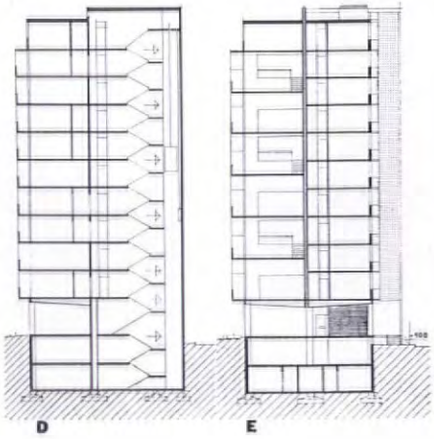
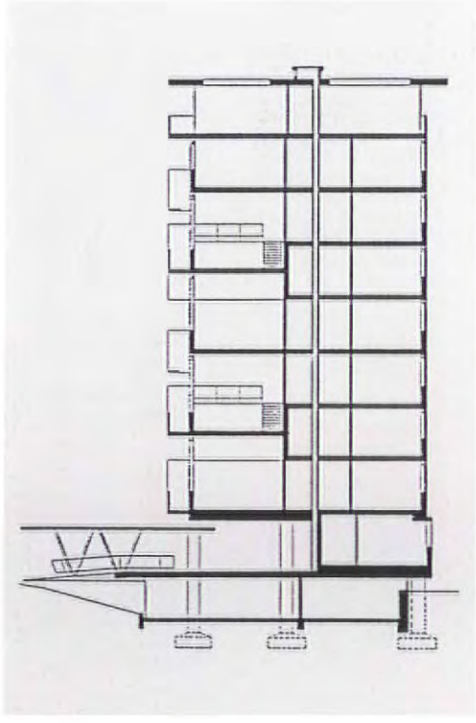
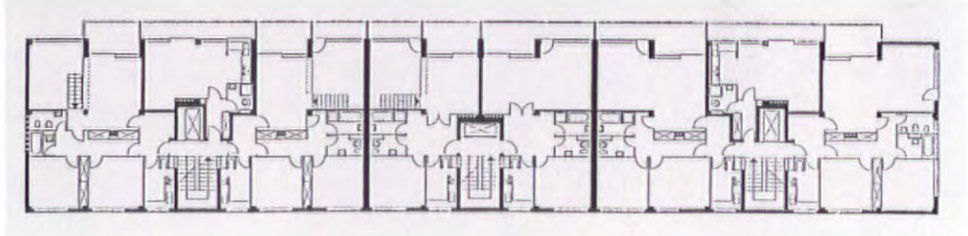


D E

Hansaviertel Apartment Block, West Berlin 1957

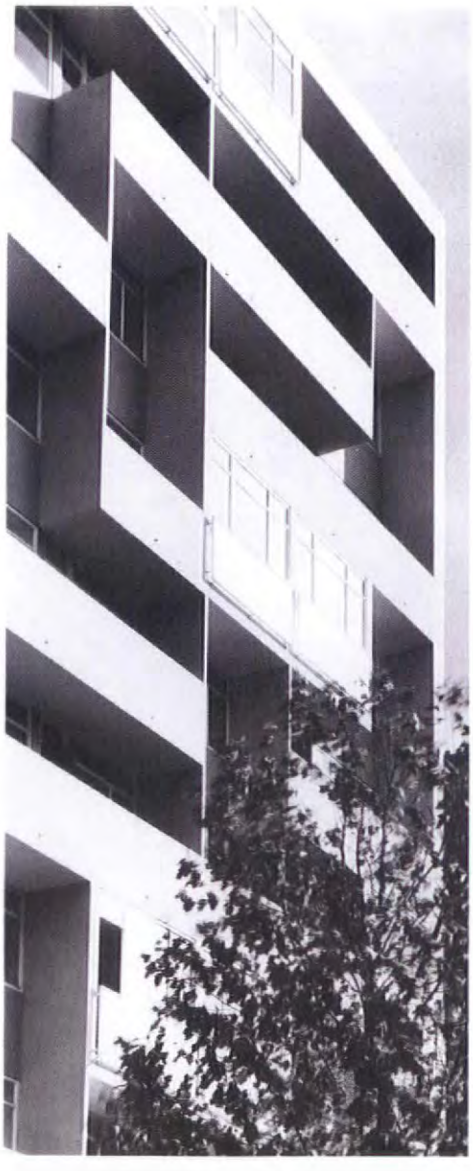
Containing 59 apartments, but laid out according to 14 different apartment plans, this eight-story concrete building raised on pilotis and with roof gardens above was Vago's invited contribution to the Interbau housing demonstration district commissioned by the Berlin city authorities. Although intended for low income tenants, a cost overrun of 15 per cent on the building was permitted in order to achieve a higher standard of finish. Other contributors to Interbau included Le Corbusier, Alvar Aalto, Oscar Niemeyer, Walter Gropius, Arne Jacobsen, Hans Scharoun and Frederick Yorke.





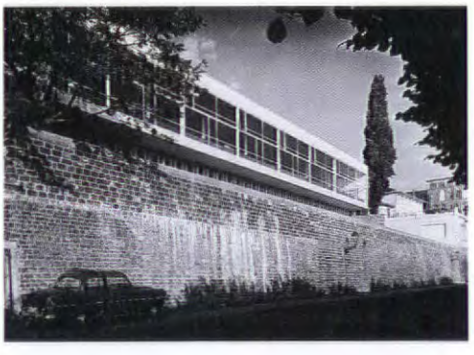
Apartment House, Rue Erlanger, Paris 1957

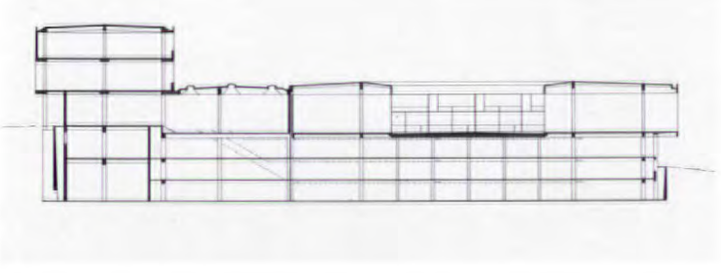
Pierre Vago's only building in Paris, this 56 apartment structure was designed for a private developer. The main facade of the building was distinguished by the manner in which its projecting balconies and storey-height windows formed an abstract pattern of light and shade derived functionally from the varied plans behind them. Today Vago reflects that this development was so successful financially that more money could have been spent on materials and finishes.

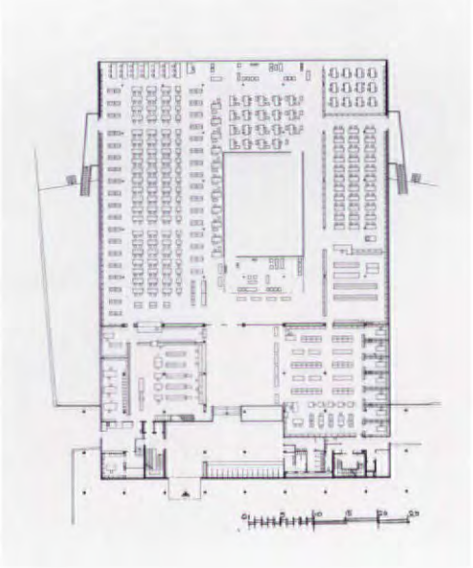


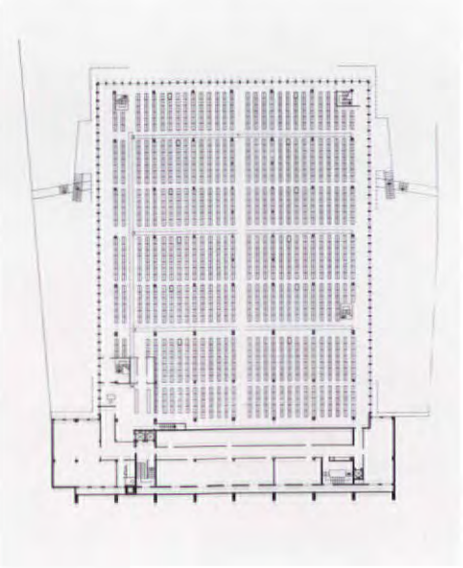
University Library, Bonn, West Germany 1958

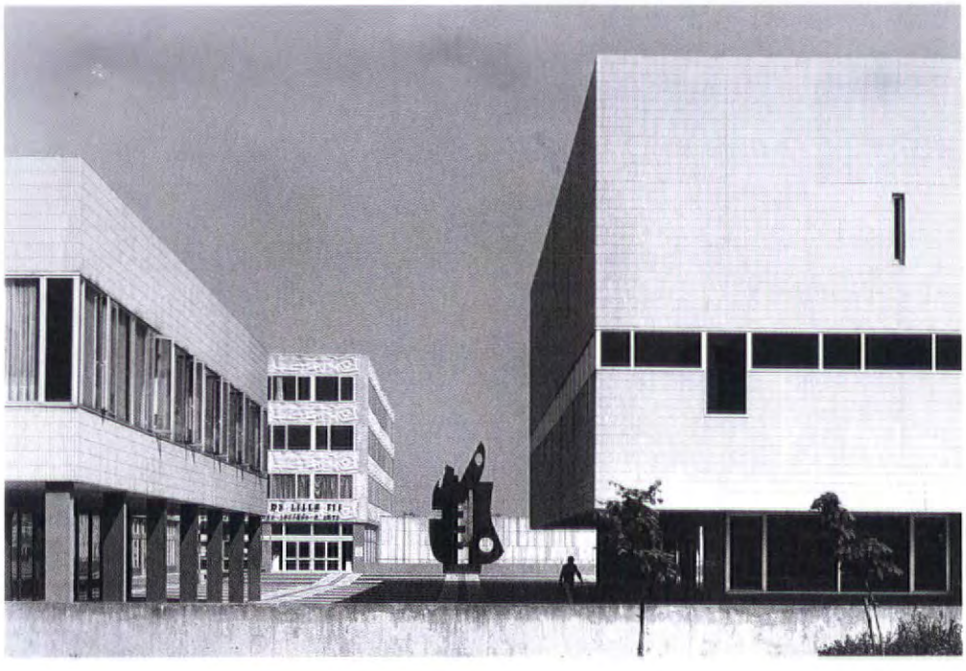
This building was the outcome of an invited competition in which Pierre Vago was one of only two foreign architects invited to compete with eight German practices to design a central library for the greatly enlarged university of Bonn. His winning design was executed in association with the German architect Fritz Bornemann. The building is in some ways reminiscent of Vago's North African work, but executed with a greater variety of materials, including timber lath ceilings and decorative glass mosaic wall finishes. There were also difficult technical problems with three basement floors containing a maximum of 5 million books located below the level of a nearby river (See section and plans below). Vago remembers today that the mechanical handling system devised to raise books from the stacks to the reading rooms, which are open-planned around a central courtyard, operated at the then very high speed of 7 minutes per volume.





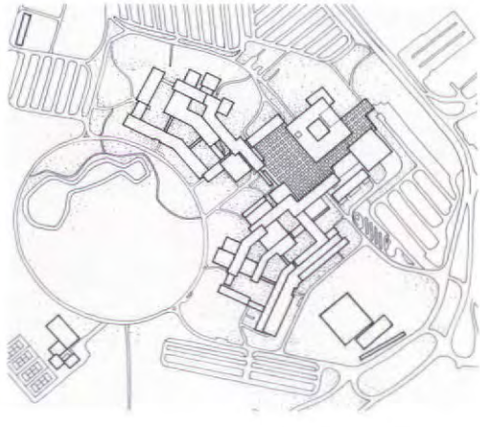


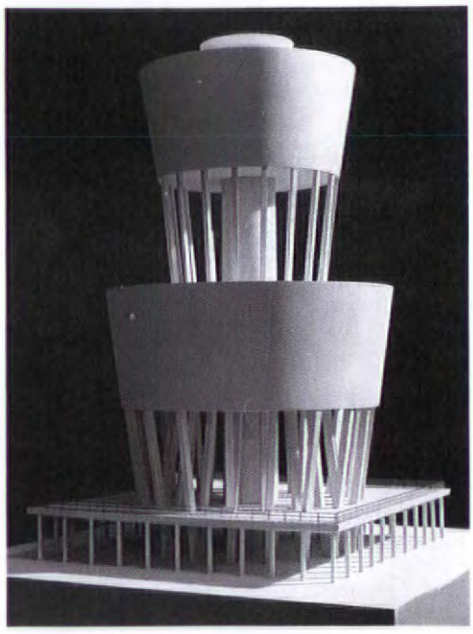




Masterplan and Buildings for Lille University 1964-74

Part of the enormous French new university building programme that was to play such an imponderable part in the events of May 1968, the new Lille university for 16,500 students in the faculties of literature and law was masterplanned and executed by Pierre Vago over a period of 10 years. From the outset the design assumed a vertical and horizontal planning module of 7.2 metres and the roof area of the numerous interconnected buildings generated sufficient rainwater run-off to feed a large lake in the centre of the campus. Designed to operate as a "commuter college", Lille incorporated large car parks and was sited close to a major road leading to the centre of the city. In no other project did Vago go to greater extremes in an attempt to wring expressive modelling, shadowing and graduations of colour out of stepped changes of level and conventional concrete frame buildings clad in glass with precast concrete spandrel panels. To the same end he also incorporated an unprecedented number of works of art including friezes by Singier, a 7 metre-high steel sculpture by Lardera and a 20 metre-long ceramic mural by his wife Nicole Cormier-Vago (left). Intended originally to bridge the main road passing by the entrance to the campus, the central access route linking the main buildings stopped short of this for many years. Subsequently a bridge was built but not correctly aligned with the original as sketch plan and aerial photo below show.





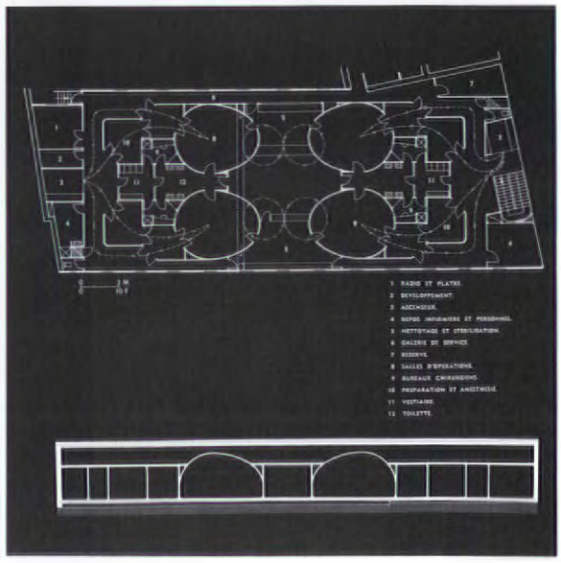
Water Tower, Martigues 1955

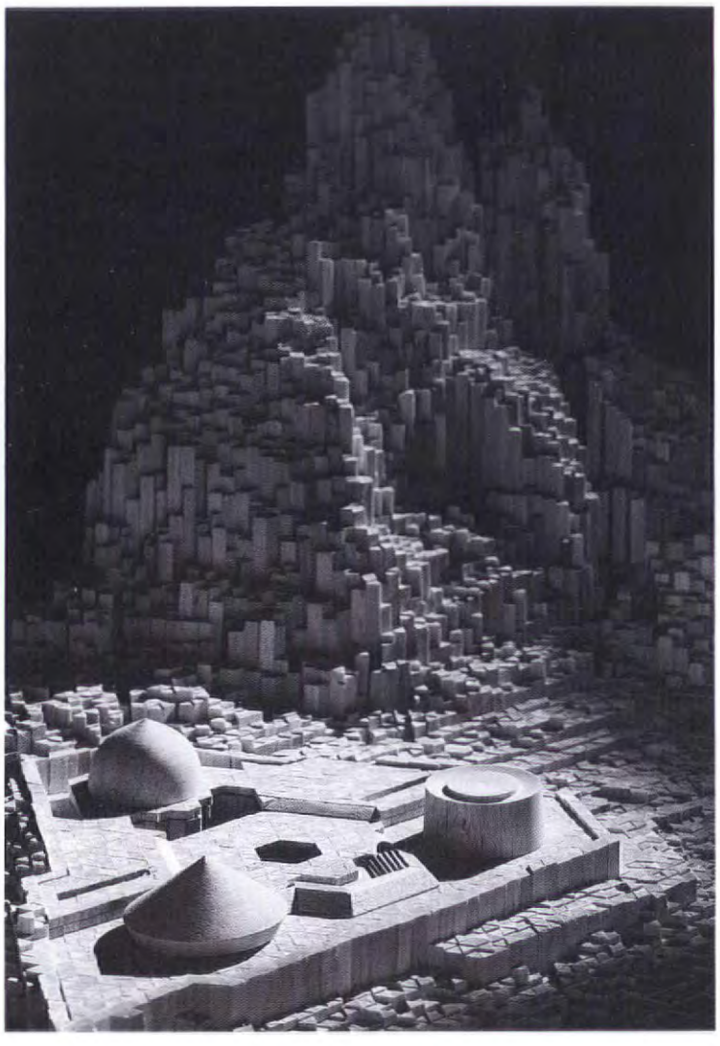
This almost constructivist project for a combined restaurant, exhibition gallery and low and high pressure water reservoirs was rejected by the local building control authorities on the grounds that its forest of thin prestressed concrete support columns and thin reservoir walls were an "untried medium" and would require prohibitively expensive testing.

New Operating Suite, St Michael's Clinic, Toulouse 1959

Despite its small size and unprepossessing external appearance this single-story 450m² building is one of the most ingenious and advanced ever executed by Vago. His task was to design and enclose four interlinked operating theatres under optimum sterilised conditions.

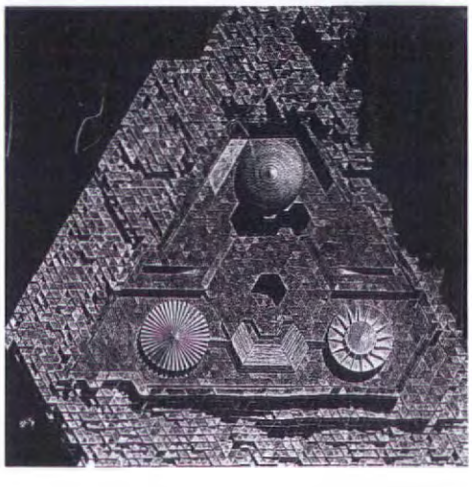
After studying operating theatre design in a number of new European hospitals, Vago concluded that the best system was that employed by the Franco-American architect Paul Nelson at the Saint Lô military hospital completed in 1950. Nelson had introduced the idea of domical concrete-shell operating theatres with flush-mounted lighting to reduce the internal surface area of the operating rooms and make them easier to keep sterile. But one of the problems at Saint Lô was heat build-up caused by the lamps. In principle Vago adopted the "Nelson Unit", as it was then called, but improved it in a number of ways. Concealing all plumbing and wiring in service zones between and above the operating theatres, he also adopted closer-fitting, lozenge-shape domes that not only required half as many spotlights, but included equipment to programme their operation so that unnecessary lights would never be switched on. Next he placed watertight glass lenses in front of each spotlight so that a water circulation system could be installed in the roof zone above the theatres to trickle water down the outer surfaces of the domes for evaporative cooling. Finally he introduced a system of two-way drawers and X-ray viewing windows that greatly decreased movements in and out of the operating theatres by surgical and support staff. The result was a highly efficient and hygienic system that is still in use.





Sinai Sanctuary 1980

In many ways the most remarkable of all Pierre Vago's projects, this scheme originated after Egyptian president Anwar Sadat's historic visit to Israel following the Camp David Accords of 1979. The intention was to mark the return of the Sinai to Egypt in 1982 with the opening of a religious sanctuary serving Arabs, Christians and Jews built at the foot of the 2,600 metre Mount Katherina near the Santa Katherina monastery. The project was conceived at a meeting in Athens between Pierre Vago, the Jewish architect Al Mansfeld, and the Egyptian Moslem architect El Rimaly. After one week of concerted effort a scheme was devised with three temples in the characteristic shapes of the three religions standing upon a plinth laid out using a triangular grid. A model of this design was shown to President Sadat who received it with enthusiasm and inspected the site with the architects using an Egyptian Military helicopter flying from an Israeli desert airstrip. The design was then worked up in detail. But time passed and governmental authorisation to carry out the work never arrived. The assassination of Anwar Sadat in 1981 put an end to the project.



Pierre Vago: A Biography

Born Budapest 1910
Family moved to Rome 1919
Studied at the Ecole des Beaux-Arts and the Ecole Speciale d'Architecture, Paris 1928-1932
Private practice Paris 1934-39 and 1945-85
Editor *L'Architecture d'Aujourd'hui* 1931-1949, President of the Editorial Board 1949-68
Founder International Union of Architects (UIA) 1948. Secretary General 1948-65. Honorary President 1969-
Founder of International Academy of Architecture and Vice President 1981-

Selected Projects

1932	Prefabricated steel house, Exposition de l'Habition, Paris
1936	Architect of French Exhibition, Milan Triennale
1937	Architect's Club, Paris World Exhibition
1945	Arles, Tarascon, Beaucaire master plans
1948	Headquarters of the Bank of Algeria, Paris
1953	Central Bank of Tunisia, Tunis
1955	Renovation of town centre, Le Mans
1956-58	Basilica at Lourdes
1956	Library of the University of Bonn Hansaviertel apartment building, Berlin
1961-71	Les Sablons district of Le Mans
1971-72	University of Lille
1980	Sinai Sancturary project, Egypt

THE MIRACLE OF JENA

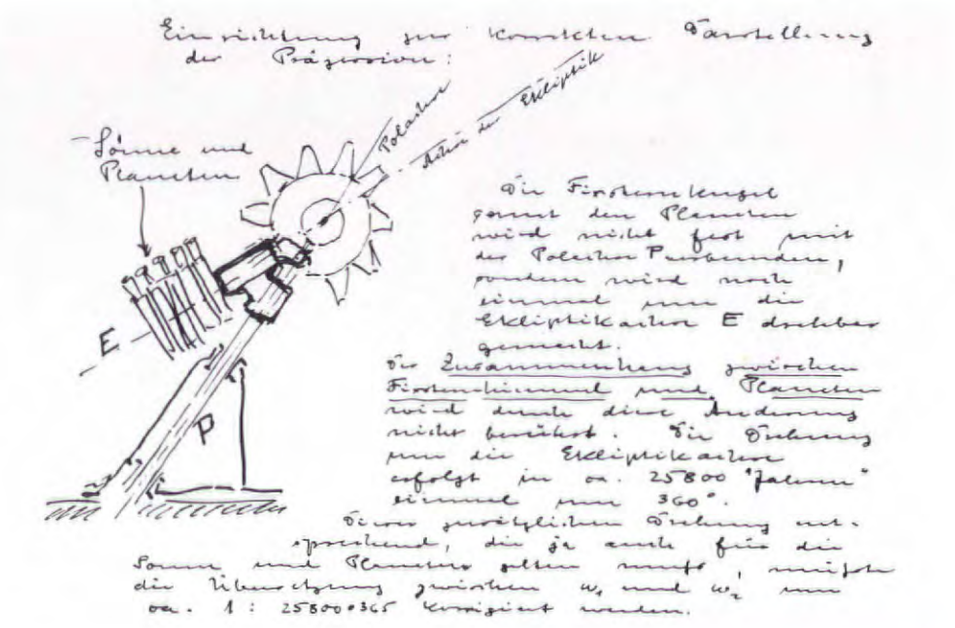
Design is still in the Newtonian age, architecture in the pre-Copernican, or so it seems when reaction triumphs and progress is dismissed as vandalism. Yet the design implications of the Einsteinian universe are not unknown. Richard Buckminster Fuller, whose first geodesic dome was assembled in 1948, grasped at the new structural principles it offered. What is virtually unknown is that Dr Walter Bauersfeld, a scientist working at the Carl Zeiss factory in Jena, Germany, had designed and built a geodesic structure over 20 years before. In this abridged extract from his forthcoming book, Architecture from Projection *(Anabas Verlag, Giessen 1993), Joachim Krausse describes the event and its consequences. The translation is by Peter Norman.*

(Above right) The first geodesic dome. The iron framework of the test planetarium, which was demonstrated in 1924 on the roof of the Carl Zeiss factory in Jena.

The object that was to spark off one of the greatest revolutions in building history, like its originator, does not make an appearance in the history of architecture. The structure that Walter Bauersfeld designed at the Carl Zeiss Company in Jena after the First World War and which became known throughout the world as the Zeiss-projection planetarium has only been recorded as part of the history of civil engineering. It is here, in the history of concrete construction that our object is to be found, as the first application of monocoque construction or "shell building". By "shells" one understands curved surfaces which are cast or sprayed in a thin layer of concrete and possess a high load-bearing capacity. A model in nature is provided by the shell of an egg. With monocoque construction, an element was introduced into architecture which had not hitherto been known. Of interest to us in what follows, are the starting point and the conjunction of circumstances from which this innovation emerged. The point of contact linking, in this instance, optics and scientific instrument-making with building.

In 1913 Carl Zeiss Jena had received the contract to build a planetarium for the Deutsches Museum then under construction in Munich, the first museum of science and technology in Germany. The museum's founder and director Oskar von Miller was

Bauersfeld's first sketch for a star projecting machine. From manuscript May 5. 1920.



obsessed by the idea of getting the general public to understand the scarcely imaginable processes of science and technology through appropriate models and exhibits.

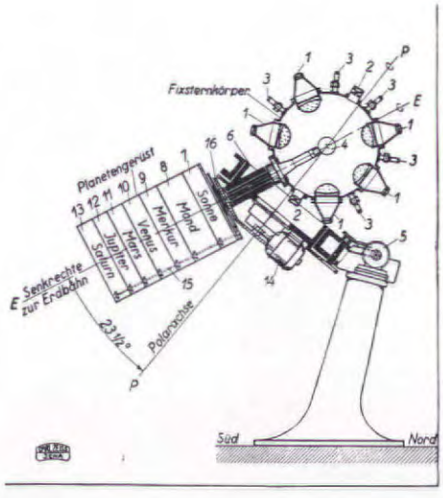
Miller had a feeling for the experimental dimension of machines, instruments and experimental arrays, and enjoyed such things as dioramas, mises-en-scène and special effects. For the planetarium, he wanted "a journey through the Copernican universe" – while of course retaining the greatest possible degree of scientific accuracy. The observer should be placed at the centre of cosmic events, in such a way that he can comfortably follow the simulated movements of the heavenly bodies with the naked eye.

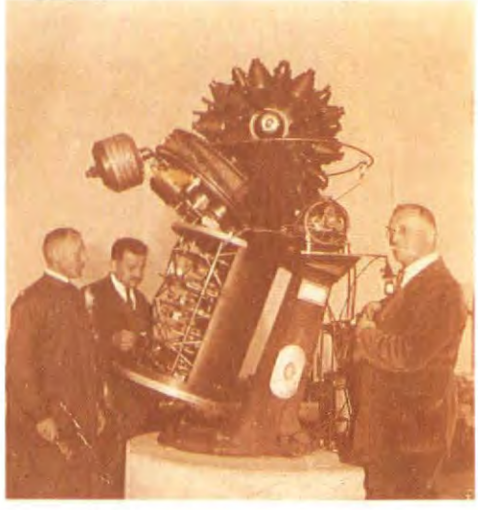
On the basis of considerations like these, Carl Zeiss in Jena was commissioned to build two models of the heavens. The first was a so-called Copernican Planetarium, a panoramic room 9 metres in diameter with, on the ceiling, a mechanical model of our planetary system in which the Sun and the planets, represented by shining globes of varying size and brightness, hang down from the mechanism as from a rigging-loft in the theatre, with the fixed-star background painted as a panorama of the zodiac on the enclosing wall and starlight penetrating the interior from filament lamps behind tiny openings.

The second model that Oskar von Miller commissioned from Zeiss was to "place the viewer, in accordance with the ideas held by the astronomers of antiquity, on Earth, conceived as being at rest, on a fixed platform which was to be built inside a large, rotating tin globe, the sphere of the fixed stars and the planets of the ancients attached to special mechanisms were to be moved inside this globe in accordance with their apparent paths."

This second model was to be constructed at the Zeiss factory by Dr Walter Bauersfeld, an engineer who was at home in the specialist field of optics and precision engineering. Work on this project was interrupted during the First World War, but was taken up again after the end of the War. Then, over the next five years, the projection planetarium took shape as the exemplar of a modern Universe simulator.

The failure of the first mechanical experiments had let Bauersfeld to the following conclusion: "to obtain a faithful replica of nature seems to be out of the question so long as one insists on achieving the objective with heavy machinery, that is, with equipment that will never be equal to the task of convincingly reproducing that mysterious and soundless world-movement of nature." Bauersfeld's plan simply stood the problem on its head: "The basic idea of the solution was to make the shell of the sphere fixed and produce an image of all the stars on its inner surface by means of a system of projectors set up close to the centre of the sphere. For this, it was necessary to colour the surface of the sphere above the horizon white in order for it to receive the projected images. Below the horizon, on the other hand, special measures had to be taken to render the images invisible." We see here how the possibilities for omnidi-





(Above left) Patented projecting machine; the geodesic divided sphere provides light beams for fixed stars, the cylinder contains moving spot lamps for the planets.
(Above) Mechanical engineers with the prototype of the projecting machine in the Zeiss factory 1923.

Picture sources:
Archive of the author;
Betriebsarchiv Carl Zeiss Jena. With special thanks to Edith Hellmuth;
Archives of The Dyckerhoff & Widmann company, Munich;
Archives of Schott & Gen. Jena. With special thanks to Adelheid Rentsch;
Archives of Carl Zeiss Oberkochen. With special thanks to Dr Wolfgang Pfeiffer.

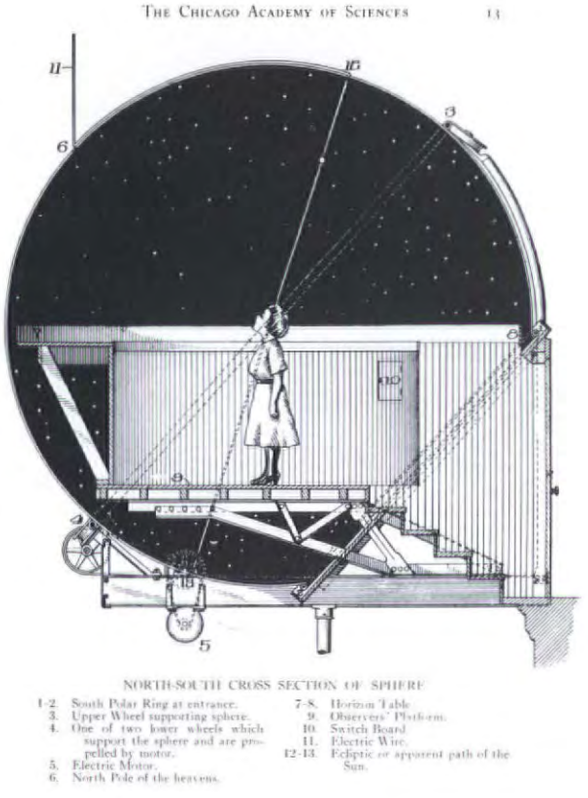


Bild 250. Projektions-Planetarium.
Oben: Das Planetarium im halbkugelförmigen Projektionsraum.
Neben: Der Apparat selbst.

(Above) Atwood Celestial Sphere, Chicago 1913. The starry sky was simulated by a rotating sphere of brass.
(Above right) Projecting machine in the centre of a hemi-spherical screen: a light space simulator, 1924.

rectional photographic projection form the starting point for a revolutionary construction. It followed the projection idea that Bauersfeld not only had to develop a new and – because it had to be programmable – quite complicated type of photographic projector, but also a new, spherically curved projection screen. There was no immediate precedent for either. The approach to a solution was not found until after the War, but wartime experiences nevertheless seem to have prepared the way for it.

If one wants to get an idea of the scale of magnitude of arms commissions in the optics industry, it is sufficient to visualize that for every gun barrel – be it a cannon, machine gun or rifle – there was a telescopic device – be it telemeter, periscope or field glass. The number of photographs taken in the War came close to the number of projectiles fired. Optics came to occupy a complementary position alongside ballistics.

It was in particular the air war, the use of airships and aircraft both for reconnaissance and for air attacks, that threw up new problems for equipment and instrument making. There emerged the tasks of constructing and rapidly manufacturing very precise instruments for determining the direction and speed of aircraft, and the construction of sighting devices in which the correct angle could be obtained without calculations.

The aeroplane had turned the four-dimensional time-space continuum into a reality.

The first people for whom this concept of space and time had a practical validity were the flyers. To them, and to nobody else, the Earth also appears as a flying object. But not only did the validity of the concepts of absolute space, time and movement come to an end here, but also the geometry of Euclidean space.

The alteration of the experience of space for those beyond the small circle of aviation pioneers and members of the avant-garde became complete during the years of the First World War. The possibility of attacks from the air gave rise to its inverse: the need for air

Zeiss factory 1924. On top of the roof (right) the dome of the planetarium.

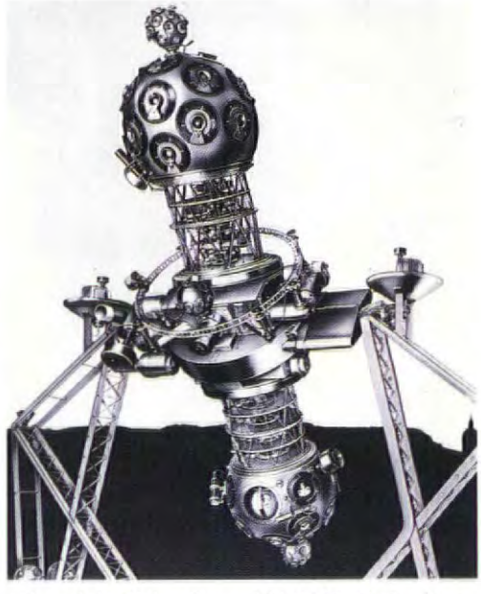
defence. It was anti-aircraft batteries, with their guided fire mechanisms, that provided the model for cybernetics and the development of computers. Computers, which are a result of the search for a solution to the prediction problem of AA fire, have their forerunners in relatively simple analogue calculating machines, which had already been developed for air defence during the First World War. In the 4-D space-time continuum, aiming by eye was no longer sufficient.

In optics the methods developed for aerial reconnaissance, especially precise aerial photographs with special cameras and sensitive plates and films, refined the procedures for searching for moving objects which could not be seen with the naked eye. As telescopic observation glasses became more and more efficient for the task of locating aircraft even at high altitude, reconnaissance flights were deferred until the hours of dusk or darkness. "This led to the creation of devices by which the enemy's movements could be made out even in the dark." This was written by Zeiss worker and former Captain Leineweber, and it was the Zeiss Company that – together with Goerz – developed and manufactured so-called optical aids for the military. The extent to which the Zeiss people were convinced of their technical superiority during the War is revealed in the following comment: "Even though, as captured equipment showed, our opponents were not negligent in technological development, nonetheless it can be rightly stated that we remained far ahead of them in the field of optics."

Bauersfeld's projector thus had the characteristics of a searchlight that reproduced in a relatively small mechanism in the centre of a sphere the patterns of movement traced on a large scale by the stars and planets. The apparatus integrated the various projectors for the fixed stars, the Milky Way and the planets. Sun, Moon and the other planets were simulated by separate planet projectors which were stacked on top of one another around the ellipse axis. The Milky Way was projected independently of the fixed stars, because in its case – as opposed to the projection of the stars with its sharp images – it was a question of hazy outlines and nebulous patches.

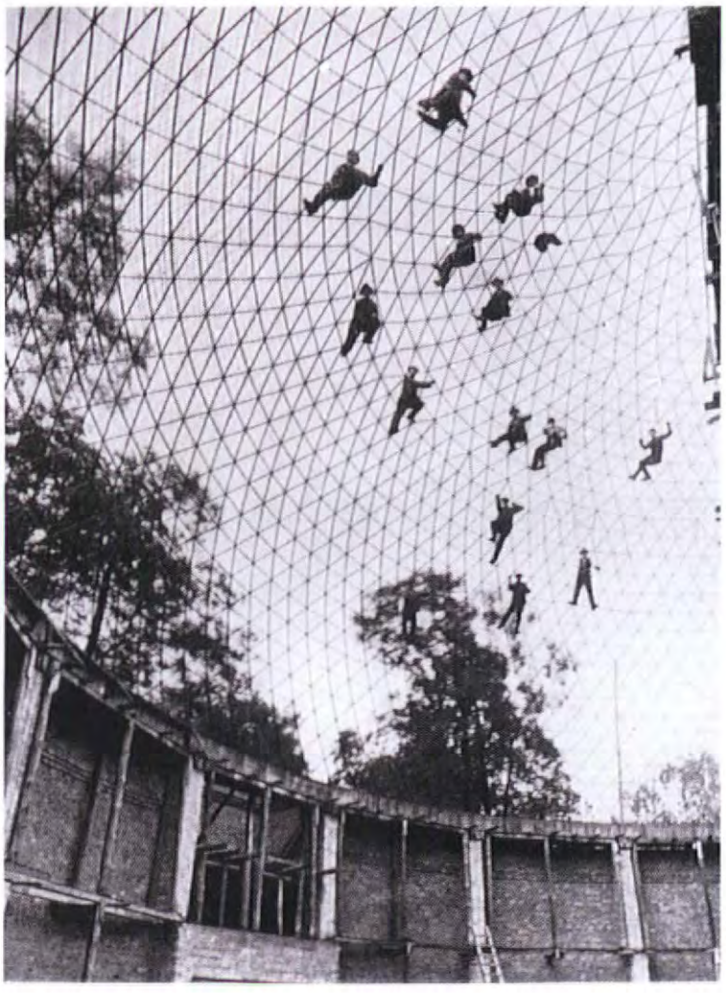
The image of the fixed stars was created by means of a special purpose-built projector consisting of a spherical bowl half a metre in diameter. A lamp in the centre served as a common light source for the projectors, which rested like spray nozzles on 31 round openings in the spherical bowl. Each one exactly mapped a hexagonal or pentagonal section of the image of the fixed star background onto a section of the spherical projection wall.

Bauersfeld describes the structure of the sphere as follows: "If one starts with the familiar regular solid whose surface consists of 20 equilateral triangles, and makes a straight cut across each of the 12 vertices which this solid possesses, then 20 hexagons and 12 pentagons are formed on the surface.



(Above left) Walter Bauersfeld (1879-1960), director and chief engineer of the Optical Works. Carl Zeiss Jena invented the projection planetarium and a new method of lightweight construction for domes and vaults. Photo: before 1914.
(Above) Improved projecting machine, designed by Bauersfeld/Villiger. From 1926 on this type was produced in several series.

Planetarium opened for public in 1926. Some dozens of Zeiss Planetarium buildings were erected all over the world. In the 60s they also became training centres for astronauts.



Planetarium Jena, dome under construction, iron framework for the dome completed.

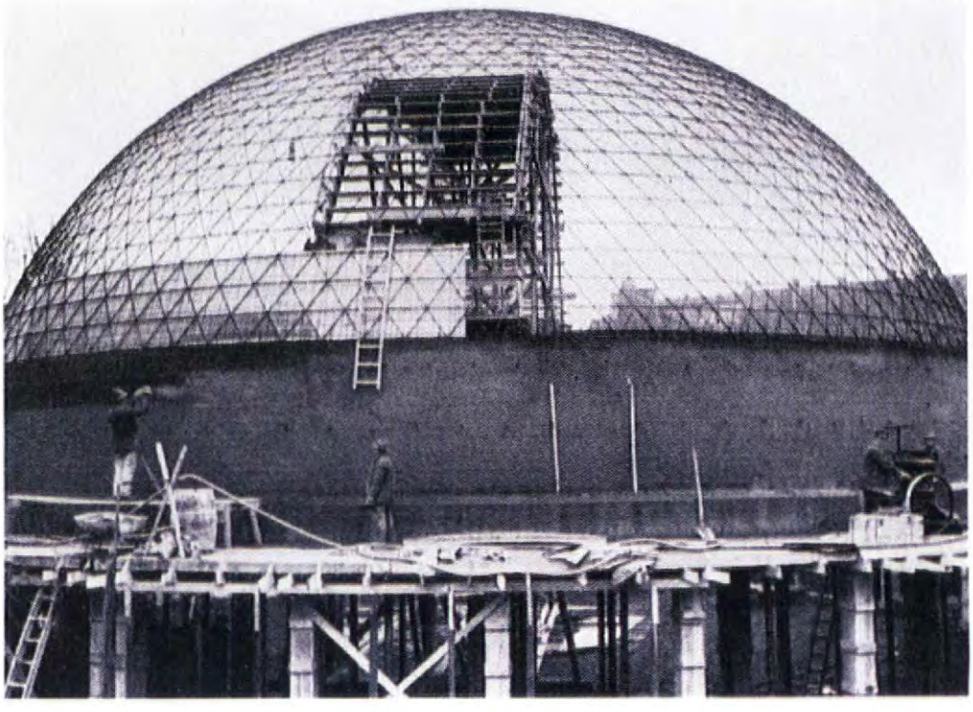
With the cuts in the right places it is easy to ensure that the circles circumscribing the pentagons and hexagons are all equal. If one then imagines the edges of this solid projected out from the centre onto a spherical surface with the same centre, then the division of the sphere as described is formed."

We are still here dealing with the description of the projector, but note that this also applies to the structure of the reticulated sphere that encloses the room as a projection screen. The 31 sectional images of the night sky with 4,500 individually visible fixed stars on the cut faces of the polyhedral projection – the 32nd surface is occupied by the axis – fit together on this screen in such a way that an overall image free of gaps or distortion is formed. There is thus nothing accidental about the correspondence between the projector and the projection wall; it derives rather from the concept of projective geometry. The regular polyhedron which Bauersfeld chose as the shape of his projector could be replaced by another regular polyhedron, for example a tetrahedron, octahedron, cube, etc without altering the principle.

This method of projecting a regular polyhedron onto the surrounding sphere creates on the latter's surface a network of lines which is known as geodesic, because the edges all lie on great circles, or "geodesics". Their radius is the radius of the sphere. But the geometric structure that Bauersfeld used in practice for the shape of his spherical projector, as well as that of the projection wall, was now also to become the structure for an architectural solution: the supporting structure for the dome of the planetarium. Bauersfeld thereby became the pioneer of a form of construction from which two revolutionary developments immediately followed: lightweight supporting structures, which were later developed so successfully by Konrad Wachsmann, Richard Buckminster Fuller, Max Mengeringhausen and many others; and monocoque construction, which opened up completely new possibilities for reinforced concrete in coping with large spans. It was the optician and precision engineer Bauersfeld who introduced this development, even though it belongs entirely in the field of building construction.

The novelty has very ordinary roots. Bauersfeld informs us about the circumstances: "In 1922 the first planetarium mech-

Jena planetarium; scaffolding inside the dome. Concrete sprayed onto formwork from outside.

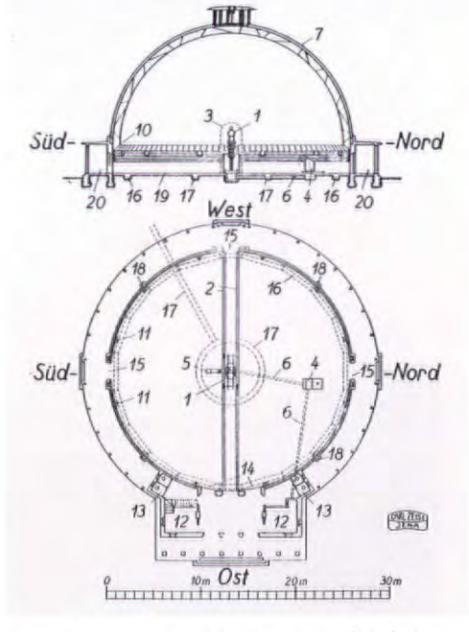


anism, which had been developed for the Deutsches Museum in Munich, was nearing completion. It was to be set up in Munich in a hemispherical room about 10 metres in diameter. For mounting and testing purposes, a similar spherical room was needed in Jena. Since no indoor space large enough for this purpose was available, a light-weight spherical building had to be erected outdoors, and needed to stand up to the effects of wind and weather at least for a few months. At first we thought of a construction along the lines of a circus tent. But that was ruled out because canvas, like all textiles at that time of very high inflation, was much too expensive. By contrast, steel, being a purely German product, was very low in price. So we ended up going for a steel construction. Since we attached great importance to creating the hemispherical shape very exactly, the construction of a hemispherical network out of steel rods seemed to us to be the most promising building technique."

The Jena network dome was a model of radical light-weight construction. The structure had to be light, because there was no space for the construction except on the roof of the Zeiss factory. Bauersfeld describes the unique properties of this light-weight supporting structure thus: "Although it appears very fragile, it is strong enough for a number of people to be able to clamber about on it without any noticeable deformations occurring – and it is composed only of iron rods 80 x 20 mm in cross-section and about 60 cm in length. The essential feature is the configuration of the nodal points. The rods stand on end, they are grooved at the ends and are held firmly together by round plates fitted with appropriate necks. A high degree of rigidity of the nodes was thereby achieved. The dead weight amounted to only nine kg per square metre. Of course, the lengths of the rods had to be very exact, with a tolerance of some 1/20 mm, in order for the spherical shape to work out exactly. Some 50 different lengths of rod were required, and getting on for 4,000 rods in total. You will recognise in these details the involvement of the designer geared towards precision engineering."

Zeiss obtained a patent for Bauersfeld's nodal construction. It takes account of the fact that "in a network, the various nodes by no means present the same geometrical pattern at every point. The number of rods is not the same at all nodal points, and the same is true of the angles of inclination of the rods to each other and to the plates." In order to guarantee this, the Zeiss nodes have notches running around the plates and the rods have ball pivots. The two angles in space are therefore not fixed in advance; the node can be used both for varying geometric figures and for differing sphere radii.

The time was not yet ripe for this structure

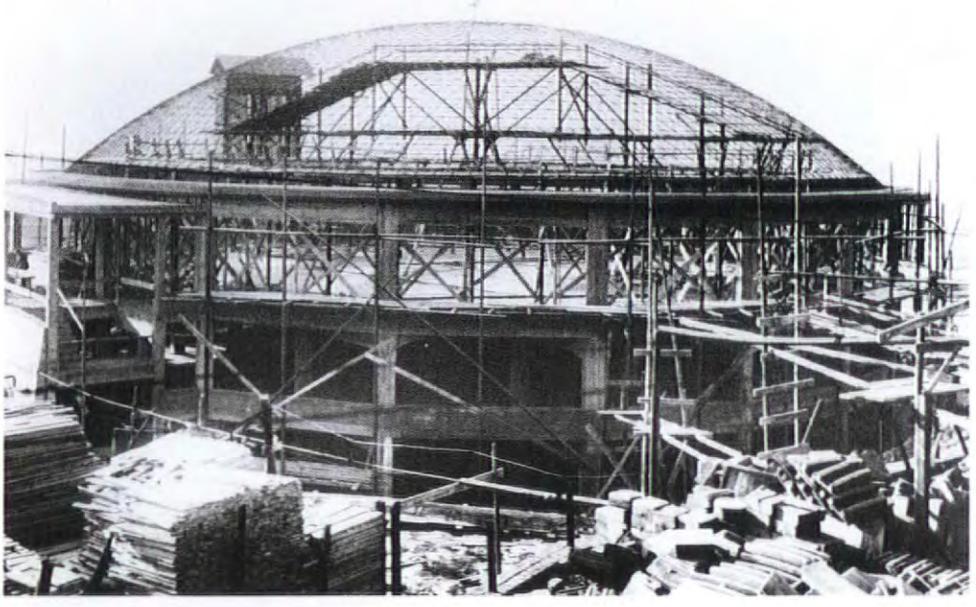


Design of Zeiss Planetarium Jena; section and plan, 1925.

Zeiss Planetarium Jena. Drawing by the architects Schreiter & Schlag 1925.

(Below) First industrial use of 'Schalenbauweise' (skin-construction) for a dome at the Schott glass-works in Jena, 1924. The dome has 40m clear span, its concrete shell is only 6cm thick. Later on 'Schalenbauweise' was successfully employed for industrial plants, hangars and market halls.

(Bottom left) Adolf Meyer, the Bauhaus master and partner of Walter Gropius, projected a building for Planetarium Jena in 1925. He estimated the invention of Bauersfeld as revolutionary and introduced the Schalenbauweise in Frankfurt when he moved there from Weimar 1925/26.



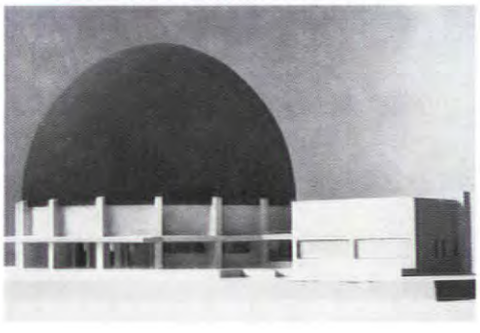
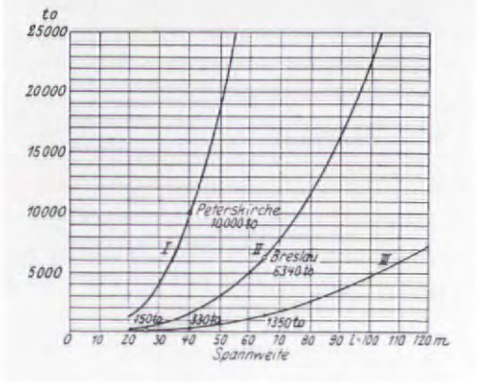


Diagram comparing dome construction: 1. Dome of St Peter's in Rome. 2. Max Berg's 'Jahrhunderthalle' in Breslau 3. Schott dome as example for 'Schalenbauweise'. The diagram was published by the collaborator of Bauersfeld the civil engineer F Dischinger of Dyckerhoff & Widmann in 1925.



to be covered with light alloy panels or fibre-glass, as was done experimentally by Richard Buckminster Fuller after the Second World War. On the other hand, there was already in Germany a developed concrete industry which was increasingly competing with iron and steel construction.

One of the leading concrete building firms, Dyckerhoff & Widmann AG, (Dywidag), had already done various building work for Zeiss. It was natural for Bauersfeld to consult the people from Dywldag about manufacturing the shell. At first he assumed that the surface could be filled in with plaster. But since the smoothest possible surface was needed for the projection, another idea took shape: "namely the spraying on of a concrete mixture using the shotcrete technique. This concrete spraying technique had only been developed a short time before, but had yielded very good results. The smooth inner surface was to be achieved by fitting a wooden casing with spherical curvature onto the network from the inside, so that the wire mesh and the rod structure itself were completely encased in concrete. The spherical shape offered the further advantage that the wooden casing, which was to be made about 3 x 3 m in size, could be removed after the concrete had hardened and used several times for the same purpose. By happy circumstance, there was also the possibility of using very finely ground cement, which only required a very short time to set, and which had also only very recently been introduced into concrete construction."

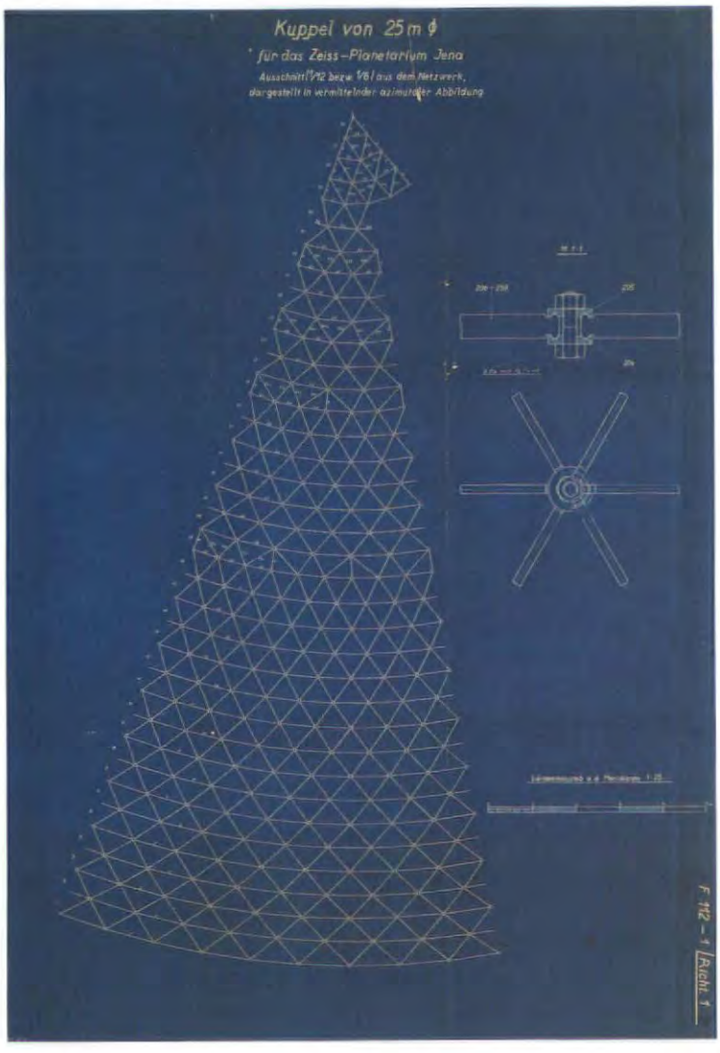
In this way, it was possible to produce thin-walled dome shells with which even large spans could be vaulted. The Munich Planetarium had a diameter of 10 metres, the first Zeiss dome on the factory roof 16 m, the second for the neighbouring glass factory Schott and Gen 40 m; the later polygonal domes, for example that of the Market Hall in Leipzig, which created the effect of opened-out umbrellas, each had a diameter of 76 m, more than Max Berg's Centenary Hall in Breslau, with only a third of the weight. The Schott Dome, at 40 m, came close to the span of St Peter's in Rome, which is 42.6 m. The shell had a wall width of only 6 cm, and weighed only 330 tonnes, a thirtieth of the weight of St Peter's dome at 10,000 tonnes. Around 1930 there were already plans for shell domes with a span of 150 m. And it is likely that Speer's design for a Congress Hall for the capital city "Germania", crowned with a dome of 250 m in diameter, could only have been built using the technology of monocoque construction. In any event, there was a proposal in existence by the Dywidag monocoque builder Franz Dischinger for a concrete dome with double shells, which even made allowance for bomb strikes.

A number of further steps were still necessary in order to make monocoque construction practicable for usable building of every kind, and these steps were made as a result of the cooperation between Bauersfeld on the one hand and Dywidag's construction engineers.

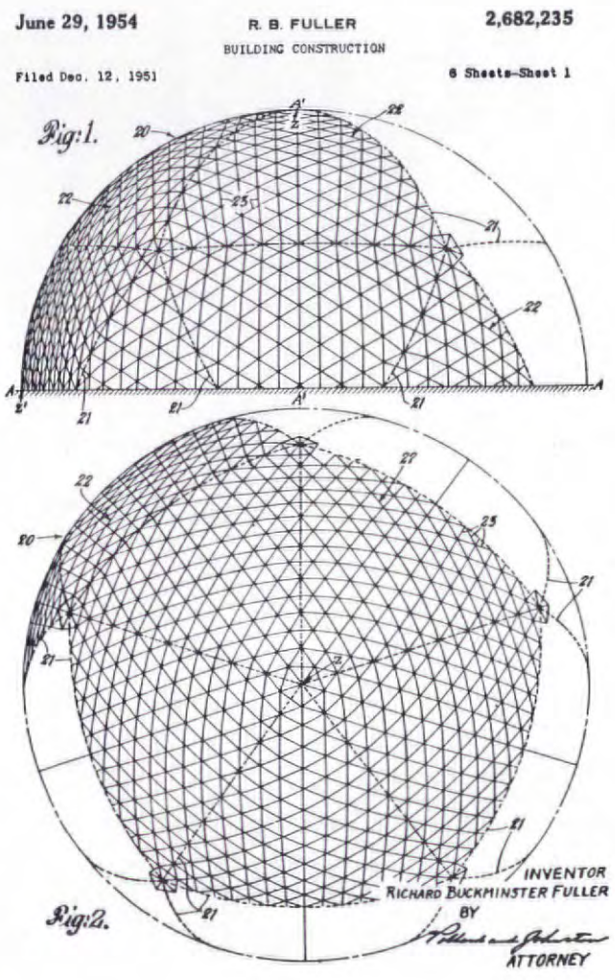
A major step was made with the discovery that not only double-curved shells – such as the sphere – can be made using monocoque construction techniques, but also simple curved shells, such as cylinders, which can easily be erected over rectangular ground-plans. This opened up the enormous field of contracts for hall buildings to this construction technique; market halls, exhibition and trade halls, railway stations and hangars – for all these building tasks the Zeiss-Dywidag method was used. And more patents were files.

Another major discovery was made on the occasion of the 1926 Gesolei Exhibition in Düsseldorf: that the network no longer needed to be concreted into the shell, and could therefore be re-used. The tetrahedral support-

Design of the triangulated network of iron rods for the dome of Zeiss planetarium. Designer: Bauersfeld and Dischinger. Patent holders were Zeiss and the Dyckerhoff & Widmann company, specialist reinforced concrete consultants for the German construction industry.



Buckminster Fuller's Patent application for geodesic domes was dated December 12, 1951.



ing rod structure now serves only to hold the formwork on which the actual concrete shell is applied with normal reinforcement.

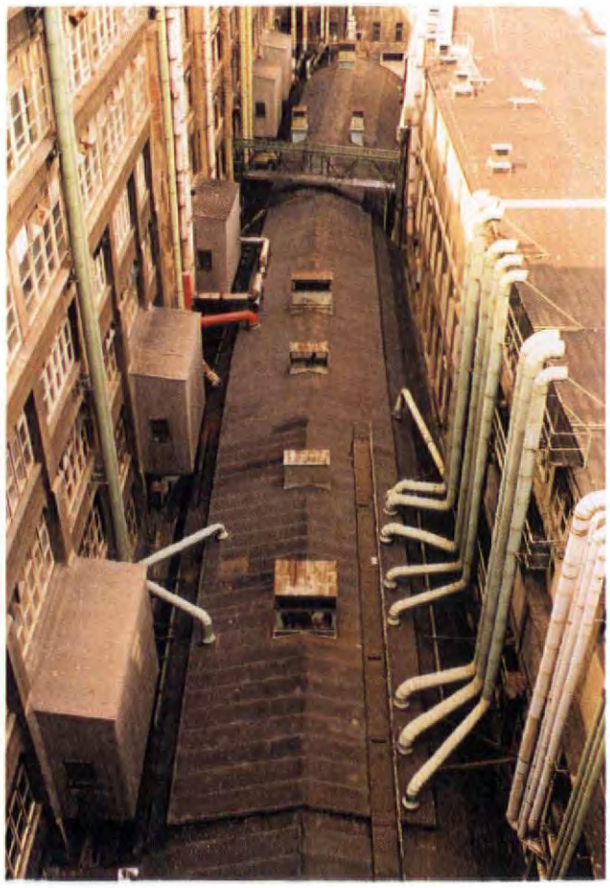
The first architect to understand these revolutionary developments was Adolf Meyer, the Bauhaus architect and for many years the associate of Walter Gropius. Meyer, whose importance for the development of modern architecture has up to now been totally undervalued – a result in part of his early death in 1929 – was deeply involved in the new construction method, and in the work he did in Frankfurt for the city, he erected some remarkable buildings using monocoque techniques. When a competition was advertised for designs for the public planetarium in the Prinzessinnengarten in Jena, Adolf Meyer took part. But in 1926 a design was picked for execution which was not Meyer's but that of Schreiter & Schlag. While Meyer parabolically superelevates the shell slightly and thereby emphasizes it as a shape (association: egg in eggcup), the more conventional design of the building actually erected, with its ring of colonnades and wide entrance hall on supporting columns, makes allusion to the Roman model of the Pantheon. It had not been understood that the dome had removed all justification for the existence of the column as a support.

Adolf Meyer had recognised the relationship with the natural sciences, and in a short article for the first volume of the Werkbund journal *Die Form* in 1925 stated: "The dome buildings of the Zeiss planetariums are, because of the audacity and grace of their construction, among the most remarkable phenomena in the field of the architecture and engineering of the age, and their influence on architecture as a whole cannot yet be foreseen."

It took nearly another 30 years for this knowledge to be converted into a series of constructional and aesthetic experiences for architecture. This took place principally in the USA, through the work of R Buckminster Fuller, who – like Bauersfeld – had developed his geodesic dome constructions out of the ideal of projection. During the Second World War he was employed at the Board of Economic Warfare working on logistic studies; in 1943 he published a polyhedral map projection of the Earth, which, when folded and stuck together, formed a folding globe. In 1951 he filed a patent for domes; like Bauersfeld's his Geodesic Dome was once again created through the projection of an icosahedron onto the circumscribed sphere. In the following 30 years more than 300,000 geodesic domes were built: from the radar stations of the DEW Line to the US Pavilion in Montreal in 1967. They have become the symbols of the most diverse currents and movements all over the world. □

DECLINE AND FALL

Three years ago the firm of Carl Zeiss Jena employed 60,000 people and was the most advanced industrial manufacturing complex in East Germany. Now East Germany is gone and the name Carl Zeiss has been transported lock, stock and barrel to the West. The Hauptwerk in Jena, where more than 100 years ago Carl Zeiss, Ernst Abbé and Otto Schott combined their talents to build the world's first precision optical factory, is derelict. The story of its rise and fall is a microcosm of the fate of all the collapsed economies of the East. It is a story that conveys the drama and the magnitude of the task of recovery and reconstruction that confronts the European Community.

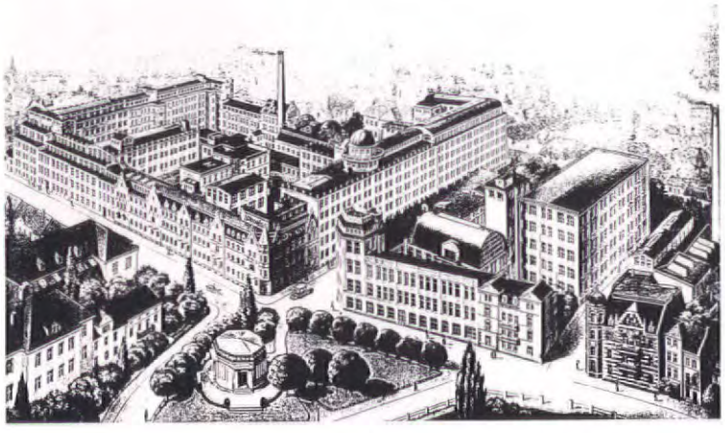


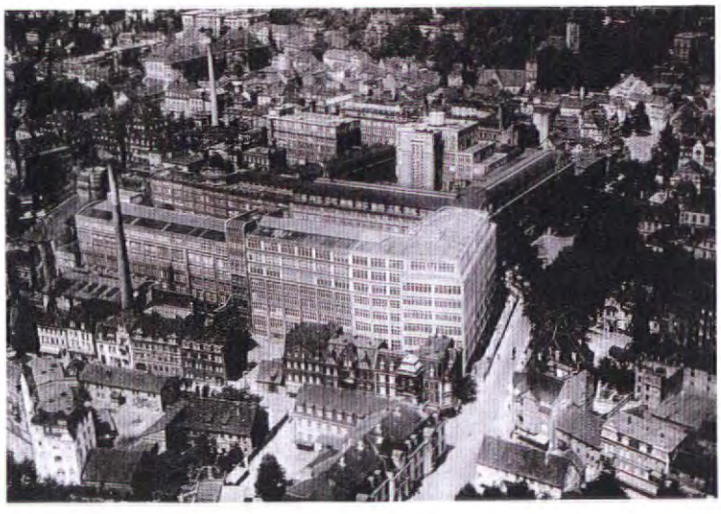
'Tunnel building' H12, erected over the street between Building 11 and Building 9

The 60 year-old four-lane motorways are being doubled in width at frenzied speed and the right-angled exits are being replaced with cloverleaf crossings. All over what was East Germany oil is replacing brown coal, ramshackle trams are being replaced with modern ones, and smoking two-stroke cars are giving place to catalysed Western models. But still the slowness of transport and communications in the East betrays the 40-year timelag that separates life there from the West. Leipzig has industry and a world famous symphony orchestra, but its airport is rudimentary; still host to a static display of ancient Russian aircraft; still crowded with people gathered just to watch the planes arrive and depart. Every day package tour operators transport East Germans abroad for the first time in their lives. At Leipzig they board the planes in state of wild excitement. Families wave them off with tears in their eyes. Freedom to travel is something they were denied for more than a generation.

Jena is a city of 100,000 people roughly midway between Leipzig and Frankfurt, its history distinguished only by the defeat inflicted upon the Prussians there by Napoleon in 1806; and the name of the optical company founded there by Carl Zeiss 40 years later. For more than a century, under four successive German regimes, the name Carl Zeiss was synonymous with the name of Jena; it was the place where Zeiss the precision optician, Abbé the scientist, and Schott the glass maker came together to create the world's first scientific optical manufacturing industry.

From its humble beginnings in 1846, Carl Zeiss Jena prospered and grew. For nearly a hundred years the factory expanded and its products developed in sophistication and performance. As a result of this success the town of Jena grew rich. Its population of 7,000 in 1866 had increased to 100,000 a century later. But in the first half of the twentieth century more and more of its business came to be dominated by the armed forces. With the massive development of military optical and imaging systems, Carl Zeiss Jena became a crucial research and development centre for the defence industry. Consumers of Carl Zeiss military equipment reach back in time from the now defunct Warsaw Pact, through the Nazi period to the Weimar Republic, the armed forces of Imperial Germany, and even the Prussian army that defeated France in 1871.



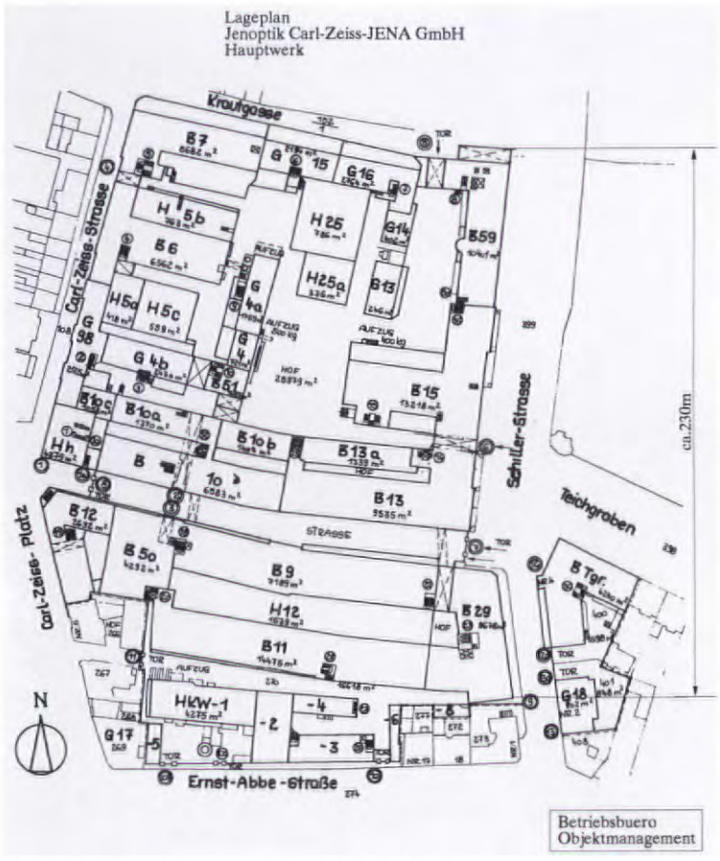


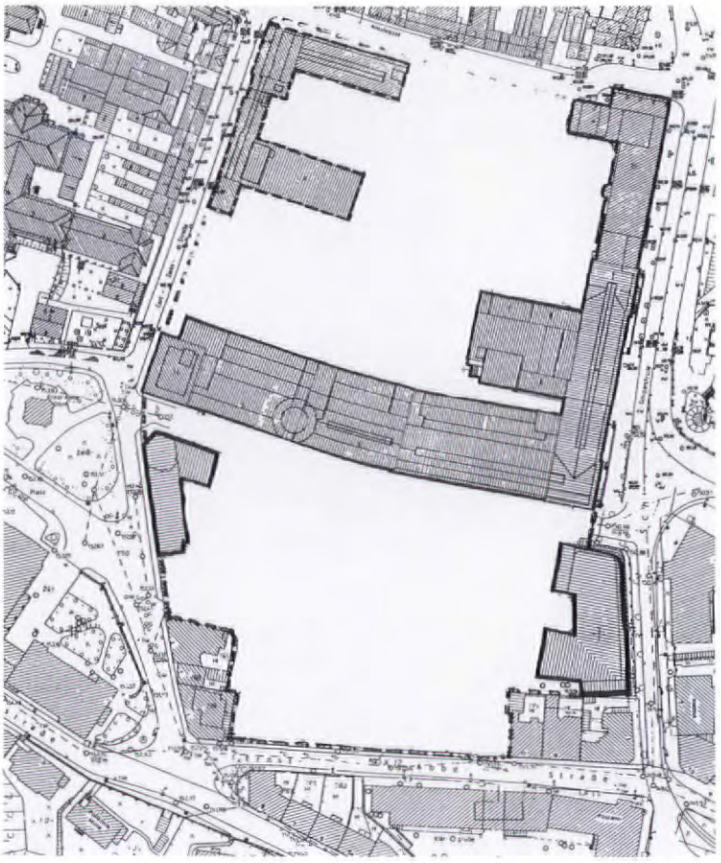
The growth and fate of the Hauptwerk at Jena. Top left 1896; top right 1912; above left 1930; above, bomb damage 1945

The German armies that invaded Imperial Russia in 1914 and the Soviet Union in 1941 were equipped with Zeiss gunsights, binoculars, rangefinders and artillery predictors.

With the second great defeat of Germany at the end of the World War in 1945, Jena was occupied by the United States Army, and the most advanced Zeiss optical equipment and many key Zeiss Personnel were spirited away to the West. Then the area was adjudged to be in the Soviet zone of Germany and the Americans handed it over to the Red Army, who completed the sacking of the Zeiss factories, taking the remaining equipment and all fixtures and fittings, including toilets, water tanks and the entire heating system, back to Russia. It was not until the formation of the East German state in 1949 that the plant could painstakingly begin to be repaired, the lost machine tools reconstructed and the scattered workforce reassembled to regain its former reputation.

Somehow, by methods that are now barely remembered, all this was done. By the late 1950s Carl Zeiss Jena, redesignated a *Volks Eigener Betrieb* (VEB or people's enterprise), was again a power in the world of precision optics. From then until the reunification of Germany the industry centred on Jena was the jewel in the crown of the East German economy, the country's one first-class, high-tech industry. Universally acknowledged to be one of the world's largest and best precision optical manufacturers, for years the firm produced advanced military and aerospace, medical, commercial and consumer optical equipment for export. In the 1980s it led the way into the new fields of micro-electronic, laser and computer imaging being pioneered in the West. The first microchips manufactured in the Eastern bloc were made by Carl Zeiss Jena. Even today, with the ComEcon





Block plan of the Hauptwerk 1991 (above) shows buildings numbered according to date of construction. Block plan (right) shows demolitions.

Security lockers and "Trabbie" (below) are relics of old regime. Roof of B9 (bottom) was site of first ever planetarium.

economic system destroyed and the Soviet Union only a memory, Soviet-built tanks in use all over the world, and Soviet spacecraft orbiting above it are still equipped with Zeiss optical instruments.

All this came to an end with German reunification. In June 1990 Carl Zeiss Jena came under the control of the *Treuhandanstalt* and began to run down its operations. In the year and a half that had passed since German Economic and Monetary Reunion, the company had already divested itself of 30,000 workers. Then, on January 1st 1992, Jenoptik GmbH and Carl Zeiss Jena GmbH – the post-reunification successors to the old East German *Volks Eigener Betrieb* – dismissed 20,000 of their employees.

Although it was not wholly unexpected, this last mass sacking was a shocking event, throwing a quarter of the workforce of the city out of work on a single day. Today, what remains of Carl Zeiss Jena is a pale shadow of the powerful organisation that throughout the life of the East German state was a major foreign currency earner, an underwriter of important scientific research, and a provider (throughout East Germany) of no less than 60,000 skilled jobs. As late as 1989 *Glaserne Fackel* ("Fire from the Glass"), a costly seven-part serialised life of Carl Zeiss was made for East German television – and the sets used for it lovingly re-erected in the Jena optical museum. Today more than 50 Zeiss planetariums are still in operation around the world, the last one made in Jena was delivered to Finland in 1987. But today also, hundreds of the highly qualified scientists and technicians who worked on projects like this have either relocated to West Germany, are unemployed, or serve as janitors or parking attendants. Today the Jena technical and sales translating department, once numbering 56, has been reduced to three, with only the luckiest former scientific translators kept on as secretaries or tour guides for the Carl Zeiss Optical Museum, a now neglected building which still opens regularly every day even though the factory that produced its exhibits is closed.

In its VEB form Carl Zeiss Jena had five factories administered from the Hauptwerk, the original Zeiss factory that was steadily enlarged over a period of 100 years until it became a 10 hectare labyrinth of interconnected office, laboratory and factory buildings occupying the very centre of the city. Like the satellite factories in and around Jena – the Sudwerk, Göschwitz, and two other factories whose buildings were demolished in 1990 and whose sites are now being developed into business parks – the Hauptwerk was an industrial fortress, operating a security system whereby employees were allowed to bring nothing into the factory, nor to take anything out. In order to enforce this rule, special lockers were supplied outside the gates where workers could store their private possessions. Some of these lockers still remain.

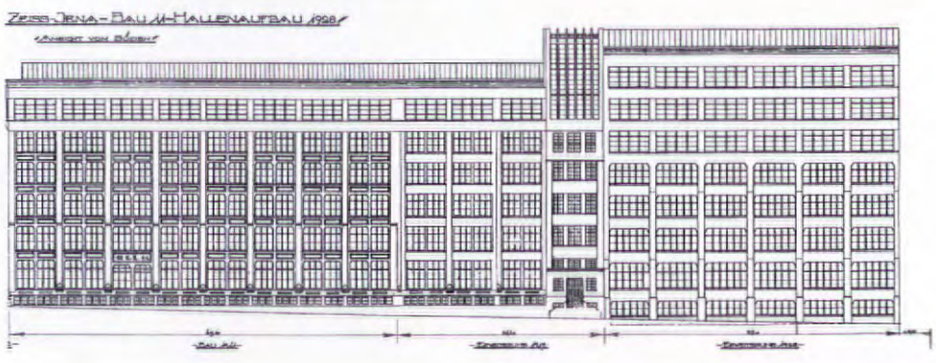
Today Sudwerk still employs 1,500 people on optical maintenance work, and Goschwitz another 1,700 on peacetime developments of laser and microelectronic imaging. But at the Hauptwerk, despite the retention of its tall administrative building and its rooftop observatory – used up until two years ago to demonstrate mirror telescopes – all optical work has ceased except for a small start-up

computer imaging consultancy located in an abandoned building that hopes to specialise in facilities management systems. In the administrative offices only a few key staff have been retained under the direction of Doktor Späth, the former premier of Baden-Württemburg, now chairman of JenOptik GmbH and the government appointed saviour of Thuringia, where the unemployment rate is now a daunting 30 per cent. His project now, among many, is to demolish, gut and partially refurbish the whole Hauptwerk site so that it can take its place as a transformed element in the new United German economy.

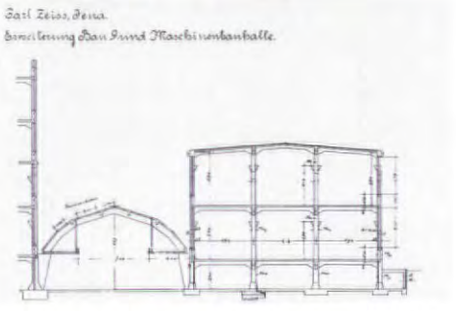
Because the Hauptwerk grew by accretion instead of by planning, its layout follows the original central Jena street pattern. The operation went as follows: first the narrow streets were taken over, then taller buildings replaced the houses either side of them, then the tall buildings were bridged across, one to another at upper levels and tunnelled together from basement to basement, and then finally single-storey barrel-vaulted concrete buildings were placed not only on the roofs of the tall blocks, but along the lines of the enclosed streets at ground level. This process, effectively ended in 1945 – although one final tall building and an elaborate externally ducted steam district heating system was added as part of the refurbishment of the complex in the 1950s. From then on building maintenance was minimal and acres of blistered black roofing felt attest to 30 years of inadequately resourced attempts to make good the ravages of time and neglect.

Although at the time of writing about a third of the Hauptwerk has already been demolished, the buildings that survive span the history of the factory in the twentieth century. In fact because all the earliest buildings were replaced before the end of the nineteenth century, they are a living museum of the German industrial architecture of the 60 years up to the commencement of terminal neglect in 1945. Today the oldest surviving brick laboratories date from the 1898, while the youngest structure, the former 14-storey Research and Development building, now undergoing conversion into new office and retail space, was completed in 1959.

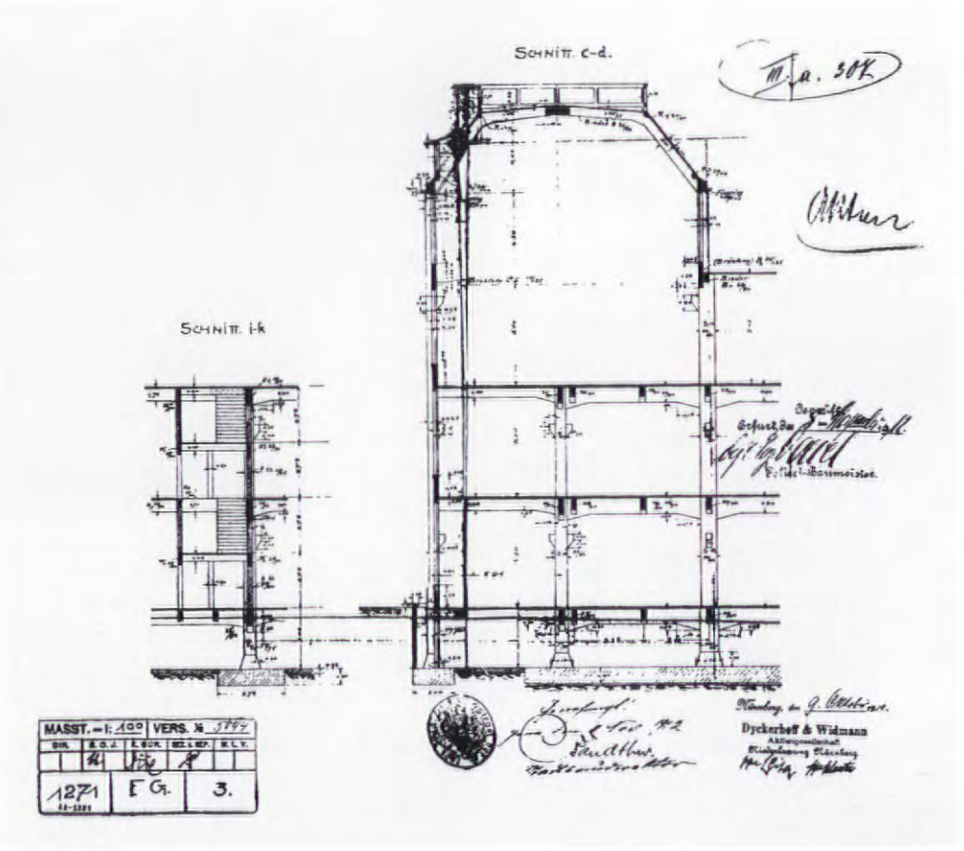
Throughout the four regimes that have governed the eastern part of Germany during the last 90 years, Carl Zeiss retained an unique and simple system of building designation based on the year of construction. Thus the brick-built Bau 98 fronting onto the Carl Zeiss Strasse is the oldest surviving structure in the Hauptwerk, having been built in 1898. It is not however destined to survive the present redevelopment programme as its design and construction is not considered sufficiently meritorious. Two slightly later buildings nearby, Bau 6 and Bau 7 (built respectively in 1906 and 1907) are believed to be the first reinforced concrete buildings ever constructed in Germany. They were erected according to the Hennebeque patent by the Nuremberg firm of Dyckerhoff und Widmann, builders of



(Top left) Concrete fins over stairwell of B11, now demolished. (Top right) Emil Fahrenkamp's B29, reglazed but still impressive. (Centre) Original drawing of now demolished B11. (Above) Details of B29 before renovation



Early concrete structures B9 (above) and B12 (top and right) were among the first in Germany



many later buildings at Carl Zeiss Jena and pioneers of shell concrete construction.

Later concrete buildings slated to be saved from demolition include Bau 12 (1912), an octagonal structure that once served as the administrative offices for the whole complex, which is destined to become part of a new hotel. Bau 10 and Bau 13 (1910 and 1913), which are six-storey structures by Dyckerhoff and Widmann – the first still boasting the now disused rooftop observatory and the second some elegantly curved concrete vaulting to its penthouse – and Bau 15, another elaborately vaulted concrete structure fronting onto the Schiller-Strasse that once incorporated a fire station.

Observatory on roof of B10 (below) and B29 entrance detail (below right) are unique features

Undoubtedly the most distinguished survivor in architectural terms will be Bau 29, built in 1929. With its elegant early Modern bronze entrance portal, this 10-storey, 10,000 square metre office building was designed by Emil Fahrenkamp, architect of the famous Berlin Bewag building, one of the few large Modern structures in the German capital to survive World War Two intact. Another survivor from the opposite end of the pre-war spectrum is to be the uniquely unnumbered 15-storey Carl Zeiss Jena Hochhaus, a stripped classical administrative tower erected in 1935. This building, along with the former research and development building, will form the nucleus of the new commercial and retail developments planned for the site.

The principal casualties of the demolition programme are two relatively early concrete

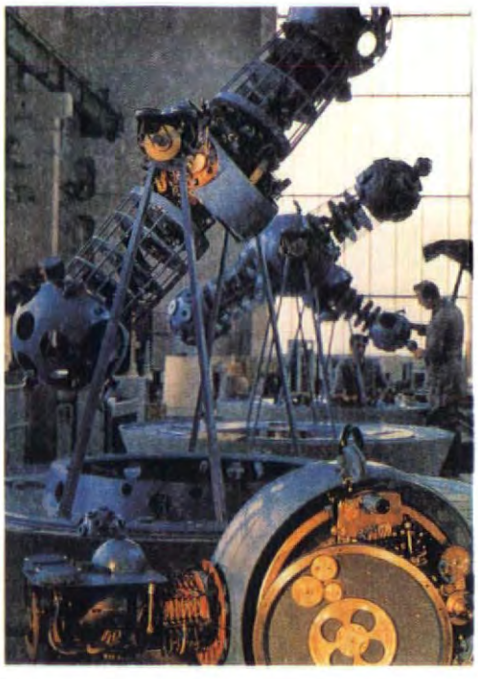
Evolution of B59: (centre) as Zeiss R&D building, (right) stripped for overcladding, (left) as offices and a shopping centre by architects Rödl + Braschl

structures Bau 9 and Bau 11 – the first of which once boasted the first planetarium in the world on its roof (see preceding article) – and a complex of smaller buildings on the Northern perimeter of the site built between 1915 and 1925. In addition, all the emergency low concrete vaulted structures built along the street lines between the buildings are scheduled to disappear, as are the basements, communicating tunnels, underground storage tanks and storage areas, which are heavily polluted with chemicals.

The destruction of the Hauptwerk in its present form is viewed with mixed feelings by the people of Jena, for the influence of the optical factory upon the city was so pervasive for so long that it is difficult to separate one from the other. The influence of Zeiss, Abbé and Schott extends outwards from the factory to the complex of Jena community buildings built by the Carl Zeiss Foundation and indeed through the very names of the streets themselves. Even if the Hauptwerk were to disappear completely, the impact of the optical industry upon Jena would still be powerfully evident.

Today, as a half derelict complex of buildings, the Hauptwerk is imposing and enigmatic rather than attractive. Like the abandoned industry of Britain's once powerful Midlands and North, it is part of the legacy of another world order, one that has lost its relevance and power with the speed of the undoing of a magic spell. Like that other talisman of East Germany, the immensely tall chimneys of the lignite-burning heating systems with their associated fumes, smog and pollution, the great factories of Jena demand a "New Deal" that must be as rapid and complete as any that any government has ever successfully undertaken. With so many former Zeiss employees forcibly retired on 60 per cent of their last year's take home pay, it is hardly surprising that the conversion of the great factory town into a service industry centre of offices, hotels and shops is viewed with scepticism. And yet it is not impossible. As the history of the optical industry in Jena shows, the city has survived destruction before and risen to power again. But as the West German administrators of the bankrupt Carl Zeiss Jena estate know only too well, only a speedy achievement of prosperity and full employment can really bring about a burial of the past enshrined in those gaunt buildings. □

Carl Zeiss Jena's most famous products,planetarium projectors, under construction in 1976



A NEW BEGINNING

In August 1991 DEGW were asked by Dr Lothar Späth, the new chairman of Carl Zeiss Jena, to look at the Hauptwerk and its existing buildings and suggest how best to refurbish or redevelop the site. By then Carl Zeiss Jena was bankrupt and in need of radical re-structuring for the future. Geoff Scotting of DEGW Berlin explains what happened next.

DEGW's study was undertaken in Jena and London by the Urban Planning group who suggested that they should produce a development strategy for what was really needed, a vision for regeneration. In parallel with this DEGW undertook a comparison study of a West German city of similar size, Erlangen, dominated by Siemens as Jena had been dominated by Carl Zeiss. This gave a profile of the sort of commercial and social facilities lacking in Jena which could confidently form part of the thinking for redevelopment of the site.

The development strategy was presented in October 1991 and set out its main objectives:

- To realise the employment potential of the site;
- To create development strategies for short, medium and long term action;
- To create a development framework within which decisions can be taken;
- To identify issues in need of more detailed investigation;
- To set the agenda for discussions with the planning authorities.

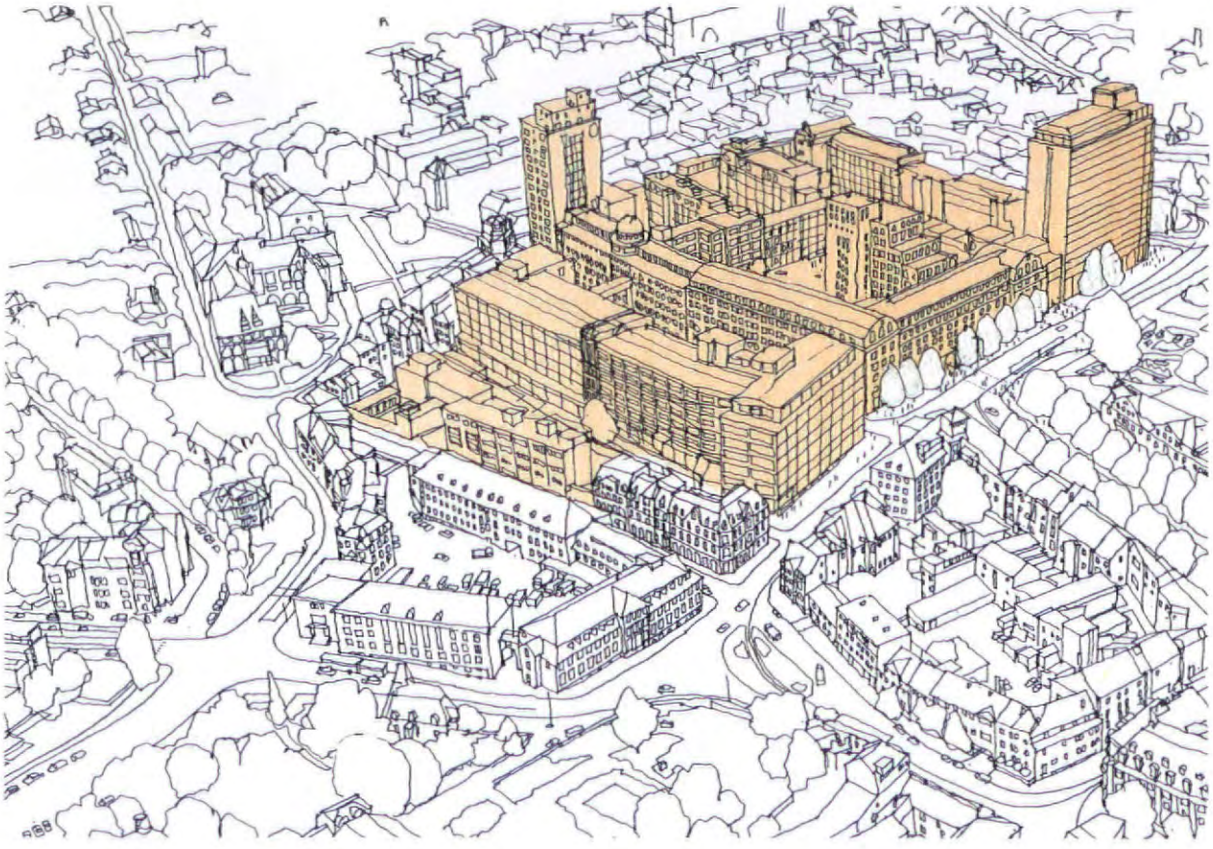
As well as detailed analysis, option studies and a phased implementation strategy the study succeeded in providing a vision, its centrepiece being a simple 1:1000 scale model of the site and its surroundings showing the existing buildings. During a presentation of Dr Späth and senior Carl Zeiss management some of the existing buildings were lifted out and replaced by a model diagram of a new business quarter for the city. This had the unexpected effect of an instant design contract signed on the spot to continue work on a masterplan, and the formation of the means for implementation.

At the suggestion of Dr Späth a joint venture company was formed to act as a project management vehicle for the property interests of the re-formed company, JenOptik. The joint venture was between DEGW and IFB, a multi-disciplinary Stuttgart firm of engineers and architects. This project management company, JenProjekt, was established in Jena and has the task of procurring all project management, design consultancy and construction services for JenOptik over a diverse range of sites and buildings, of which the Hauptwerk site is one, with an added remit to employ local skills.

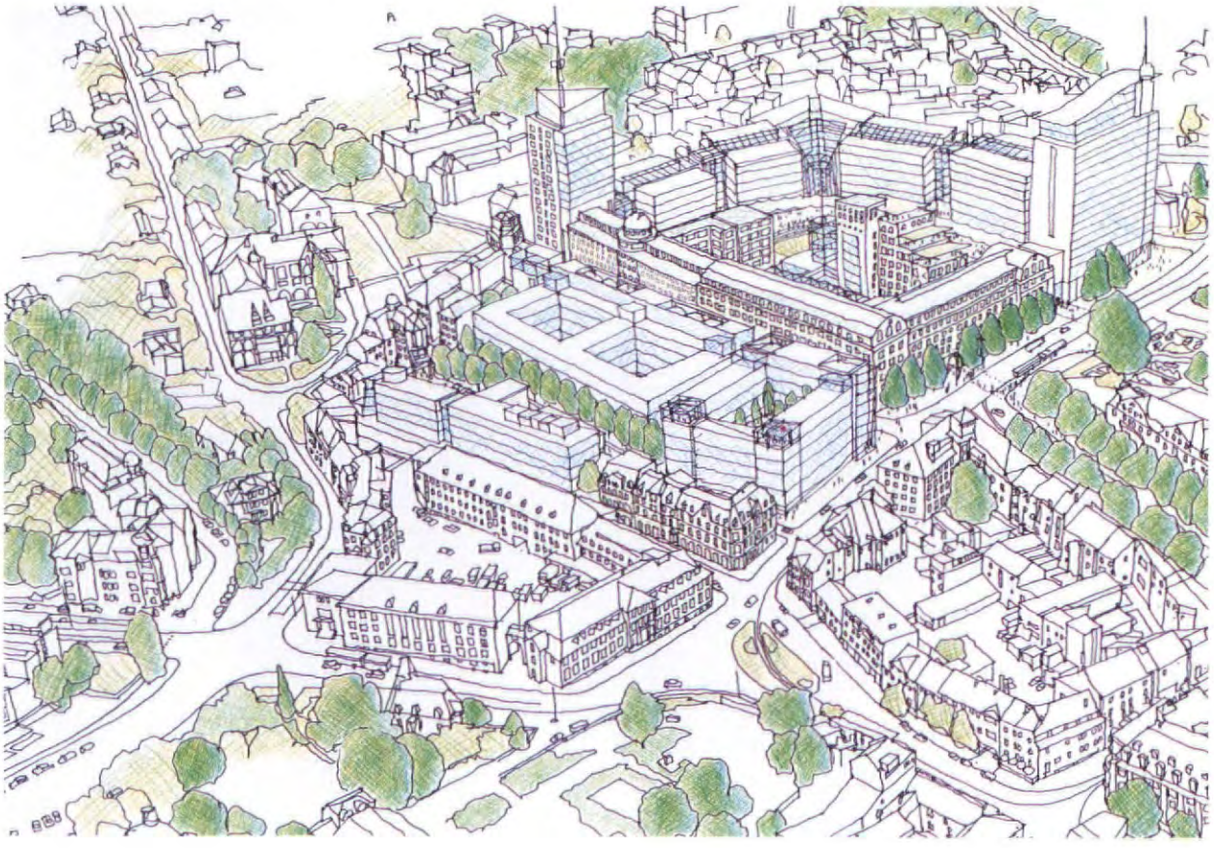
Implementation

For DEGW the project moved on to an exciting but uncertain second phase in November 1991. It was clear that the momentum had to shift from London to Jena and three DEGW architects moved to a site office to ensure a closer link with JenProjekt and the client, and to ensure that the future proposals responded to both the physical and social reality of the city. Some urgency was injected into the project when in December the majority of the workforce on the site were made redundant and the once bustling city within a city became quiet and awaited its future.

The nature of the work changed and the first construction job came out of DEGW's suggested strategy to open up the private road bisecting the site to public use and a designed 150 metre long hoarding was required to shield a first phase demolition site. This led on to proposals for the conversion of the empty fire station on the site into an exhibition and investor centre for JenOptik to act as a focus for their activities in attracting investors, internationally, to invest in Jena and Thuringen.

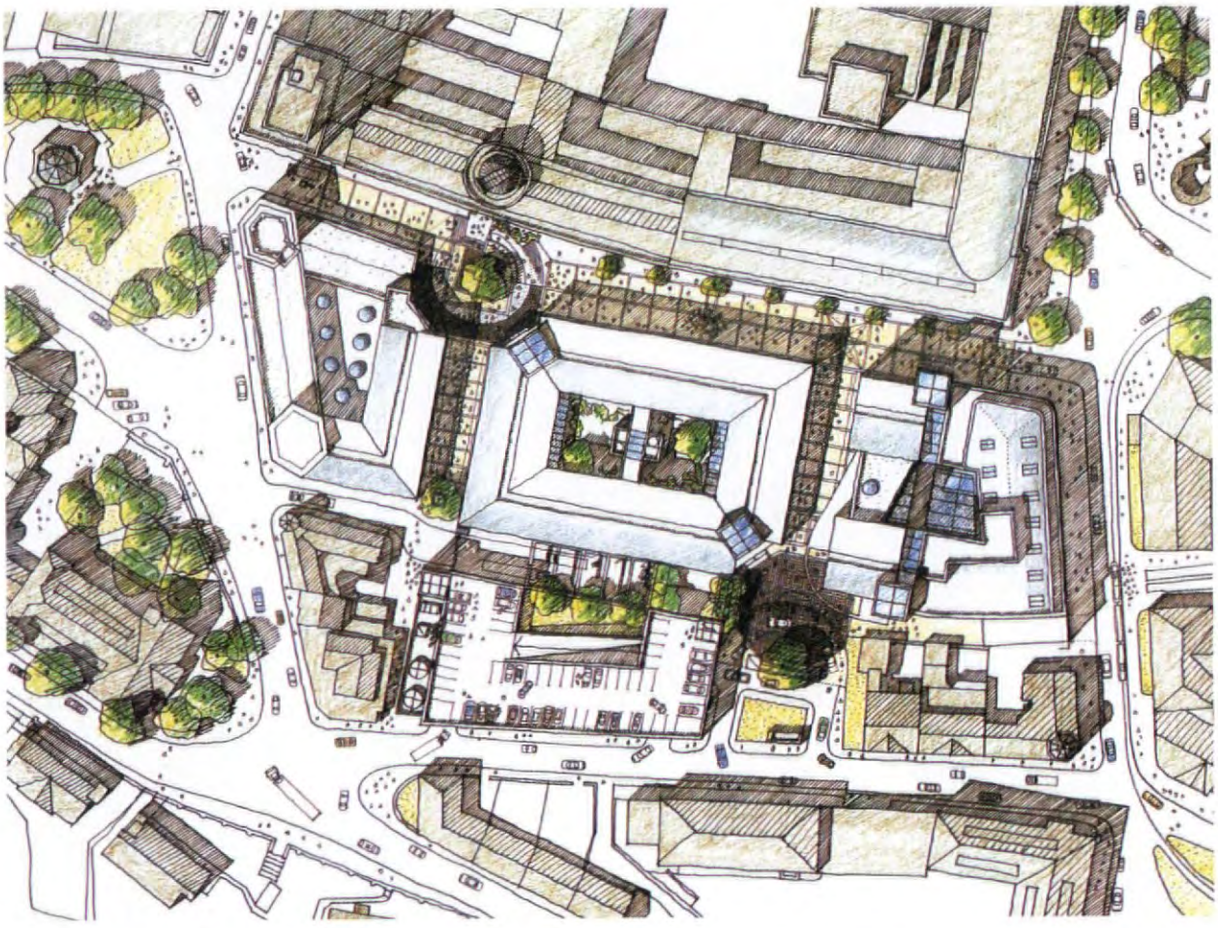


Aerial perspective of the original site before redevelopment



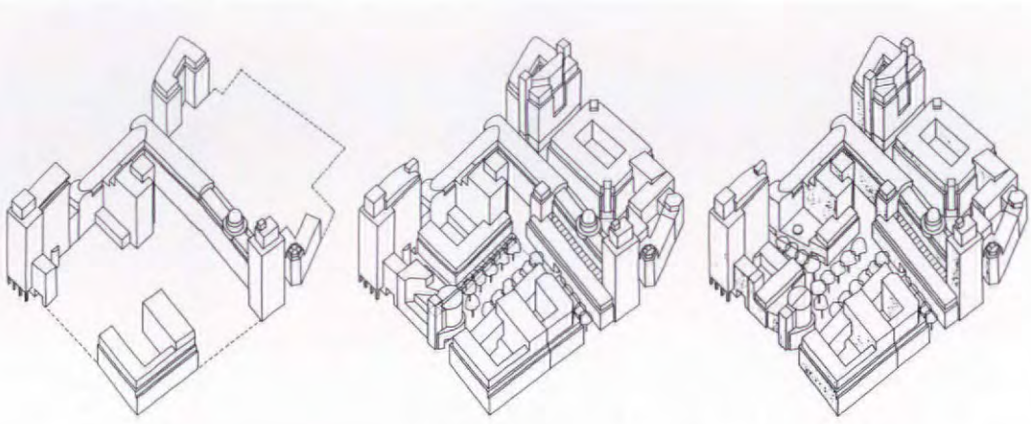
Aerial perspective of the original masterplan, November 1991

The original masterplan for the south site; completed in December 1991, since revised.

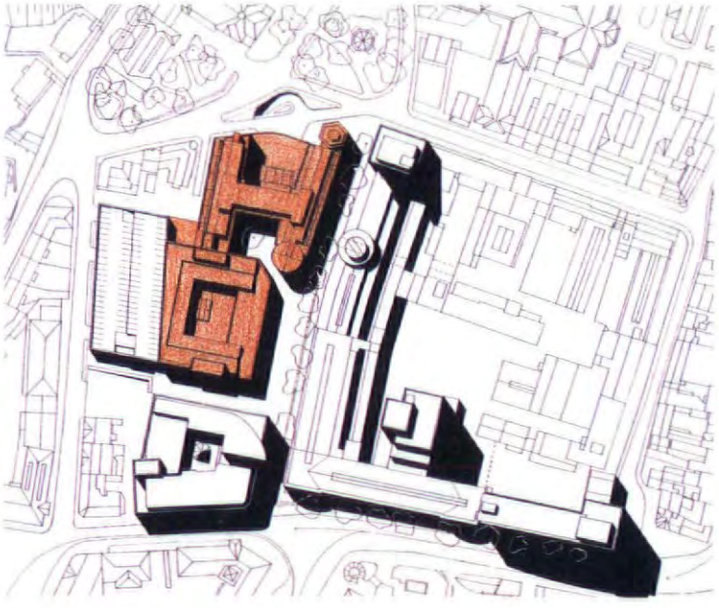


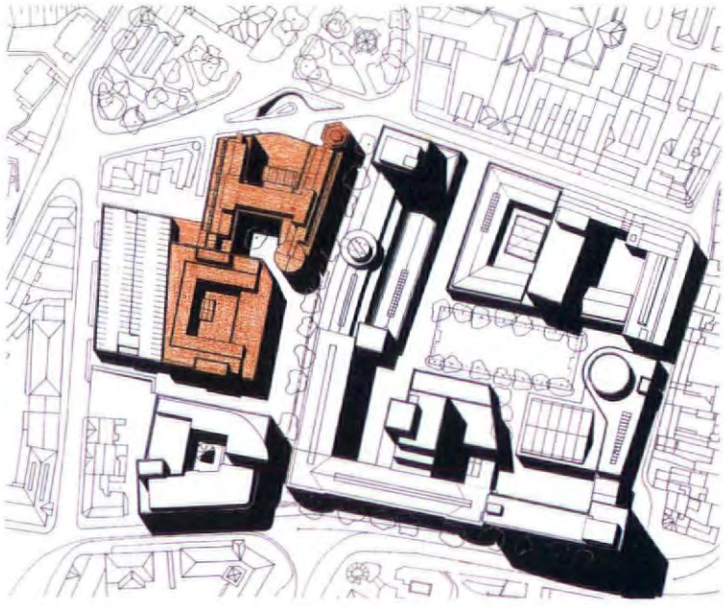
Perspective views of the original masterplan of the south site.

Progressive implementation of the master plan from maximum demolition (left) to completion



(Below left) Site plan, first phase complete; south site fully developed, north site partially developed.
(Below) Site plan, second phase complete; whole Hauptwerk site developed.





The South site

The initial development strategy had outlined the South site (south of the new public road) as an opportunity to quickly provide sites for inner city commercial users and give confidence to the regeneration strategy. The buildings on the South site were the least attractive for refurbishment except at the two ends, an attractive 1912 hexagonal tower and an imposing 1929 "Bauhaus" building designed by Emil Fahrenkamp, architect of the Shellhaus in Berlin. The buildings between were in poor condition, polluted by the production process for which they were built. The idea of keeping the ends, or "bookends", seemed attractive and won support from the client and planning authority.

DEGW's South site masterplan completed in March 1992 followed a series of meetings with potential investors and the planning authorities and established a hotel location onto Carl Zeiss Platz across from the Volkshaus, a fine local landmark. Two department stores and offices above were located to the East confirming the new public street as a major new shopping street for Jena. It was made clear by the planning authority and both agreed and welcomed by JenOptik that the commercial uses on the South site were to be seen to both support and fund more social uses on the North site where a greater concentration of retained buildings could potentially house low cost, low rent, non-commercial activities. JenOptik concluded that the most desirable strategy was to sell off the South sites and use the revenue to fund refurbishment and conversion of buildings on the North site.

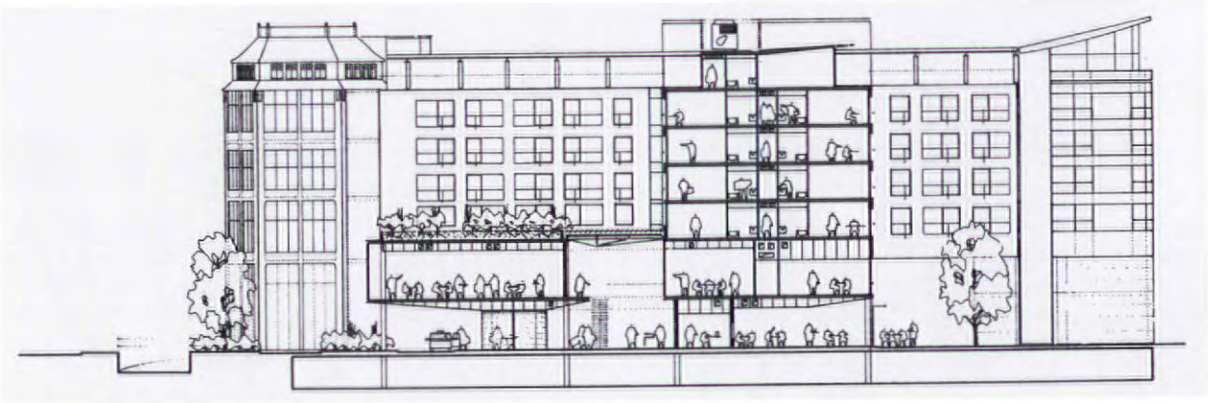
The North site

The first phase of DEGW's North site masterplan was completed in May 1992 following a two day workshop held in Jena during which various options were presented and discussed by the invited participants including the client, potential investors and users, the city and the university. The resulting three options will be evaluated against the stated goals:

- Integration into the existing city centre;
- The creation of a distinctive urban centre;
- The integration of naturally mixed social, educational and cultural uses;
- The creation of a new public open space.

The North site masterplanning is expected to continue in September 1992 following feedback from the workshop and more detailed consideration from the client and potential users of the site.

Hotel elevation onto Goethestrasse



Section through hotel

Perspective view looking south onto Carl Zeiss Platz

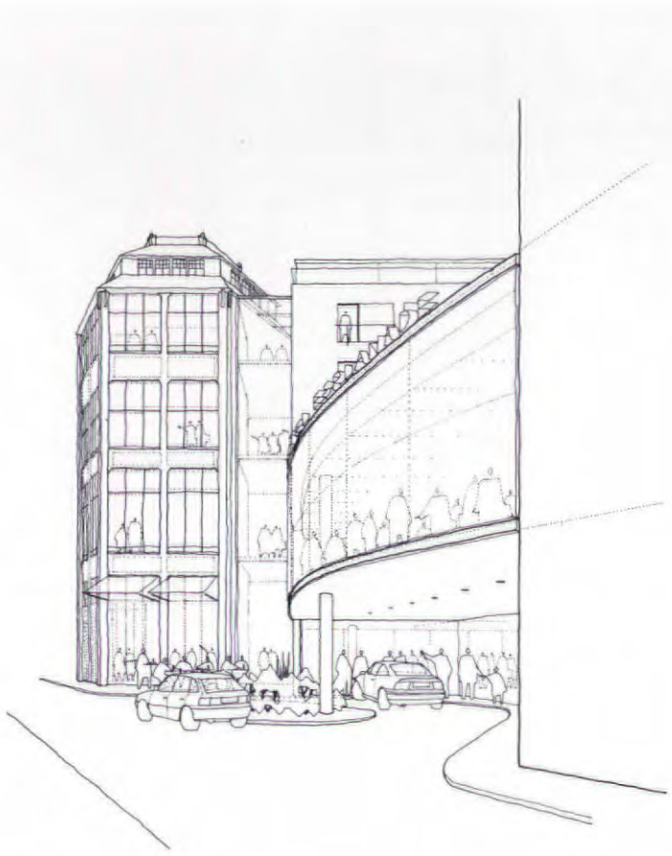
The hotel

The third phase of DEGW's involvement in the Hauptwerk site commenced in June 1992 when detailed proposals were sought by JenOptik and an investor to show how a 220 bedroom, four star hotel could be designed for the attractive but difficult site overlooking the Volkshaus and incorporating the retained hexagonal tower. Seven months of living in hotels in Eastern Germany and Berlin had well prepared the newly formed Berlin Architecture group to the design task and a solution based on an H plan bedroom block was quickly selected from the alternatives presented.

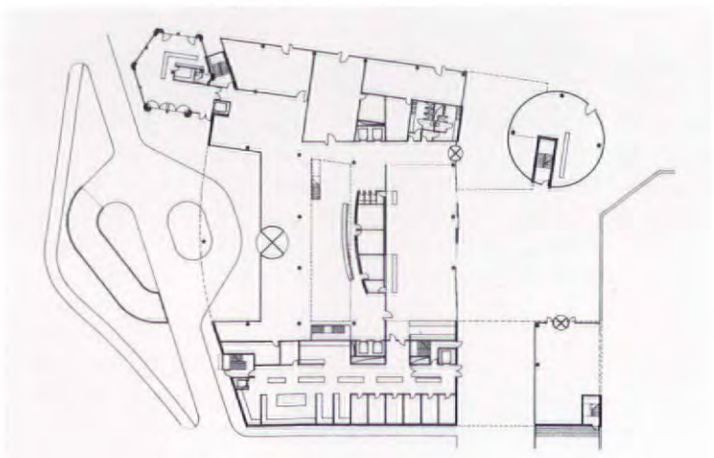
The H plan form with its fragmented elevation onto Carl Zeiss platz drew some criticism from the conservation authority who felt that the existing solid elevation onto the square should be retained. Further studies including a sketch model and perspective views were represented to them and they agreed that the proposals were both complimentary to the informal nature of the square and allowed a new and better relationship between the tower and its surrounding buildings.

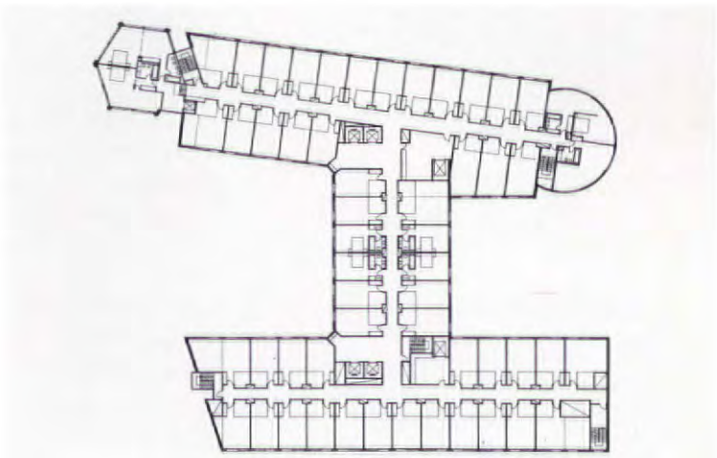
The exploration of the form of the hotel naturally led on to an exploration of the form of the abutting department store and its relationship to the street and DEGW were asked to provide detailed proposals for this building and its underground car parking. The hotel design is however further advanced and preliminary architectural studies suggest an architecture both "modern" in style yet with materials that fit happily into the street and the urban framework, including render, grey limestone, white windows and side-panels, and lead roofs.

Together the hotel and department store/office building total 25,000 square metres with 4,000 square metres of underground car parking and will create up to 900 jobs with varying skills accessible to a wide range of local people. It will have a contract value of approximately 75 million Deutschmarks and a completion date of January 1995. □



Perspective of hotel looking north towards entrance and showing retained tower building.





(Below left) Hotel ground floor plan. (Below) Typical floor plan

JEWEL ON THE GROUND

A small building by the recent standards of Sir Norman Foster & Partners, the new library at Cranfield opened in October 1992 is a fascinating study in the use of minimal variations to achieve maximum visual effect. The interior, with its combination of concrete and steel structure and its splendid glass staircase, is particularly impressive.

All photographs by Timothy Soar

Louvre-shaded side wall with fritted glass.

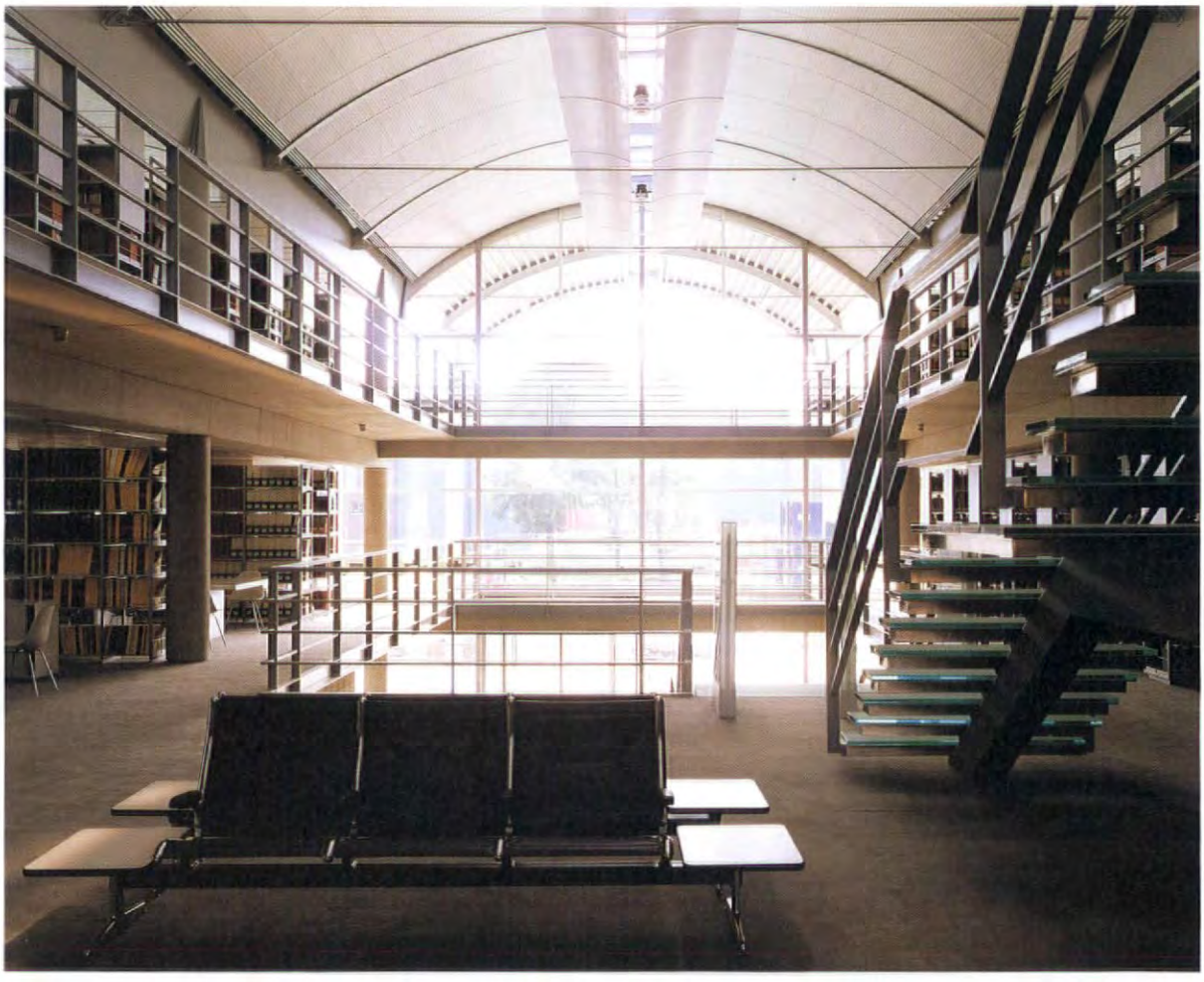
Cranfield Institute of Technology, located on the site of an old RAF base near Milton Keynes, is an unexpected hangover from the post-war Labour government. Founded in 1946 by Sir Stafford Cripps, it was intended to become an international centre for the study of aeronautics, a field in which Britain was then a world leader. That was nearly 50 years ago and today the Institute is greatly changed. Since 1969 it has been a chartered university specialising in management as well as aeronautics, and now it boasts the largest contract research income of any such institution in the country. About the only thing about Cranfield that has not changed is the quality of its buildings, which range from pre-war RAF vernacular to various combinations of hangars and sheds.

Presented with the opportunity of £7 million from the Department of Education and Science to transform this situation, Cranfield opted for a new library designed by Sir Norman Foster & Partners. At 3,000 square metres on three floors the building is not large by Foster standards, but it is large enough and elegant enough to transform beyond recognition the quarter of the Cranfield campus in which it is to be found. Of composite steel and concrete construction, with its appearance dominated by lateral rows of metal louvres and a roof consisting of four large glistening barrel vaults, the new library is positioned to dominate a rudimentary square paved with grey concrete bricks, over which it is able to impose a modest but undeniable sense of order.

In the dismal and unruly surroundings of Cranfield this is no mean achievement, but it pales into insignificance compared to what is achieved within. The inside of the building, whose library component appears to be organised on the increasingly popular goodbye books, hello monitors principle, is far more conclusive. Once through the large diameter revolving door and into the atrium, the Cranfield chaos without is forgotten. Here is everything that the conventional library is not, and a working environment of extraordinary serenity and elegance. With a steel framed and clad roof system atop a concrete frame that is painted externally, fair-faced internally and clad in glass, the building makes as eloquent a use of reinforced natural light at its own diminutive scale as Stansted Terminal does to the power of ten.

Like all non-roof serviced Foster buildings, Cranfield is an experience in the quality of light as much as it is an experience in the quality of space. As a design principle Ken Shuttleworth, the Foster Partner responsible for the design, decided early on that all solar shading would be positioned outside the envelope. This decision has had interesting results. Toplighting through the roof has a distinctly Stanstedian feel about it, with ridged glass rooflights built up above the apex of the barrel vaults admitting "raw" daylight, and internal "seagulls" as the delicate winged baffles are called, bouncing this off the profiled curved metal ceiling panels.

The sidelighting of the building is modulated in different ways. To the South the view out through the entrance to the brick-paved square is almost completely clear, because a large projecting roof portico is there to shade the glass. To East and West, on either side, the views out from the upper library floors are equally unobstructed, but they are split up by broad, outrigged metal louvres into rectangular slots, ensuring that the closest existing buildings on those sides are largely obscured, either by louvres or trees. Only to the North, where no solar shading is necessary, is the view from the administrative



First and second floor interior (left). Form imposes order on an unruly site (below).

offices unmodulated and uniformly dismal. This view however was a choice of the Cranfield staff themselves.

Because the new library will be used by some 7,500 postgraduate and professional development students each year, together with 400 academic and research staff, and because the Cranfield campus "has no heart", as chief librarian John Blagden succinctly puts it, an unique social function has been incorporated into the building. The large grey slate-floored entrance hall boasts an extremely long stainless steel bar and coffee servery with seating that is intended to spread outside as well during summer months. This unusual combination of restaurant and library is feasible because none of the seven kilometres of open shelving is located on the ground floor – although the small seminar rooms there are partitioned in stack-bonded concrete that can easily be taken down to provide expansion space for the dense bays of compact shelving that adjoin them.

Unquestionably the dominant feature of the three-storey interior public space in the new Cranfield library is the glass staircase, with its treads supported on stainless steel spreaders from two square section steel beams between ground and first floor, and a single beam from first to second. This staircase, at first sight too large and glamorous-seeming for a quiet library building, is in fact carefully muted with silicon mounting pads for every tread.

Though eagerly described by Cranfield enthusiasts as a library of the future, it is perhaps instructive that this building is only partly air conditioned and will rely on an undisclosed mix of paper-based and remote and direct electronic information servicing when it comes fully on stream in 1993. The building is fully networked for information technology even though it has no raised floors; access to data points being located around the perimeter on first and second floors where false ceilings are also fitted between the downstand

fairfaced concrete beams.

Even if the surroundings of the new Cranfield library were not so undistinguished it would still represent a considerable architectural success. Internally, the quality of light and space beneath the long public barrel vaulted section, with its floor decks ringing the central atrium void and its neatly offset revolving entrance doors, is worthy of the master at his best. □

INTERNATIONAL FORUM OF YOUNG ARCHITECTS PUBLICATION

The International Forum of Young Architects is a world-wide organisation aiming at stimulation of avant-garde trends, conceptions and projects in architecture.

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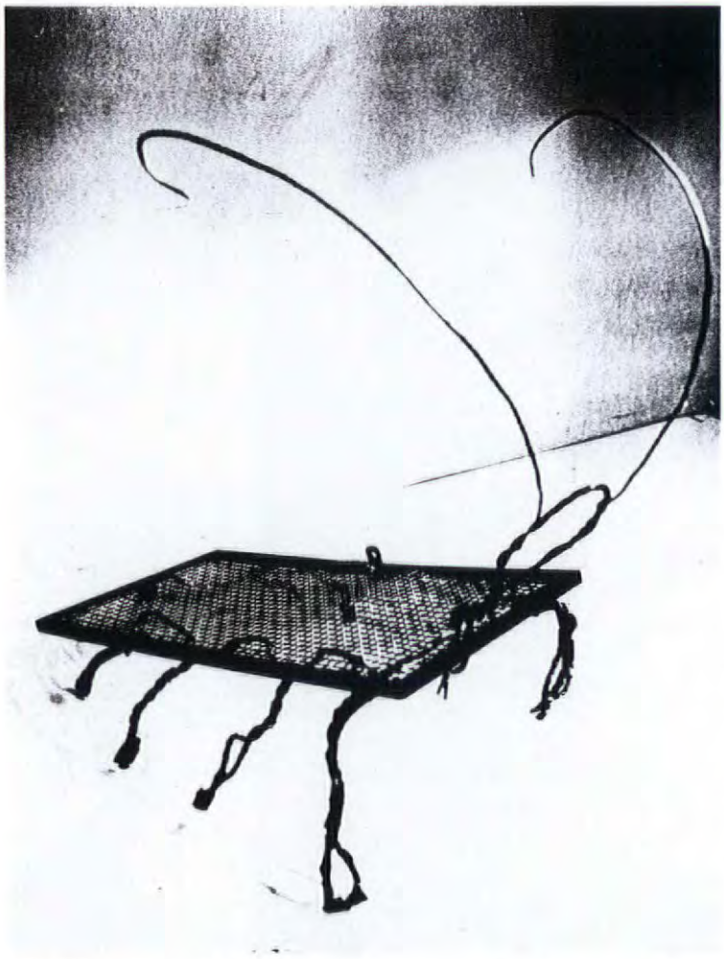


VOICES FROM RIO

Young architecture in Rio de Janeiro is a carnival of mixed languages, poetic expressions and traditions. But beneath this colourful surface it is structured by several conceptions that are fundamental to Brazilian culture as a whole. Among these are a mythological approach to reality; the natural integration of Man into nature and the importance of the Heroic Modern period of the 1960s. These are the most influential sources of inspiration. Or, to put it another way, Myth, Nature and Modernism are the strongest Brazilian conceptual determinants.

Israel Nunes, one of the young architects presented below, had warned me that to understand Brazilian culture and art "your sensitivity is the only possible key. Either you respond to it, in which case you don't need the language, or, if not, you shouldn't try to speculate about it." Following this formula, it seemed wiser not to risk speculation, but to select young architects whose works represent most clearly the poles of Brazilian architecture, and let them speak for themselves. The presentation of these polarities should allow the reader to reconstruct the whole field, if he has the "key"...

Ex-Culture of Vasco Acioli

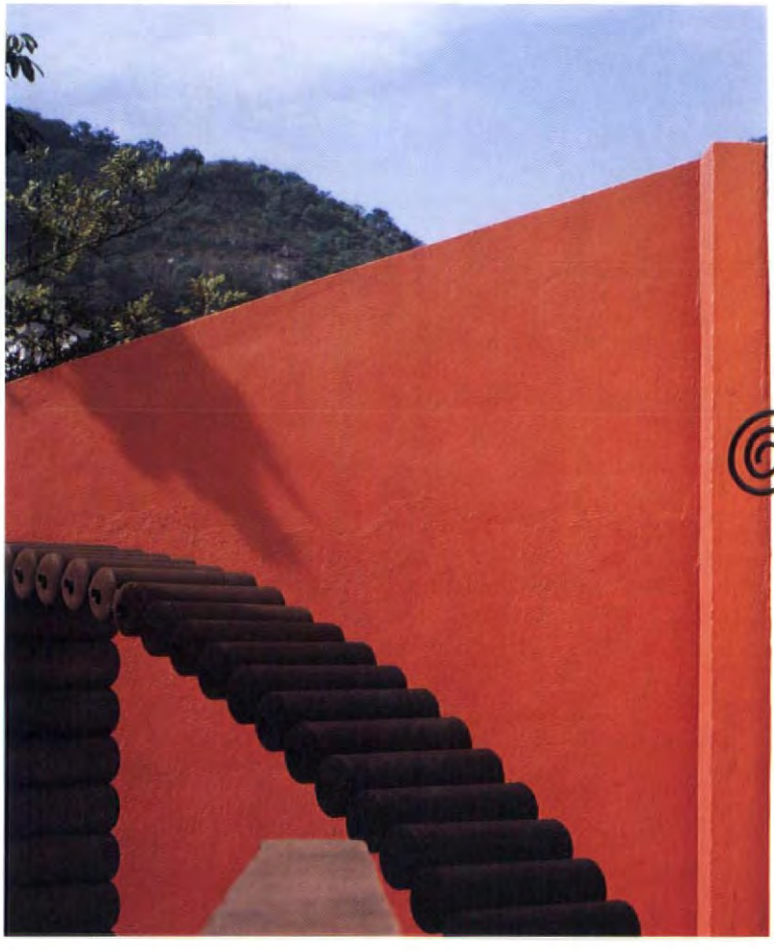
Although working as an architect, Vasco Azevedo de Acioli is best known as the author of series of conceptual sculptures. His works resemble fantastic creatures from other worlds and are made up of ready-made elements and products from industrial and building design. The name Ex-Cultures that he has chosen seems to be an amalgam of Sculptures and Extinct Cultures. Thus exhibitions of Vasco Acioli's works find their place somewhere between conceptual installations and a paleontological museum.

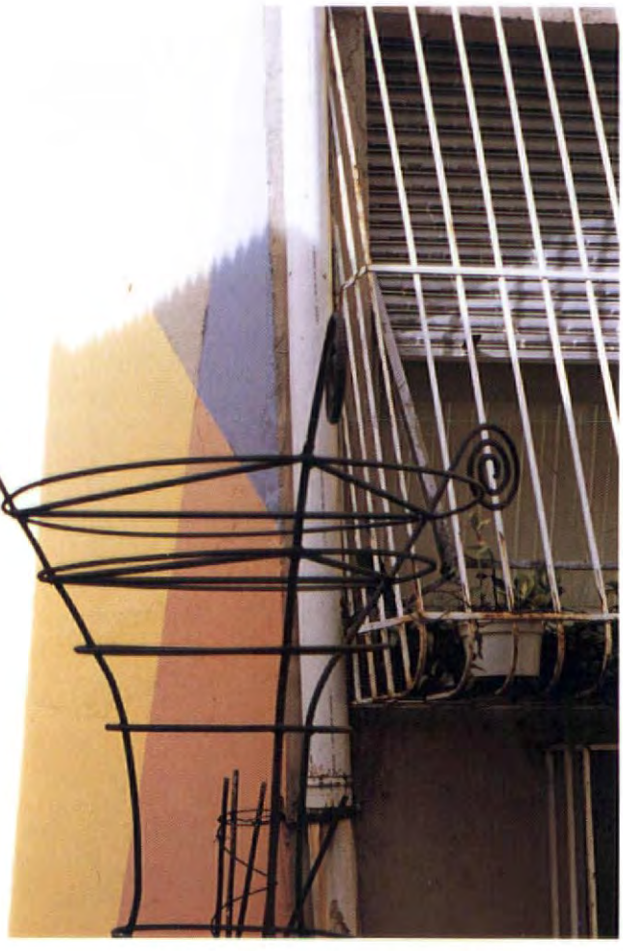
GS: In ancient cultures there was a specific belief that all objects of reality, even those made up of "dead matter", possessed a soul and lived their own secret life. Do you share this animistic belief at least in relation to your works?

VA: It is more than sharing. I believe that every object in this world possesses what is called Anima. I think that all inanimate objects have this kind of soul, including those that I create myself, and I am absolutely sure that every one of us is sometimes able to share this idea. Imagine you are very close to a big piece of rock, and it is warmed by the sun and you touch it... Don't you catch yourself thinking for a second that it is alive and animated?

Does this belief, which determines the basic conception of your work, have some roots in local mythology, either contemporary, or of

Far left: Fibrodonte Mandibulares – a Creature by Vasco Acioli. Centre and right: Fragments of life in the world of Vasco Acioli.





Far left and above: Jardin Botanico House by Flavia Farrias and Israel Nunes, 1990. Fragments with garden sculptural wall and the terrace. Below: TV Centre house in Parati by Isabel de Mello, 1988.

the Pre-Columbian Indians, or of the Macumba people?

Well, yes, there are lots of influences from traditional ideologies expressed in fairy tales, legends, beliefs, prejudices etc. In fact my creatures live their ambivalent lives simultaneously as sculptures and as species of extinct cultures. This is reflected in their names. For example, when I want to appoint a certain creature of mine to guard the Church doors, I call it Cerberus Vaticanesis. So it is an example of how mythology is present in my works.

If one of the sources of your poetics lies in the mythological world, then can we consider the cultural area of the modern science-fiction literature, thrillers, horror films, as the second?

This is a valid point. It is exactly a type of crisscross thinking in which high technology and archaeology, or paleontology, are equal. I used to study these kind of things a lot, not only because they interest me, but also because I am crazy about science fiction books and movies. I love images in general, and specially moving images extracted out of strange worlds. Films like Alien, and Blade Runner, even old things, for example, Lost in Space etc inspire my imagination more than anything else. I'm very influenced by this kind of information.

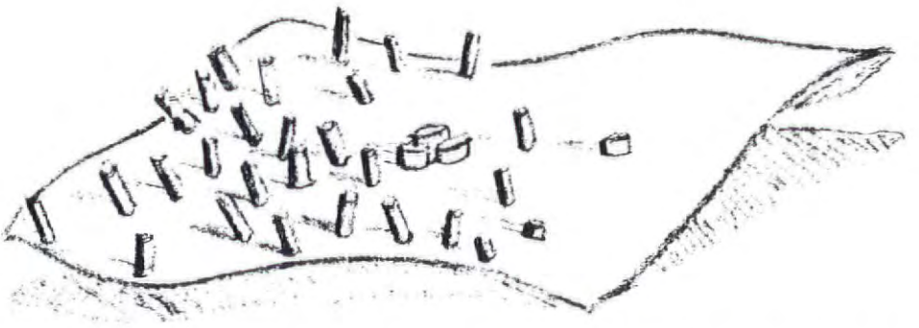
What comes first: the other worlds, which then you populate with your creatures; or vice-versa, the species, from which you then reconstruct the conditions of life, behaviour, type of environment etc?

Well, I suppose first comes the creature. But of course all of them participate in the imaginative Universe, which is already established in my mind. So I already know what kind of world this creature will inhabit. But all of them have their own personality, their own energetic sources, their own diet, if you like.

Here we come very close to the problem of the imaginative dimensions of the artist's world, to the essence of its poetic order. What are the rules of your artistic reality?

I can give you an example. Once, I was married, and my wife and I used to take turns at washing the dishes. When it was my turn, I

Works by Vasco Acioli. Above – a project for a new one, Igneofagus Barathrensis, which springs up from higher temperatures.



used to stack the washed things in a specific way: one dish here, and then two bridges of knives, and another dish, and a formation of cups – one on this side, and one on the other – a metre away, and then another bridge of knives, and another dish... A composition, in fact, combining all together: the dishes, the services, the stone and even the marble of the kitchen. And my wife would become crazy when she got home: all that was form to me, a part of the art in life, was an amorphic mess for her. And she destroyed everything. So I think that the rules of imagination play the role of universal order in any kind of art.

Yes, I suppose this was a question of differences between yours and your wife's notions of Chaos: for her you were a source of disorder, and vice versa.

No, there is an immanent hidden order in everything, even in what we call Chaos. The logic inside the Chaos is the logic of accidental changes that may start a process of structuring and growing. There is some order in anything that is growing, that is alive and, as you know, I suggest that everything is alive.

Houses for All Times of Isabel de Mello

As an architect working mainly in the field of restoration and reconstruction of historical buildings, Isabel Christina Verissimo de Mello is a connoisseur of the historical traditions in the architecture of Brazil. Her architecture is an example, of how most innovative works can be made out of most traditional architectural languages. Isabel's inventive fantasy gives birth to original types and forms which appear through the hybridization of conventional elements: walls, doors, staircases, windows. These features place Isabel's architecture close to some of the architectural inventions of Louis Kahn, to his philosophy of turning back to the origins of architecture, to "volume zero" of architectural history. Perhaps because of this, one can hardly identify the age of her buildings: they are just pieces of architecture that belong to any time.

GS: Isabel, your houses look almost as natural formations, grown out of place and time. Is it your conscious intention to hide the age of your works, to simulate natural and artless origins?

IdM: Because I love Nature, I use traditional languages of architectural forms as my own expression. And through these forms, colours, materials, I try to express the sensitivity of the surrounding nature: the light, the air, the trees. I search for the magic of natural harmony with the world. I am trying through my architecture, to integrate people with Nature, Man with the Earth.

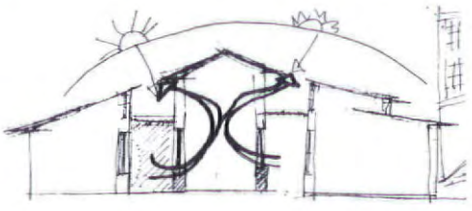
I found several very inventive combinations of types in your houses. Among the most original devices one can place you wall-window-door hybrids. What is the aim of such mixtures?

The house plays the role of a filter that regulates the extent of natural influences on the man. This shelter-filter is ambiguous: the wall separates the cultivated from the wild but, at the same time, the windows in this wall give access to light, air, sound etc. So, both the wall and the window work as a filter, a dosage mechanism of external influences. That is why I prefer the integration between the wall and the windows. I design walls which can be converted into windows or doors, or vice versa.

Another transformation is seen in your staircases. Besides the provision of the vertical communication, your staircases usually play the role of "light-carrier", or "light-wells"...

The staircase is always the most exciting problem in my work because it is the natural integrator of many processes and dimensions: of the horizontal and the vertical, of the outside and the inside, even of the sky and the earth. That is why I often use the staircase as a filter element and thus I integrate it with

Works by Isabel de Mello. Left and below left: TV Centre house in Parati. Terrace and fragment of elevation. Below right: Own house in Parati, 1990. Bottom: House in Santa Teresa, Rio de Janeiro, 1989. The "wall-window" effect.

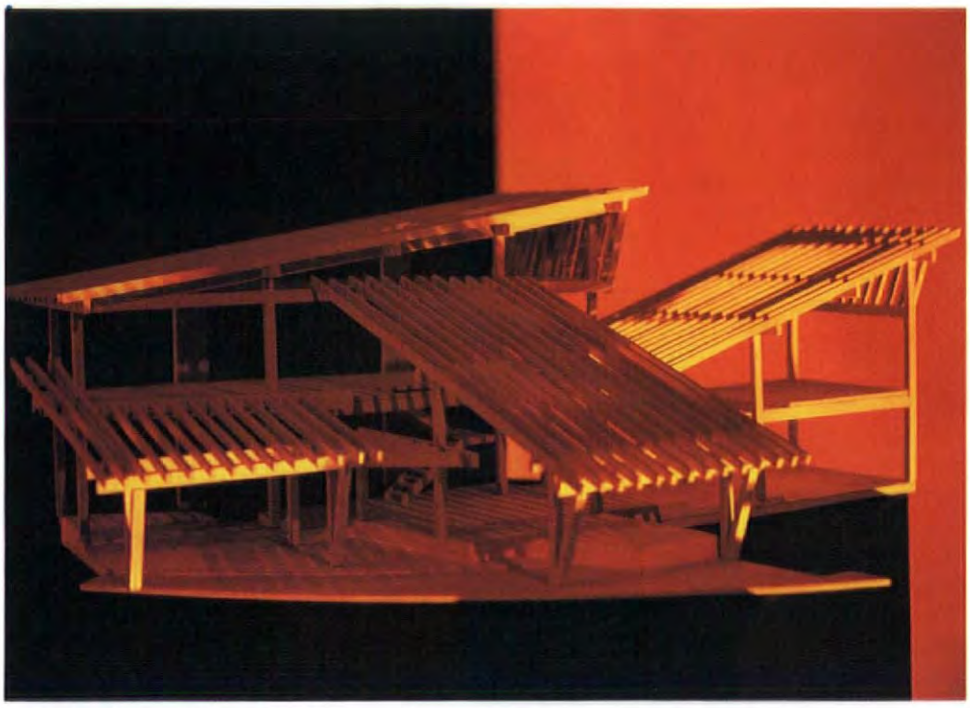


windows or other lighting devices. This results into something like windows open to the sky which work also like natural ventilation machines for the whole house.

Do you also use the integration process in the aesthetic sense, I mean the poetic interaction between the natural and the artificial?

Beside Nature, the most important thing is Beauty. I am trying to create beautiful spaces that can provoke emotions, nostalgia for a harmony which has been lost. The beauty inside the house and the beauty outside it. The latter is the natural landscape. I think that the window views have to be selected, formed and framed like paintings, paintings which are alive. Part of the magic of the house lies in its integration with the landscape through its windows.

To which existing trend of architectural culture or philosophy would you attach your own work?



Works by Flavia Farrias and Israel Nunes. Above: House in Ilheus Bahia. Project 1991. Below: Suburban House in Rio de Janeiro. Project 1991.

I don't know... To none. I often think that the creation of architecture is an intellectual game whose task is to establish an equilibrium between the numerous conditions necessary for human life, starting with climate, light and relief, and ending with the psychology of the inhabitants. I do not look for many variants in the process of this game. I look for the one decision that leads to the best result. That is my philosophy of architecture. You may call it "philosophy of integration", an integration of Man into Nature.

Sensitive Architecture of Flavia and Israel

Flavia Farias and Israel Nunes represent the most European looking pole of Brazilian young architecture, perhaps because of their wide professional experience in Italy, Portugal, France and England. But what differentiates their work from the present day European avant-garde, is their obvious preference for the sensitive instead of the speculative approach to the design process. This feature links the works of Flavia and Israel to the expressive Modernism of the Brazilian '60s, putting them in the wider context of the Latin American version of Modernism – colourful and sensitive, inventive and formally unlimited.

GS: When we speak of Brazilian architectural imagery, we usually picture in our minds strong colours, simple volumes, plastic forms – the lexicon of expressions from the heroic period of Brazilian Modernist architecture in the 1960s. But your own architectural culture has been formed in Europe in the PoMo years. How do you combine these two sources of inspiration?

F&I: Yes, we return to post-war architecture, which I would call the classical architecture of Brazil. We feel ourselves deeply influenced by its strength, by the way it reflected traditional Brazilian culture. This means that we worked out a very high artistic and social standard in architecture during the 1960s, and today after the stagnation period of the military governments, we hope to reach it again. So it then seems natural that we consciously refer to the architecture of that period. This does not in any way contradict our personal intentions and aspirations to reflect the present-day moment of our culture as well.

What about the contemporary European architectural sources for you work?

We lived in Europe two years ago, and we have some understanding of architecture in Europe. I had a scholarship in Rome, and I've done one specialization in computer graphics, and after that we lived in London, in Paris, and in Lisbon. The Architectural Association school in London has taught me a lot. I even worked for some period in Zaha Hadid's office in London. But it is one thing to be taught to understand, another is to know how to feel. Our way of feeling the architectural object comes from our Brazilian sensitivity.

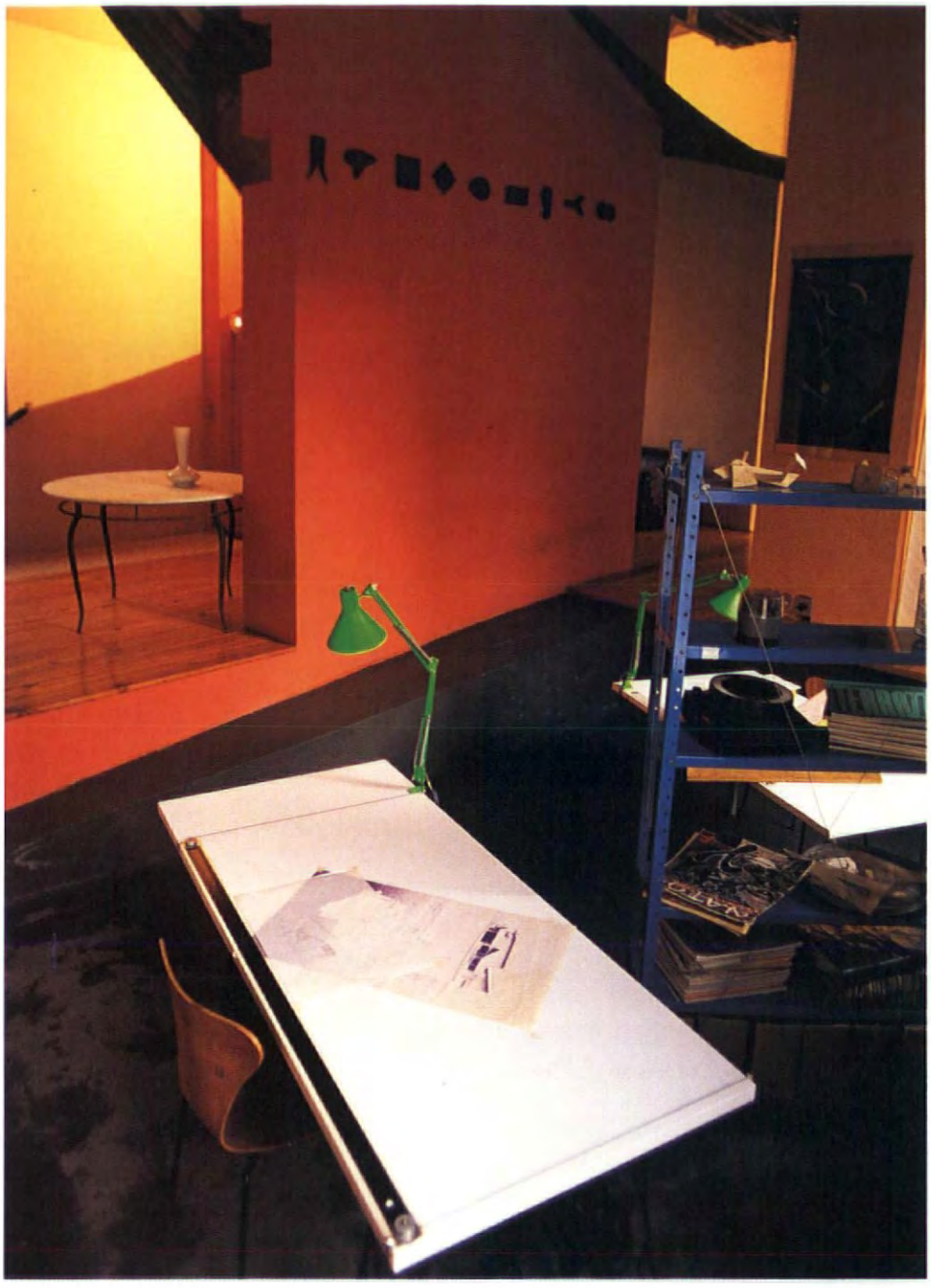
How do you use this sensitivity as a design instrument?

Sometimes we use it to find new functional explanations for an architectural form which has appeared in our work for purely aesthetic reasons. When we start working on a project, the most important thing is to formulate the spatial and formal interaction of the site with the building, then you have to think what your client will feel inside that new spatial interrelationship.

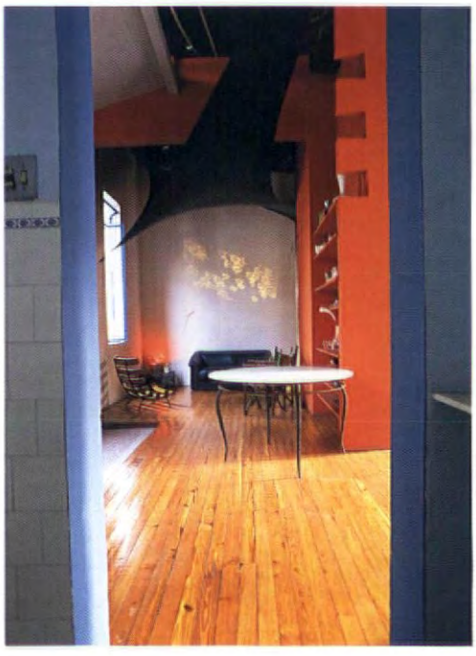
Do you programme the way in which your clients understand your architecture? Do you teach your clients architectural languages?

Yes, something like that, because I think that the architect has to influence the client himself, to shape his understanding of form and space.

But teaching is something different. When



Flavia Farrias and Israel Nunes: Jardin Botanico House in Rio de Janeiro, 1990. Fragments from interior spaces and staircase to terrace.



we want to explain our piece of architecture to somebody, we don't talk much. We just take the person and walk with him through the building, leaving him to experience the spaces and forms himself, to experience his own feelings about it.

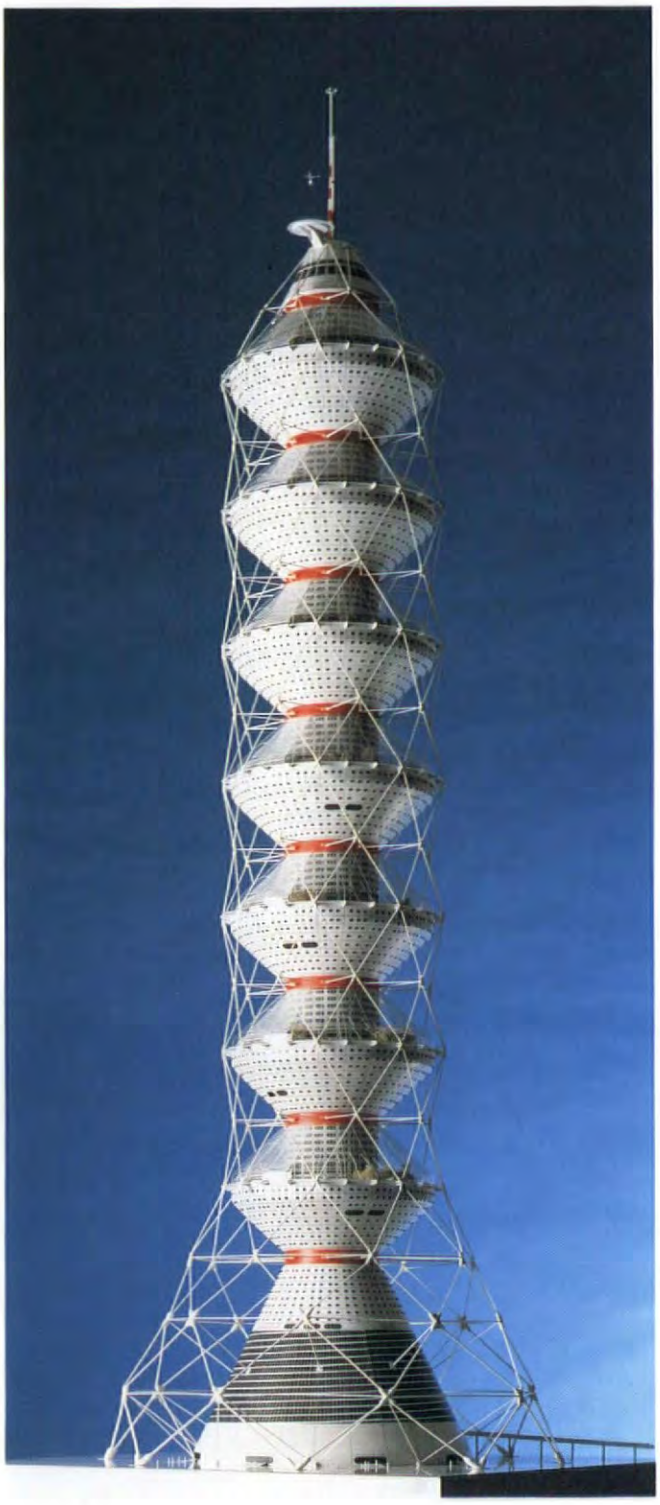
So may be speaking is not that important?

Quite honestly, we prefer to experience things by feeling them, rather than by speaking. If you want to grasp this house – just do it, feel it.

Can we say that you are trying to do real things and not signifiers?

I think this is the exact formula. It is more important for us to produce than to signify production. Brazil is unique in comparison with other countries. Sensitivity is the only possible key to the reality of its culture. Either you have got this key, and you don't need any language, or, if not, you shouldn't try to speak or speculate about it. The same applies to the Brazilian art, and particularly to our work too. □

TOMORROW'S WORLD



Project 112 Coexistence tower, 1984

A good cause, a crusade, a think-tank, a centre of restless iconoclasm and innovation – or the last bastion of the true values and traditions of the Modern Movement? The tiny, but vastly influential, London-based practice Future Systems is all these, and more, writes Kenneth Powell. Thirteen years after it was founded by Jan Kaplicky and David Nixon, and nearly a decade after Kaplicky's departure from Foster Associates gave it a fully independent existence, Future Systems is beginning to build.

Back in 1987 Richard Rogers described Future Systems as "optimistically involved in glorifying today's life." He went on to say; "when looking at their work it is possible to glimpse the future". Five years later, the future looks, perhaps, less inviting, and Future Systems has certainly shed its unclouded optimism in favour of a more critical view of twenty-first century possibilities. The advent of Amanda Levete (ex-Rogers) in 1989 – the beginning of a seamless personal and professional partnership with Kaplicky – and the gradual withdrawal of David Nixon to concentrate on work with NASA in the United States has transformed the practice. Levete's hard-headed practicality and urge to build leaven Kaplicky's occasional pessimism and visionary impatience with the "real" world. Not so long ago, Future Systems was in danger of becoming a latter-day Archigram, a rich source of visual imagery and visionary ideas on which lesser minds grazed freely. Now the images and ideas are becoming reality, and in a way which might not have been anticipated 10 years ago.

Not that Kaplicky accepts that any of his work is impractical – rather the opposite. "Everything we do is well-engineered above everything else, and designed to be built", he

Project 158 The Spire, 1988

Project 166 The Green Building, 1990

insists. This is as true of the 150 storey "Co-existence" tower project or the 480 metre "Spire" designed for London's Hyde Park (as a late twentieth century response to the Eiffel Tower) as of the series of cheap, portable living spaces which incorporate the principles of state-of-the-art automobile and boat design. Kaplicky seems surprised, indignant even, that the bigger schemes have remained on paper. British Telecom showed some initial interest in the "Spire" but soon backed off. "Eiffel could do it a century ago – why not today?", he asks.

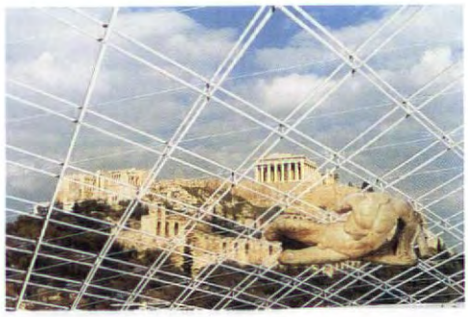
Future Systems' involvement in the Bibliothèque de France competition a few years ago provided a tantalising encounter with an architectural scene where grand visions do become reality. Kaplicky and Levete (a major contributor to the scheme) finally took second place to Dominique Perrault, but their admiration of the "true internationalism of France – utterly absent in Britain" outweighs their disappointment at the outcome. The Athens Museum competition is another matter: "a disaster", says Kaplicky. Arguably the most "contextual" as well as the most innovative of the submissions, their entry was unplaced.

The Paris and Athens schemes were significant not only for their unashamedly sculptural quality and their radical approach to the flexible use of public and private space (an element also to the fore in the proposals for Grand Buildings in London's Trafalgar Square) but equally for their approach to environmental design. "I suppose we weren't very green at the time of the Paris competition", says Kaplicky, "but we were beginning to think environmentally". The use of natural draughts to cool the Athens building marked a strong emergence of green thinking in Future Systems' work and something of a break with the determinedly pro-technology stance with which they had previously been identified. Kaplicky and Levete's work with Ove Arup & Partners on a prototype green office building is "dead serious – not just an attempt to shock". They were surprised at the outrage which the proposal aroused when it was shown, in a montage at the recent RIBA exhibition of their work, constructed on a real site in the City of London. Kaplicky's enthusiasm for the cause of ecology is only blunted by his sincere wish to detach green issues from the wider conservative, anti-progress lobby which he has been fighting for so long.

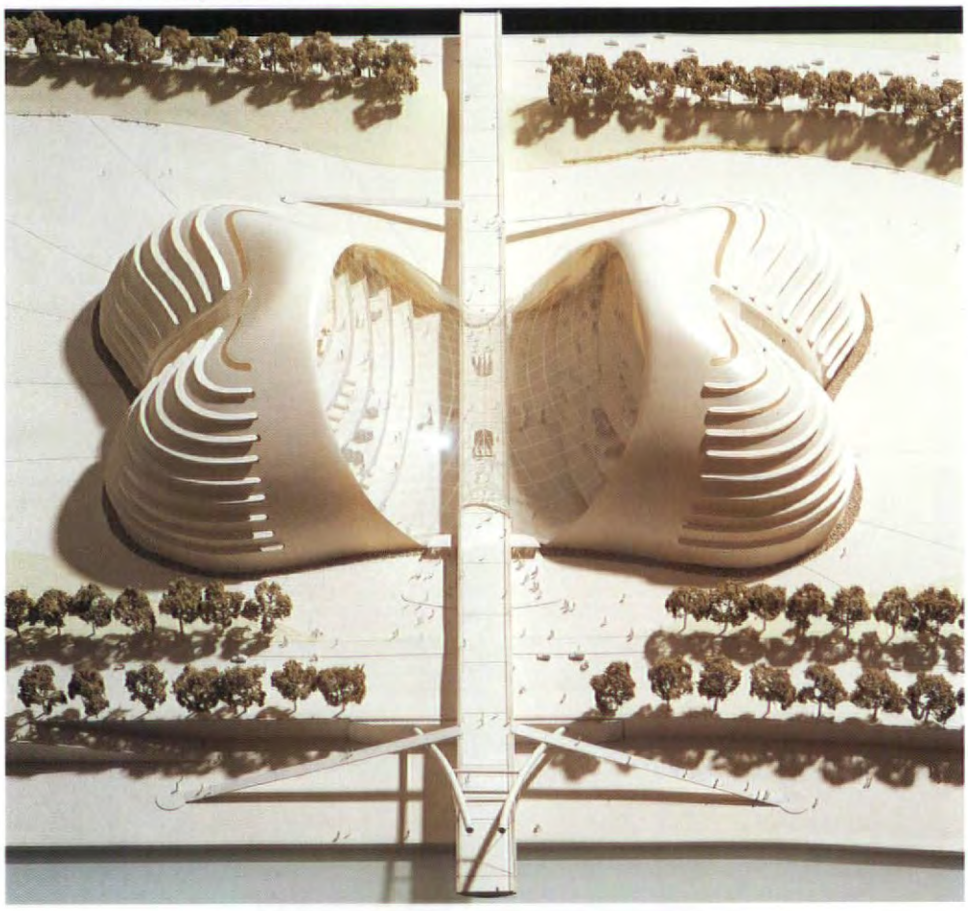
The more considered, even cautious spirit in Future Systems' recent work is not, as Kaplicky and Levete insist, a rejection of technological progress. "It's about using well-known, familiar materials where appropriate, considering cost and the impact of buildings on places and people", they explain. "But there's no inevitable conflict between technology and nature – what could be more finely engineered than a spider's web?". "Low-tech" is an appropriate response in societies where basic shelter is still a prime requirement. Future Systems' work on emergency housing for Africa was a response to the recurring crises of the region. The units could be cheaply made and quickly erected like giant umbrellas, yet nobody would back their manufacture, not the RIBA nor the relief agencies. Kaplicky finds this depressing.

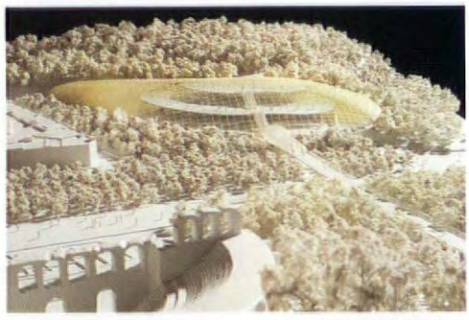
Two recent projects for the German cities of Frankfurt and Hamburg embody the new green thinking of the practice, but neither will be built. The product for a kindergarten in Frankfurt – a "green dome", in effect – was rejected in favour of a "shoebox". Hamburg took Future Systems into another new avenue, that of working with a major artist (in this case, Brian Clarke). But the scheme was abortive.

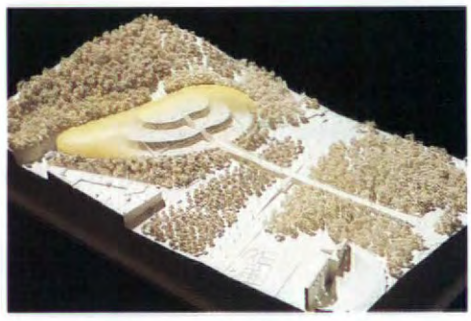
These were disappointments. This year, however, saw Future Systems' first completed building rise in London. The structure, a 300 sq metre hospitality space for the Muse-



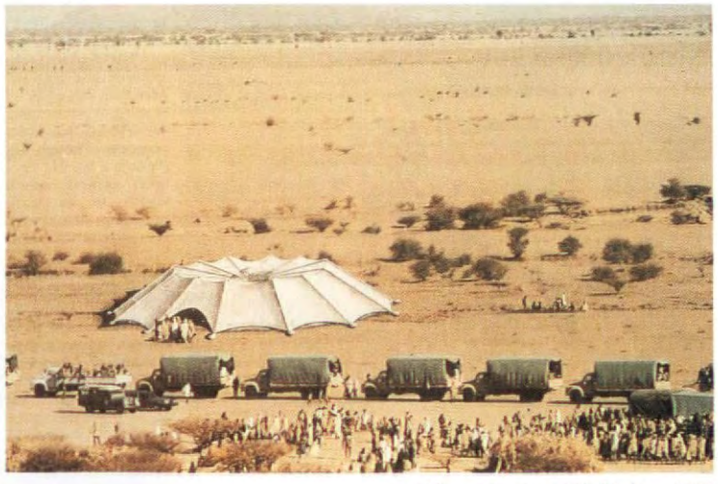
Project 171 Bibliotheque de France 1989







Project 172 The Acropolis Museum, 1990. (Top) View from the interior, (centre and above) models of the museum



(Above) Project 139 Shelter, 1985

(Above left and left) Project 119 Frankfurt kindergarten, 1991

Project 184 MOMI hospitality tent, 1991. Arched entrance, (below), and (bottom), diaphanous fabric over trusses

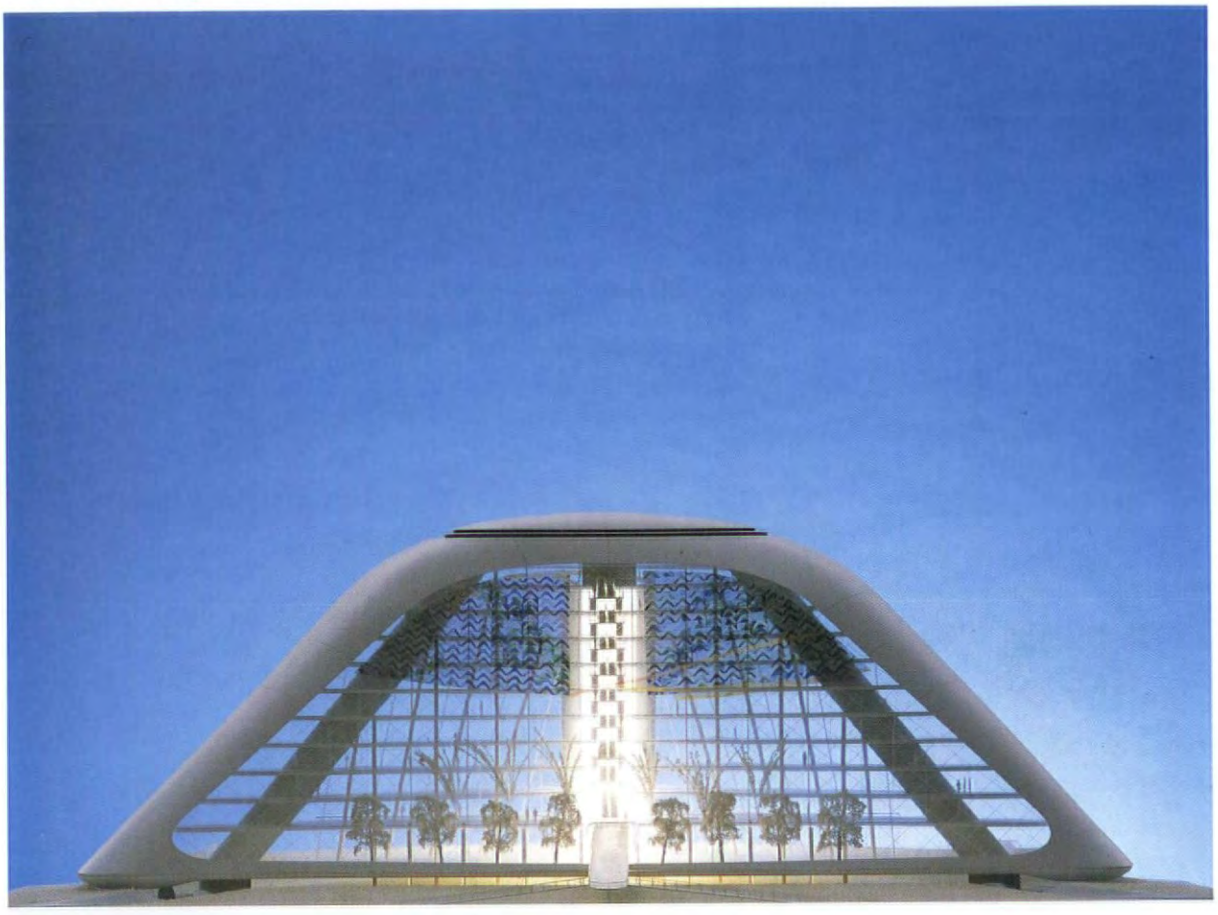
um of the Moving Image on the South Bank, is, in fact, demountable and designed to be put up and taken down as needed. Designed with the assistance of Peter Rice, it uses a familiar material (GRP) in an unfamiliar way, as part of a tensile membrane structure which is very lightweight and easy to assemble. In use, the "tent" is a far remove from the dank gloominess which that word usually summons up.

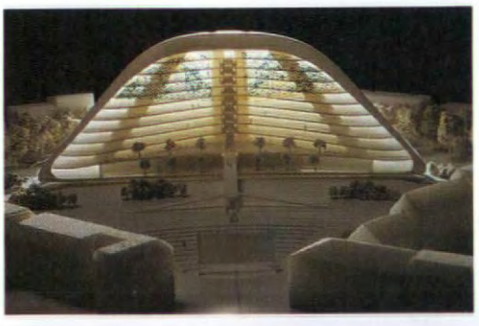
Future Systems' earlier work on temporary homes (like the "Drop" of 1989) prefigures the prototype caravan designed in 1991 for an exhibition at the Museum of Contemporary Art, Sydney, Australia. Three other firms (from Australia, Japan and the USA) were invited to participate – and produced bizarre solutions. The Future Systems caravan is seriously practical and designed to make use of well-tried boatbuilding technology. It weighs 400 kilos and contains a lavatory, shower and kitchen as well as sleeping and living space. It could be mass-produced for around £10,000, but the prototype presently rests in Australia, where there is some hope it may be produced in quantity.

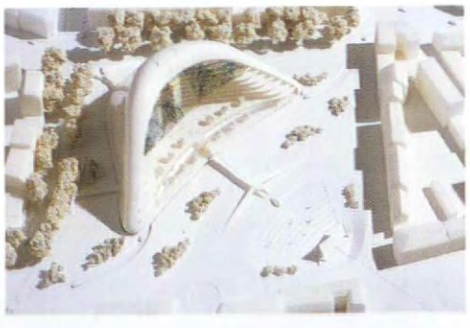
The caravan is as sculptural as the Paris library design – part of a trend in the practice's work away from awkward functionalism? "Why should architects and designers shy away from beauty?", says Kaplicky, who believes that elegance and efficiency co-exist happily and cites the functionalism of nature in evidence. Corbusier's Ronchamp, Wright's Guggenheim and the contemporary work of Santiago Calatrava are quoted with approval by the partners as examples of natural expressiveness in architecture. Mention of Phillippe Starck brings a less sure response. But Starck's attempt to remake familiar objects, like the toothbrush, inspires a certain respect. "In some ways, small objects are more difficult than buildings", says Kaplicky. Future Systems were particularly pleased to be commissioned to design champagne buckets ("like half a mermaid") and serving trolleys for London's Ivy restaurant. And, yes, they would like to design a toothbrush – sometime....

For the moment, they are thinking hard

Project 192 Hamburg Umweltbehörde, 1991



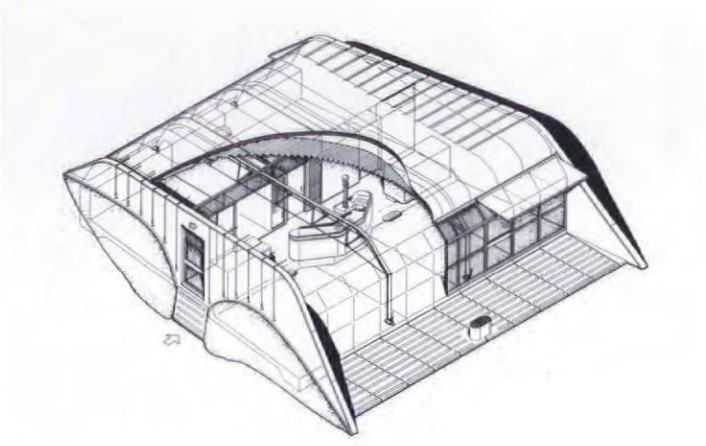




about buildings. A low-cost, ungimmicky house in Hertfordshire, designed for an engineer, is nearing completion. Dug into a hillside, it makes use of conventional techniques but makes no attempt to compromise with conventional domestic styling. Some problems with the planners might have been anticipated. In the event, the response of the local authority was very simple: the scheme was one of the best seen in the area for many years, it declared, granting permission without delay. After the frustrations of the international scene, getting a simple building of this sort approved and actually constructed is something of a tonic.

But bigger things are in prospect. Future Systems are currently working on a major commission for a house in London. The site (just 6 metres wide and presently vacant) is in Islington, part of an established, nineteenth century district. Only a few really significant new houses have been built in London since the Second World War – even Richard Rogers lives in a remodelled nineteenth century house. There may be planning problems.

Project 199 Brno business park, 1992



Project 183 house in Hertfordshire, 1990

Will the designs defer to the context? The job is certain to provide dilemmas for Kaplicky and Levete, but they have embarked on it with obvious enthusiasm.

The 1980s saw an unprecedented (even by Sixties standards) boom for architects working in Britain. Future Systems' only commission from the development industry was a modest one – a gateway for an industrial park at Chiswick in west London, which has yet to be built, though it would cost only £100,000. There is not a practice of any size in the UK which is not now looking beyond Britain for work. Future Systems' experience of the international scene is extensive, if not altogether happy. For Kaplicky, born in Prague in 1937, Eastern Europe might seem an obvious area of opportunity. Richard Rogers' invitation to Future Systems to prepare a joint submission for the recent Brno technology park limited competition reflected the close association of Rogers with the practice. The winner, in the event, was Peter Foggo, but Rogers/Future Systems have been awarded a "consolation prize" in the form of the gateway building to the development. Their scheme deserved to win. There are memories of Future Systems' Paris library: a determination to retain a green setting and a central pedestrian avenue. Other competitors were more anxious to embrace the car, whatever the environmental price. While some of the rival proposals seemed to take their cue from the leaden Modernism of the last days of the Soviet empire, Rogers/Future Systems looked to the Czech Modernist tradition and to Mies's Tugendhat house (close at hand in Brno) in particular, eschewing air conditioning in favour of more economic natural ventilation. The task of distilling the inspiration behind this collaboration into one building (due on site early in 1993) will not be an easy one. It is a mark of Future Systems' prestige that the collaboration is effectively that of equals.

The key question which underlies Future Systems' work is: "why not?" The practice is innovative and exploratory by definition and, increasingly, liberated from the high-tech tradition in which it had its origins. As such, it fits well into the free and undogmatic architectural scene of the 1990s and sometimes finds common cause with some unlikely allies. Kaplicky and Levete find the contemporary European scene encouraging and the best corrective to the insularity of Britain. They see their role as "fighting against a prevailing conservative imagery" which seeks to prop up outmoded social and architectural values. They see themselves, in the best Modernist tradition, as "social" architects. Where will their work go next? They are uncertain – "but it certainly won't go classical". If tradition is one commodity they view with suspicion, they are equally determined to avoid a lapse into the purely arbitrary, for they deplore the self-indulgence of the deconstructionists. For the moment, their point of reference seems to be nature: natural forms and respect for the environment. Given the staggering indifference of modern architects for several generations to the natural world, Kaplicky and Levete may, once more, be leading the way towards a redefinition of modern architecture. □

BACKROOM BOY

Acoustics is perhaps the most recherche branch of architecture. Part art, part science, part instinct. The most successful acoustics architects are invariably self-taught and that tends to make them unusual people, as Graham Vickers found out when he met David Binns of Sandy Brown Associates.

First impressions of David Binns suggest that he is a quiet man whose international reputation as an acoustics expert has perhaps been diligently and unspectacularly earned over the years. Only his floral braces offer an early clue that there may be more to his story.

As it turns out there is considerably more, much of it quite unexpected. If acoustic architects are largely self-taught, Binns' getting of wisdom was an exceptionally colourful process that surely could only have happened in the 1960s.

Talking to him at the West Hampstead offices of Sandy Brown Associates, the firm of which he is a founding partner, you soon begin to wonder if the eponym himself might be dropping in too, so often is his name mentioned.

However, Sandy Brown – jazz clarinettist, BBC acoustics architect, *Listener* columnist, writer of baroque letters to the unwary, flawed intellectual and all-round overwrought personality – actually died in 1975 although death seems to have done little to diminish the vigour of his legend and influence. In talking about the practice they started together, Binns frequently refers to his co-founder with obvious regard and dry amusement.

"When I first met him in 1967 I knew very little about acoustics and he was the chief acoustic architect at the BBC" he says. "That meeting was quite accidental. My ex-wife was working for Cedric Price at the time, and Cedric had set up a conference as part of the Bath festival to talk about the design of concert halls. As an afterthought he said to me 'well you may as well come down too'. So I found myself down at Bath where in fact I was immediately mistaken for Sandy Brown whom I hadn't even met at that point".

When the man he had been mistaken for eventually arrived, Binns recalls that they got on rather well. A friendship developed and this soon led to an informal professional alliance.

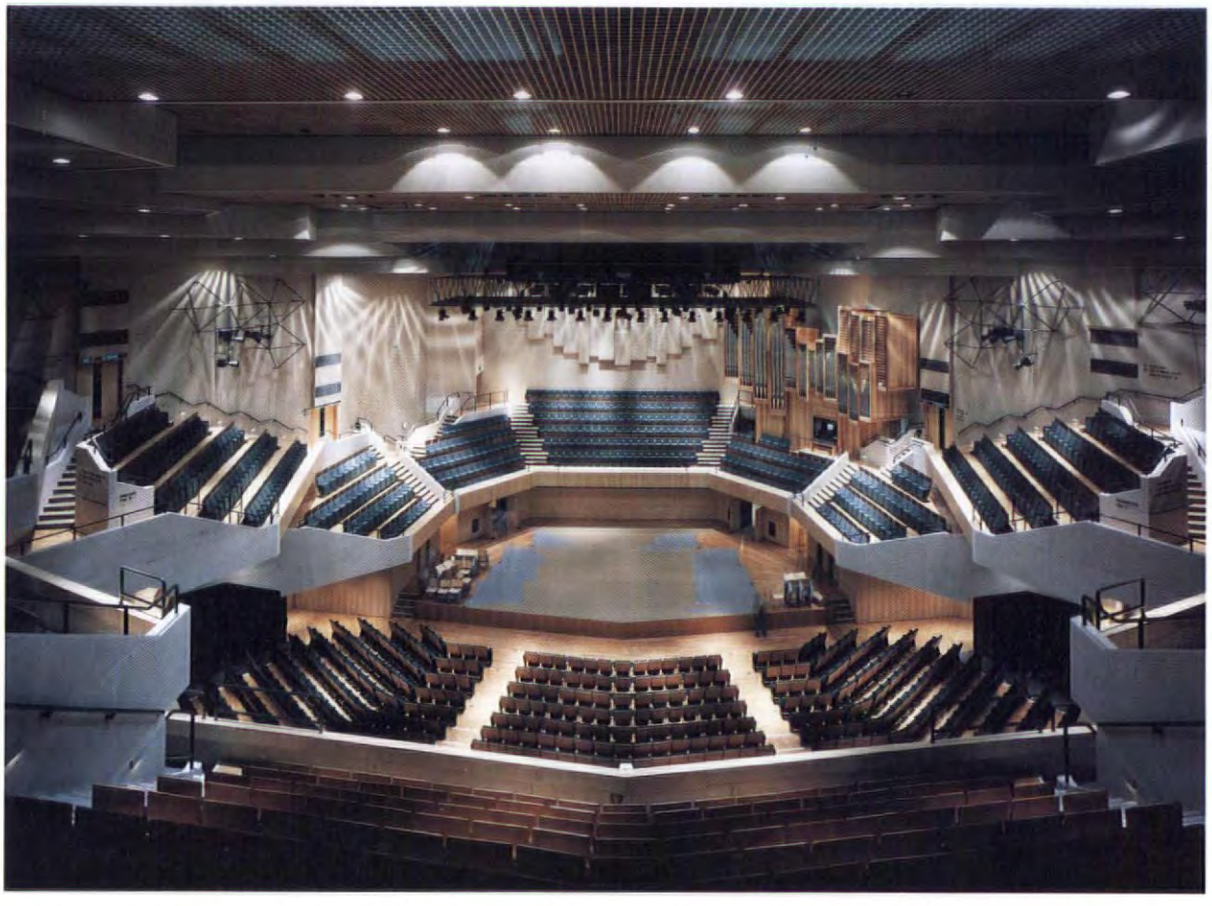
"Sandy rang me up one day, saying that he kept getting all these punters phoning him up wanting recording studios" says Binns. "This was in the days when the Beatles were big, the British recording industry was very successful and people were anxious to have UK recording studios. As a result we built quite a number of them in our lunch hour. I was working for another firm at the time, and he was still working for the BBC. It all got very hilarious and eventually quite out of hand."

The impression emerges of two very different unconventional personalities – Brown the complex extrovert and Binns the quieter subversive – united by the challenge of delivering professional services whilst having a very good time indeed. Brown's antics are well recorded, notably in Faber's *The McJazz Manuscripts*, a 1979 collection of his writings edited by Binns. Meanwhile, Binns himself had already tasted mild notoriety by being part of a group that got itself famously expelled from Oxford Polytechnic for embracing "unacceptably radical" views about architecture, ("I seem to recall" notes Binns, "we thought that architecture should all be very angular and black and white...").

In 1969 Binns and Brown at last decided to set up their own London office in the shadow of what in those days was still called the Post Office Tower. The decision was prompted by their being offered a job so large that it would have demanded an infinity of lunch hours in which to complete it.

• "It was for a chap called Shel Talmy who

St. David's Hall, Cardiff



was a record producer" recalls Binns. "He had persuaded American investors to build what was going to be Europe's biggest recording complex at the time – a four-studio film and recording centre on the site of the old Duple Coachworks factory in Hendon".

So in 1969, with a £1,000 deposit, Sandy Brown Associates was launched onto the choppy waters of international movies and music. Staff were taken on and all went well for six months, even though the proposed site unexpectedly turned out to be marshland filled with Second World War debris. Then Hollywood's fortunes turned unexpectedly sour and, with scant thought for the consequences of their action upon distant Hendon and a fledgling architectural practice, the American company pulled the plug.

"There are to this day about 150 piles driven into the marshland near the Welsh Harp reservoir" says Binns a trifle wistfully. "We just took a bottle of Scotch and sacked the staff".

In those days the acoustics architect was usually someone whose expertise lay in building recording studios. Certainly the field into which Binns and Brown had made a near disastrous foray depended upon a continuing demand for such structures. Fortunately there was still enough of this work around for Sandy Brown Associates to survive the great Hendon debacle, although it was a close run thing and required an energetic salvage operation led by Brown.

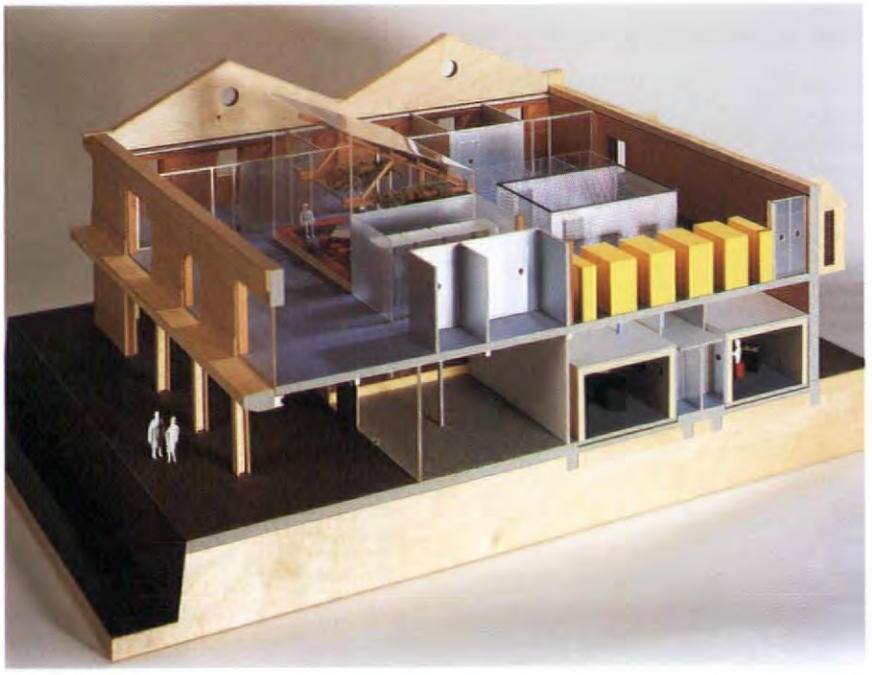
"The work continued to be mainly recording studios" Binns says. "A number of the major studios built in London at that time were done by us, including one for Eric Clapton. But gradually we were starting to collect other types of acoustic work as well, from dealing with domestic noise problems to industrial buildings. Although there were other individuals at universities offering acoustic services at the time, I think we were the first firm to set up a serious office. In the early years we certainly had very few competitors".

Today the practice gets approximately half of its work abroad, a process which began as long ago as the early 1970s when ex-Cream drummer Ginger Baker commissioned them to build him a complete recording studio in Nigeria. Apparently the twin impulses for this

Jo Reid and John Peck

Red Rose Radio, Preston

Independent local radio station at Bristol



Radio Jordan, Amman

Council chamber of the Institute of Electrical Engineers, London

exotic project were Baker's wish to record ethnic drum rhythms and his equally strong desire to distance himself from some fraught domestic situation. The thought occurs that whilst David Binns is a man quite properly sensitive to the dangers of wallowing in the past, it must be difficult for him, in these recessionary times, to recall Operation Ginger without at least some twinge of rosy nostalgia.

"I remember flying across the Sahara with him" he says, "eating caviare and drinking champagne. He just said 'Tell me how much money I have to give you'. So we opened a bank account, he put money into it and we spent it".

Those studios in Lagos also prompted the formation of a mechanical services unit at Sandy Brown Associates.

"The problems we always had with these studios was that they were too hot and air conditioning was too noisy. In self-defence, almost, we set up a branch of our practice to deal with that".

"We later moved into Europe – two studios in Berlin and one in Munich. Half our work in any year now is overseas – sometimes it's 60/40, but the ratio remains fairly stable".

Establishing exactly how Binns acquired the acoustics skills he originally lacked is rather difficult, although he clearly learned a lot from Brown in the early days. Later he surrounded himself with highly qualified partners – Neil Spring, David C Lamberty, Richard Galbraith and Kyri Kyriakides.

A picture emerges of a practice very different in character from the one that started so raffishly when the sun was gently setting on the swinging sixties. Today Sandy Brown Associates – despite premises with an exterior curiously redolent of an upmarket garden centre – looks to be a very serious business indeed. The field of acoustics demands intensive R&D, although, of necessity, this is often gained in the course of carrying out specific commissions, something which Binns says "excites me and sometimes annoys the client, who is of course paying for it".

Several photographs of scale models are to be seen pinned around the office and Binns explains the once-common practice of building eighth-size models and then bombarding them with 8-times speeded up sound to test their acoustic properties. Apparently such models are too expensive to build at this scale these days, and smaller-scale versions that yield less specific data are used in conjunction with other techniques.

Soon the suspicion arises that if you actually understood the scientific processes that the practice uses, you would not need to hire them in the first place. Does acoustical expertise really involve the mastery of dizzying amounts of technical detail, or is it actually more seat-of-the-pants stuff? (Legend has it that after all the scientific acoustical measure-

ments had been taken back in the practice's early days of designing concert halls, Sandy Brown was inclined to run his own tests by getting out his clarinet and, so to speak, test driving the place).

I ask Binns a hypothetical question: what if a capricious tycoon wanted to acquire his practice and bought it lock, stock and barrel but minus the personnel? Would the acoustical measuring equipment, technical records and databases be worth having?

"I would like to think" says Binns drily, "that he'd be wasting his money".

He goes on to explain his holistic approach to acoustics and architecture, claiming that this is what won his practice the prestigious job of handling the temporary facilities at the Seoul Olympics for giant US network NBC.

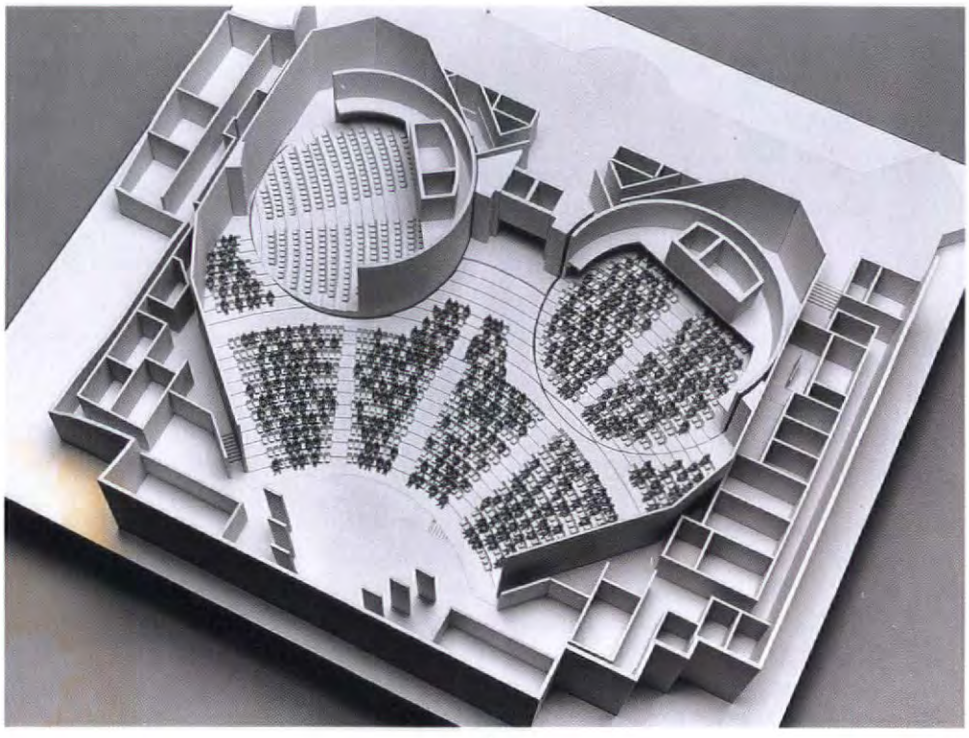
"It was because we offered a different kind of service. American consultancies don't provide the same kind of depth – they give a much more peripheral service, equivalent to the Beaux Arts system in Europe, particularly France. We were able to offer something that is very attractive to them – the co-ordination of all the technical services – not only low-noise air-conditioning but handling the enormously complicated cabling systems".

Providing what he calls "a kind of super-consultancy service" has also led to a current TV project in Hong Kong where the practice is establishing all of the basic parameters and then teaching a local design team the essential elements of design integration.

Broadcasting studios have to a large extent nowadays overtaken the recording studios, although Binns is in fact currently involved in converting a Hampstead church into a new recording studio for ex-Beatle producer George Martin.

"It will have a wonderful, huge classical recording space in the original church hall" Binns says, clearly pleased to be back doing what he perhaps enjoys most. Meanwhile a huge list of projects, past and present, testifies to the sheer size of the market the practice has cornered: radio centres, cinemas, TV and mixed media centres, independent radio stations, film and dubbing studios, auditoria and conference complexes mark the entertainment sector ("as in the past, entertainment has proved virtually recession-proof" Binns says). Hospitals, educational establishments, offices and a whole range of civic amenities represent half as much again.

Acoustic model of Edinburgh Conference Centre



If Binns was originally the subsidiary partner, the man who joined with Brown to learn and whose name did not go on the door, he must take now considerable satisfaction from the practice's subsequent success. Certainly his parents did.

"I remember when we were kicked out of Oxford Poly all those years ago, our tutor alerted Fleet Street and we had the Daily Telegraph people come down and take photographs of us" Binns says. "I went home and my parents were sitting bolt upright in bed looking at this paper with my picture in it. They never really recovered from that – at least not until I eventually got a successful firm up and running".

Anyone wondering how Binns' architectural training was completed (including his clients who may now be nervously wondering if it was completed) should know that he later finished his architectural education at the AA, of which establishment he wholeheartedly approved.

"One of the things that the AA prided itself on – or at least one of the things that appealed to me – was that of the number of people who qualified, less than half of them ended up being architects" he observes. "Now, I always thought that was an indication of a very good and broad-minded course". □

Jo Reid and John Peck

Studio at TV-AM, London

INSECURE DESIGNER: TIMID CRITIC

Raymond Loewy. *Design Heroes series. By Paul Jodard. Trefoil books. 192 pp. £11.95 (hardback).*

Review by Rob Norridge

Paul Jodard's book needs to be looked at from two points of view, first for its content and second for its physical form. In the latter connection it is ironic that a work about a man seen by many to have been the father of streamlining should itself be so heavy handed in design and production. So pronounced is this impression that from the cover the book looks like a pseudo period piece. Alas, on opening the book it becomes all too plain that instead it is simply a poorly made piece of work that consists of a number of ill-considered and poorly combined elements.

It may seem a little churlish to go on about the visual aspects of a book, but when the subject is a man who made his name by wrapping machines in a stylish skin, the relevance is indisputable. In this book the cumbersome type, whether text, headline or caption, its made all the worse by the poor quality of its printing. And however this may be excused on the grounds of economic necessity, what cannot be forgiven is the lack of editorial attention to detail. One tires of the overlong paragraphs and becomes increasingly irritated by the frequent repetition of the same anecdotes and observations. Finally one becomes exasperated by ceaselessly inaccurate captioning which ends up as a confused jumble of aboves and belows, tops and bottoms and lefts and rights.

On turning to the narrative contents one can afford to be rather more generous. What Paul Jodard has produced is a reasonably detailed introduction to Raymond Loewy's life and work which covers all the major aspects of his career whilst leaving one with a healthy appetite for more. The major criticism of this reviewer is that Jodard never goes quite far enough in this analysis, and certainly not far enough in the criticism that accompanies it, even though there is criticism aplenty in the book. When discussing Loewy's original redesign of the Gestetner duplicating machine, for example, Jodard readily admits that this was little more than an exercise in dressing-up, with no consideration given to improving the machine or solving the operating problems that led to its being disliked as "smelly" by those who used it. Unfortunately, after making this perfectly valid point Jodard then backs away as though he has overstepped the mark by questioning the integrity of a great designer. This process of advance and retreat is repeated throughout the book to annoying effect. On the other hand it certainly cannot be said that Jodard does not bring Loewy down to a human level – he does, to the point where Loewy becomes eminently dislikable. He is revealed as an insecure and arrogant man, always insisting on being addressed as "Mr Loewy" and always insisting on the appearance of a personal design involvement by signing every drawing shown to a client, regardless of who actually made it.

In the end one is left with the impression of a successful phony. A man with tremendous faults who nonetheless contrived to be a man of great influence in the growing business of industrial design. As with any new profession, it was the self-publicists and the showmen who gained industrial design its wider recognition.

DAVE SPART LIVES

Fantastic Form, Architecture and Planning Today. *By Bill Risebero. The Herbert Press. 192pp, . £14.95. (hardback)*

Review by Colin Davies

Bill Risebero's metier as an architectural historian is the brief and not too detailed survey. His books are ideal for students because they are cheap, they cover the ground and they can be read at a couple of sittings. Those who don't have the time or the inclination to wade into the text can get the gist of the story from the annotated line drawings. On most architectural history courses it is possible to get by with Risebero's *The Story of Western Architecture* and *Modern Architecture and Design* at £10.95 each, without having to shell out £60 for a Banister Fletcher. This third book in the series brings the story up to date with a survey of mainly British architecture of the last 25 years. Or at least that is what one is led to expect. However, the strong ideological ingredient in Risebero's writings has now become so pervasive that this latest volume reads more like a political pamphlet than an architectural history.

The fact is that Risebero is an unreconstructed Marxist/Modernist. While the rest of the world has been gleefully consigning Marx to the dustbin of history (Lenin's phrase, as Risebero points out), he continues to insist on the base/superstructure model of society and the inevitability of class struggle. For Risebero it was not communism that collapsed in the USSR and eastern Europe but Stalinist state capitalism. This insistence on the continuing validity of Marxist analysis gives the book an old fashioned, Dave Spart quality, despite the topicality of its subject matter.

Like his other books, *Fantastic Form* (the title comes from Marx's description of the character of human relationships dominated by commodity production for profit) is a wide ranging survey. Post-Modernism, High-Tech, Community Architecture, Deconstruction, Neo-Classicism, Prince Charles – all are placed in the context of the decline of the welfare state and the rise of Thatcherism, with the emphasis on the political and economic backround rather than the architectural foreground. Many of the familiar line drawings take the form of economic diagrams, histograms, maps and portraits of socialist heroes (William Morris, Rosa Luxembourg, Berthold Brecht, a rioter in the Boulevard St Germaine in 1968) rather than plans and views of buildings. These diagrams culminate in a two page flow chart entitled simply "Future Society" – a kind of Easiguide to Utopia.

This is Marxism by numbers. The problem is that the architecture stubbornly refuses to fit the picture. Perhaps the Russian Constructivists really were creating a revolutionary architecture, but from then on the story is of one sell-out after another. Risebero is unable to point to an architecture of which he can wholeheartedly approve, unless you count a handful of timber framed houses by Walter Segal. Which leaves us with the not very original conclusion that all modern western architecture serves the purposes of industrial capitalism and the bourgeoisie. It might be true that New Right thinkers prefer Neo-Classicism and property developers favour post-Modernism, but sooner or later Capitalism absorbs all styles and all architectural ideologies, just as it once absorbed Modernism.

Marxism sets out to explain the world, but it fails to explain the heterogeneous character of the architecture of the last 25 years, or even the single most important architectural event of the period – the collapse of the Modernist consensus in the late 1960s. Perhaps the real explanation is staring Risebero in the face. The world is still an evil place and it still needs changing but we no longer believe that "scientific" theories based on the Marxist model can do the job. □

ON EDUCATION

The training of architects is a burning issue of the day. But who, alas, pays it any attention? It no longer appears in the UNESCO programme. And since the Paris Congress in 1965, the UIA has not seriously concerned itself about it. These prophetic lines were published in 1949, in the journal Architecture d'Aujourd'hui, *above the signature of Pierre Vago.*

Before looking at how the future architect ought to be trained, one has to define what an architect is.

An artist, it will be said. Of course he should be one! To be really worthy of the wonderful title, an architect should be an artist. But let us look reality in the face. Of the tens of thousands who cover the globe with their works, how many of them are artists? And if they aren't all artists, must we get rid of the 2/3, 3/4 or 4/5 who quite clearly aren't? Are there then too many architects? Isn't there a greater danger that there aren't enough? I don't believe that anyone would seriously demand that all architects should be artists or that only artists should be entitled to call themselves architects. The necessary judgements have to be left to the clients. For the moment, we simply have to admit that architect is not a synonym for artist, and as a result, the schools of architecture are not schools of art. The diploma which rewards the years of architectural study does not ordain an artist, but is a recognition of certain knowledge. It is this knowledge, necessary to the exercise of our difficult profession, which the aspiring architect must acquire in training.

What is this knowledge?

First of all there is practical and technical knowledge. This is the "craft" side. This knowledge is just as indispensable to the true architect (who is both an artist and an excellent builder) as it is to those, more numerous, who are simply honest builders (which is itself no bad thing to be).

The craft side one can learn in the office, on the job. Well, perhaps. Each one of us knows how ignorant we were, when we began... despite the parchment so solemnly handed over to us. But all of us know, too, that the possessor of such a parchment is not, alas, an artist. Should we then do away with the parchment? I don't think so. But it has to be given another meaning than opening the door for another class of privileged persons. Its reputation must be remade: now compromised and resting on the past, it cannot be maintained without being given new life.

If it cannot be Apollo's wreath of laurel, it should at least be the guarantee of certain abilities and of a certain knowledge of a general, technical and practical nature, the only things that can be "taught" and recognised with a diploma, the only things, in the present state of affairs, that can actually be required of a young architect.

Nascuntur poetae. Artistic qualities are the gifts of the Muses, as faith is a gift of God. But the School can stifle them, or encourage them to flourish. Above all, it can and must teach and help the artist to express himself. "The architect", said Auguste Perret, "is a poet who thinks and speaks in building... Building is the architect's mother-tongue".

Unable to give the "divine spark", without which the architect will never be an artist, the School of architecture must teach everything without which the artist can never be an architect.

Composition. How many times have I heard it said that that is what the School ought to teach: it is life that will teach the trade. But what is composition? The action of putting together. And to put things together one needs a perfect knowledge of the elements to be assembled, and of the way in which it can be done. There are no recipes. Once again we see the need for the knowledge without which no "composition" is possible.

But what is the knowledge with which the aspiring architect must be provided? It isn't, of course, the "perfect acquaintance with the plumbing of a bidet", as was claimed by a ferocious opponent of every kind of reform, accustomed no doubt "to create ensembles such as those of Versailles or the Place de la Concorde", and full of contempt for the humble tasks which make up nine-tenths of our work.

This knowledge is of three kinds: general, technical and practical.

The architect should be a cultivated man. To be exact, he must not fall into the trap of specialisation. His role is one of management, of co-ordination and of synthesis. It is a difficult role. It must be prepared for. He cannot be ignorant of history, or philosophy, or psychology, physiology or political economy.

The baccalauréate is a minimum. It is a foundation, a point of departure. But intellectual training should not end there. The future architect should receive in addition a broad technical training. It isn't a question, of course, of producing an engineer in reinforced concrete or a perfect plumber. But he must be prepared for his role, which is to lead, to choose, to co-ordinate and to control. His prestige and his authority on site will depend on it.

I would add that, far from harming the artist, the broadest technical knowledge can only be helpful, from every point of view.

Finally, there is the "practical" side of the trade, which it is wrong to treat with contempt. The architect, and I apologise for shocking some of my colleagues, should be a businessman. He hasn't the right to live in some cloudy "superior sphere"; he has exceptional responsibilities. He handles (indirectly, admittedly) considerable sums of money. He draws up, executes and arbitrates contracts, agreements and deals. Let's be frank: social and economic circumstances require him every day to be more and more of a businessman (which doesn't mean being venial). Only the hypocrites will object.

The training of the future architect must take account of this aspect of our role.

But scientific, technical and practical training is not enough. If the School cannot create artists, it can on the other hand help talent to flourish, encourage the expression of natural artistic gifts and produce an atmosphere conducive to the development of imagination and the plastic sense.

The knowledge and the rational analysis of the works of the past, and of vernacular traditions; the study and practice of modelling, of painting and music; the closest contact with contemporary intellectual and artistic life; confrontation of ideas and experiences with fellow-students from abroad, these all serve to develop the imagination, and to develop the personality without ever stifling it, to accustom the young architect to express himself in volumes, forms, colours, materials, proportions and rhythms.

For architecture, while making more use of the material than any other form of artistic expression, is an essentially abstract art. Mathematics of a fairly advanced kind can play a very important role in the education of an architect. But I shall not cite all the fine things that have been said on this subject, from Greece to our own day. □

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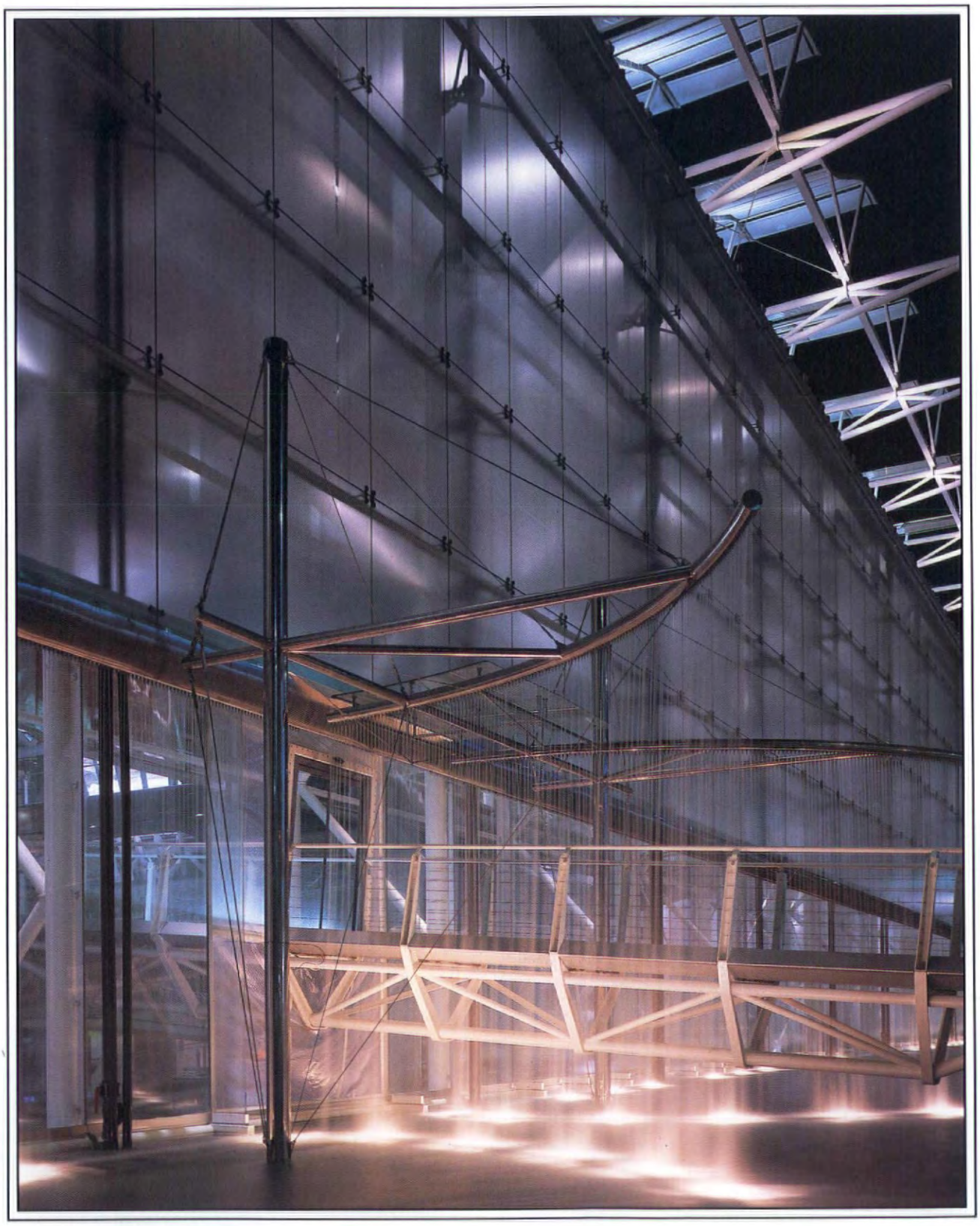

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IS ANYTHING WORTH SAVING?

The conservation and refurbishment of traditional buildings is a continuous and unrelenting task. So much so that ultimate feasibility is often in doubt far into the life of a major restoration project. Liz Trebilco of James Longley & Co Ltd, restorers of Hampton Court Palace, considers the pros and cons.

Underlying any task of a restorative nature is this simple question. But it's usually a tough one to answer.

It's that word "worth" that causes the problem. It does not just call for a judgement according to costs involved, and possible future financial gains, but, when it's a question of to restore or not to restore, it calls to account notions of historic value and heritage, right across the spectrum to nothing more than sentimental value.

In the case of Hampton Court Palace, the architectural ethics of restoration per se were aired soon after the tragic 1986 fire had destroyed so much of Sir Christopher Wren's south range, which house the King's State Apartments built for William of Orange. Should not history be left to stand untampered with, ran one argument, and the fire damaged area be preserved under a glass pyramid for all to see? Or should not the unalterable fact of the fire be viewed as an opportunity to replace the old with the entirely new, and the State Apartments rebuilt in modern, twentieth century steel and plastic?

PSA project architect Michael Fishlock, in his new book, *The Great Fire at Hampton Court** explains the arguments in greater detail. But in the event, the Secretary of State came down on the side of the PSA working party's recommendation that Hampton Court Palace should be fully restored, "using traditional materials and construction."

To reuse all and everything that was salvageable became the underlying philosophy of the restoration project. It began with sifting through charred and water soaked debris to extricate every reusable fragment, and finished with the glory of rehanging an entire glass chandelier in the King's Audience Chamber of which every single crystal had been recovered.

This total restoration approach was carried to extremes at Hampton Court Palace, which is possibly one reason why the project was seen as unique. All those involved were given an unparalleled opportunity to exercise their restoration skills to the full. The main contractors were tasked with following traditional building methods and using as near to the same materials as possible throughout their three year building contract – whether or not the finished results would be visible.

This meant washing sackful upon sackful of sea shells, which were discovered to have been used by Wren as sound insulation between floors. These were reinstated to serve their original purpose, and the firm may now be the only building contractor with a custom made sea-shell washing sluice tank in its plant stock.

Similarly, the work that went into rebuilding the roof will remain invisible to many. Remaining roof timbers were decharred and repaired where possible, otherwise massive replacement King and Queen Post trusses, following Wren's original designs, were manufactured on site, then lifted onto the roof and assembled in situ. Most of Wren's original wrought iron straps and ties were saved from the fire debris, and after reworking by blacksmiths, these were reinstated to strengthen the roof truss joints. The roof was covered in the heaviest lead sheet, as was the original, and this was possibly the single most expensive material in the entire programme.

When it came to joinery work, such as for the carved oak cornices lining every ceiling, tagged and labelled fragments salvaged from the fire were pieced together with lengths which remained in place. The contractors' joiners had to draw full size the entire cornice for the Cartoon Gallery to show exact carving patterns, to determine where salvaged pieces should fit, and where pieces of carving were missing.

As work progressed, one could view the State Apartments and see the new joinery work juxtaposed with the old. But, as with the internal panelling, tones and colours were matched and the subsequent staining and polishing took everything back, imperceptibly, to a 300 year old lustre.

Perhaps the decision to adopt the total restoration approach at Hampton Court Palace was a relatively easy one, given the unique historical nature of the building, its age, and its current role firmly established as part of the nation's heritage. With a monument like the Albert Memorial, however, the question of "worth" is felt with full force. It is only 120 years old, many would descry its relative historical or architectural value, and it is not quite so strongly imprinted on the tourist map. Again, much of the work that is needed will never by seen by the casual observer at street level.

Yet the Albert Memorial is unique, and tells a tale of its own. Its very construction is a feat of engineering it itself. The Memorial stands on a bed of concrete to an average depth of 17 feet. The steps at the base rest on brickwork and vaults, rising to a height of 40 feet. Twenty-four granite blocks form the podium, some weighing 10 tons, and the whole plinth is 3 feet high by 214 feet round. Marble slabs were used to form the sculpture of the podium, and the central figure of Albert was moulded and cast from 37 disused guns. The Albert Memorial is currently shrouded in the tallest free-standing scaffolding ever constructed – and this fact alone has made the Guinness Book of Records.

The scaffolding incorporates a hoist which has allowed conservation specialists to carry out detailed investigative research into the extent of the deterioration. The iron supporting framework has rusted, and water penetration over the years has caused tesserae to lift away from the mosaics. Much of the gilding has been destroyed by atmospheric pollution.

The contractor has also installed protective covering for the 210 foot marble frieze around the base, and crane-lifted off some 28 bronze statues for closer inspection and repair. Grouped in ranks and in descending order, these represent angels, the four Christian and four Moral Virtues, the Arts, and the Sciences. The base frieze depicts 169 artists, writers, musicians, sculptors and architects.

The Albert Memorial might be viewed as a Victorian folly by some, merely an ostentatious monument to Albert, erected by his grieving widow, Queen Victoria. Yet is bears unique testimony to the tastes and outlook of its time, and stretched the skills and artistry of its creators. Perhaps, then, these notions, too, should be taken into account when answering that question of "worth saving".□

**The Great Fire at Hampton Court* is published by The Herbert Press, 46 Northchurch Road, London N1 4EJ. Recommended retail price £10.95.

The restored south range at Hampton Court, England, refurbished after it was almost totally destroyed by fire in 1986 (above) and the Albert Memorial, London (right) completely shrouded in scaffolding errected by James Langley and Co Ltd. Circle #51.

The hidden environment. Detail of the air conditioning outlets employed by TKT GmbH (right) at the Congress Centre Auditorium, in Hannover, Germany, and (below) the exterior of the building. Turbon Tunzini Klimatechnik GmbH. Circle #50.

The interesting wing-roof of the Virginia Air and Space Centre USA, designed by architects at RWBK (left) to evoke the feeling of flight. The massive arched trusses feature custom fabricated panels from Alply Inc. Circle #52.

Contrasting black and white 'Petra' marble design from Rover Spa, of Italy, utilised on the main isle of the shopping centre of Heerbrugg, Switzerland (left). Circle #53.

Curtain walls which not only protect inhabitants from external elements but which also contribute to a safer and cleaner environment by virtue of the integrated solar cells. Flachglas Solartechnik GmbH (below). Circle #54.

'Norges Varemesse', the largest exhibition centre in Norway (below) by architect Nils Magnus Øverbye at Arkitektene Engh Oy, refurbished using Teknoglas ceramic steel exterior panel from Scanprofil AS. Circle #56.

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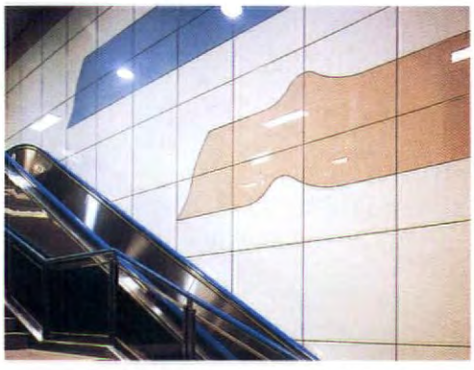
The impressive Gothic character of Breadsall Priory, Derby, England (below) sensitively restored by J T Design Build, creating a golf club and hotel. Circle #58.

Crystallised glass panels from Nippon Electric Glass Company Ltd, ideally suited for both exterior and interior walls, here on the Wacoal Kojimachi building, Tokyo (right) Circle #57.

Natural stone used successfully as a structural medium by Dring & Williams, on the refurbishment of Bristol's former general post office. Circle #59.

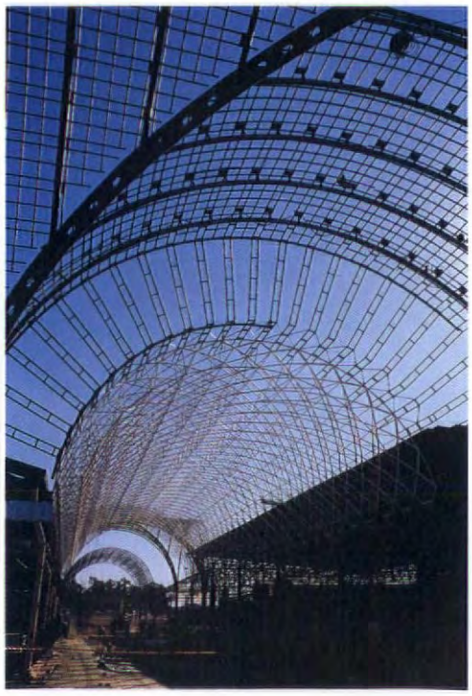
Some of the 45,000 elevators, installed by Orona Coop Ltda of Spain (below) since 1964 when the company was founded. Circle #60.



Careful brickwork design and specification gives character to the new six storey Dalhousie development (above) in the centre of Glasgow, from Marley Bricks. Circle #61.

'Neoparies', Nippon Electric Glass Co Ltd, unique crystallised glass panels in use to great effect at Shindo Higashi Station, Sapporo City, Japan (above). Circle #63.

The refurbishment of the South Wales Electricity Board offices in Cardiff (above), were carried out whilst the buildings were still occupied. Incorporated into the designs were the patented Don Reynolds sightline window. Circle #62.



The intricate and delicate exposed steel roof of the East Rand Mall, Boksburg, South Africa, (left and far left), made possible with space frames from ABBA Space Structures. Circle #64.

Blackburn Borough Council's 15 storey town hall and offices transformed after over-cladding by OCM (UK) Limited (right). Circle #65.

Utilisation of Amtico's marble collection for stunninhg visual effect at the Folkets Hus Community Centre, Sweden (left). Circle #66.

Two versions of ACO's new N 100K grating and drainage systems (below and below right) enabling specifiers to custom-design installations to suit most applications. ACO Severin Ahlmann GmbH. Circle #67.

Partek Concrete's 'Palazzo' architectural concrete cladding slabs (below); available in a vast choice of colours and either polished or matt finishes. Circle #68.

Refurbishment of the home of Glasgow Rangers FC, Ibrox Stadium, by architect Gareth Hutchinson, uses 1,500m2 of black, grey, blue and white lamax cladding supplied by Booth-Murie Ltd, (right). Circle #69.

Coxdome 'Skyline' structural glazing offers flexibility of design in a high quality, thermally efficient system. (above) Circle #72.

The British Telecom headquarters building, by architects Maurice Fielding Associates (left) using cladding and curtain wall products from Permasteelisa. Circle #70.

Waterproofing on Alpine parking deck at Grossglockner, Austria with 'Kemperol' from Kemper System GmbH (above). Circle #71.

Scotchshield™ Combination Film Prom 3M (left) which combines the features of solar control insulation and safety all in one application.

A refurbished New York City Hall, USA (below) using an anti-crack system from Sto AG.

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Beethoven's house in Bonn, Germany (left) protected from the elements by Sto AG Silicate Paints on outer surfaces. Circle #75.

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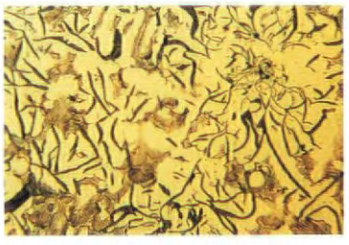
Transplastix designed, fabricated and installed, glazed elements at Rochdale's Wheatsheaf Centre (below). Circle #78.



Specialist laboratory facilities offered by Messrs Sandberg Consulting Engineers of London proved invaluable in inspecting samples of materials from the Albert Memorial, London. Above is a photomicrograph of the external cast iron column. Circle #77.

An example of overcladding using an insulated brick cladding system from Eurobrick (above) at Ashford School, Middlesex. Circle #76.

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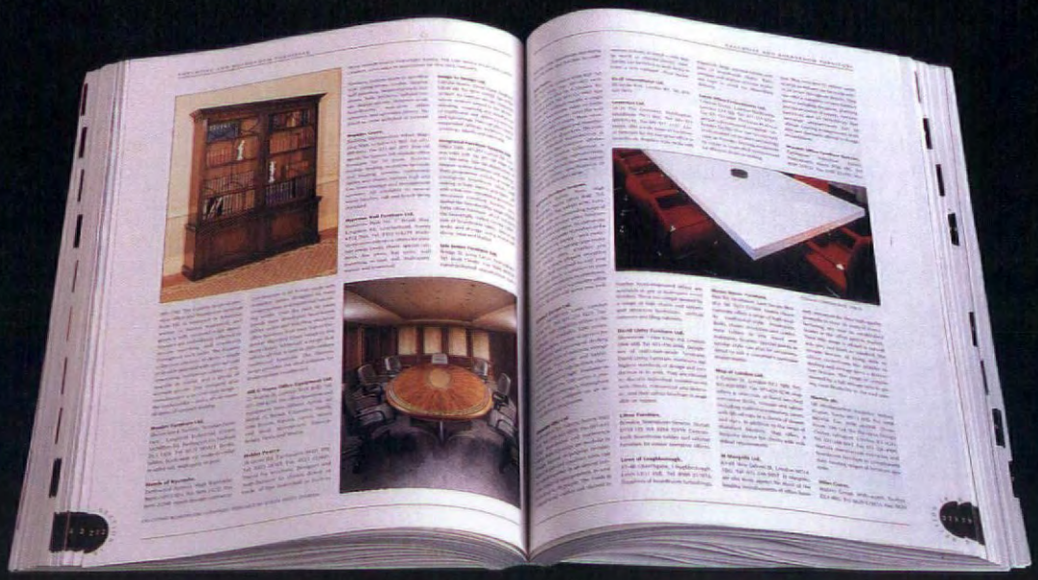

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