RDI ANNUAL ADDRESS

Technology Comes to Town

MICHAEL HOPKINS, RDI

Delivered to the Society and the Faculty of Royal Designers for Industry on Thursday 14 November 1991 with Michael Frye, Chairman of Council, in the Chair

Michael Hopkins was introduced by Professor Ted Happold, Master of the Faculty of Royal Designers for Industry

The title for this talk *Technology Comes to Town* was a phrase out of my current notebook that sounded right. What I intended was a catch-all to enable me to show you some of our recent work in London.

When I say 'our' I mean Patty, my wife and fellow partner, and myself, who have been joined in the development of our practice by three younger partners: John Pringle, Ian Sharratt and Bill Taylor. Our earlier work, which is, I hope, firmly rooted in the functional tradition and in the machine aesthetic, was mainly concerned with buildings which were not specific to their site. They could almost be thought of as technical objects, products almost, parked on their sites. They had to be elegantly parked, of course, sitting well in their particular landscape. Nevertheless, they could be dismantled and parked elsewhere. What has preoccupied us in recent years is what happens when you bring a machine aesthetic into the city. How do you respond to more complex and multi-layered contexts with overlapping visual, historical and social facets, yet still keep your building clearly close to the end of the twentieth century?

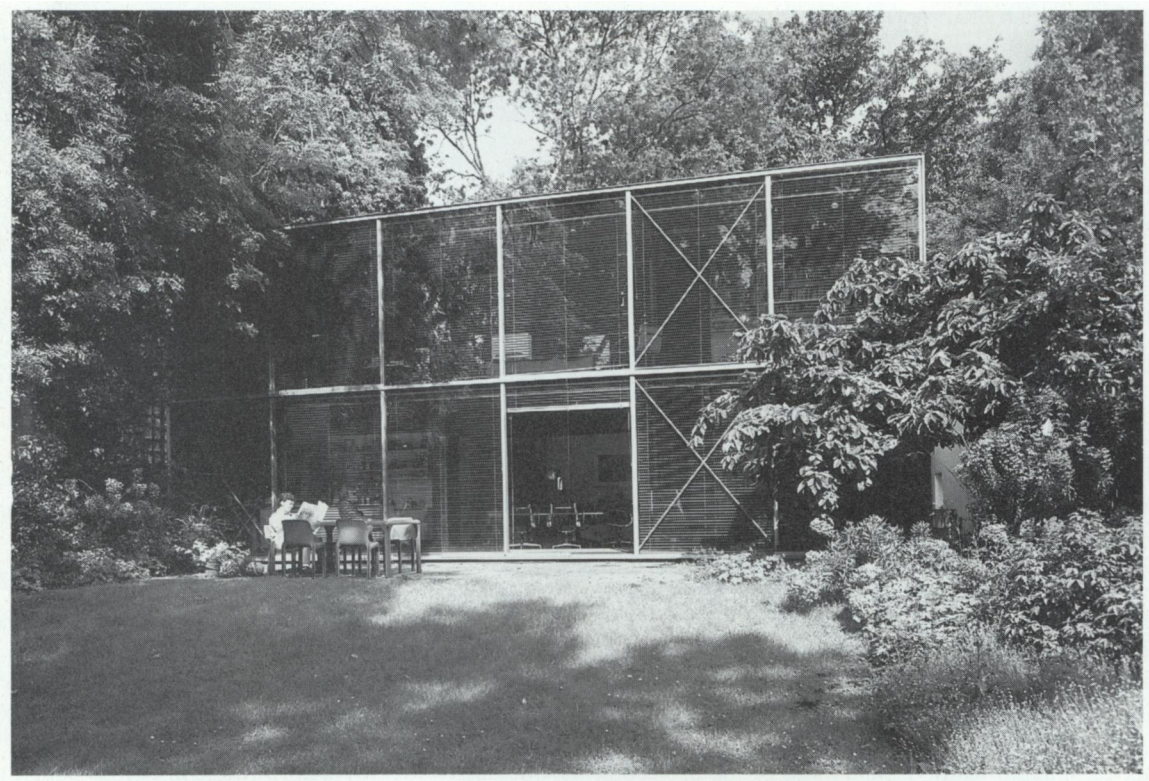
Michael Hopkins

Before dealing with our recent work, I would like to set the background which really begins with our architectural education. Patty and I were students at the Architectural Association here in London, in the 1960s. I was a more mature student but we were there at the same time. Our preoccupations then were much closer to those of urban planners than of architects. Every building project was preceded by a contextual study, not so much of the actual fabric of the surroundings, but of its social framework, density and movement patterns. When it came to the design of the project all the effort went into the development of the plans and sections which were usually of megastructures at the scale of whole city districts. Much attention was paid to the notation of these plans with such words as, and these were very important to us, 'hearth', 'threshold', 'street', 'play area', 'corner shop', 'bus stop' and 'neighbourhood edge', and most important of all was the creative deployment of these notations on the plan which was to give the scheme its cutting edge.

Elevations were only important in that they were an illustration of the plan, and a closing-off of the section. Windows were naturally large to let in light and air and to provide the maximum contact with the outside world. Those parts of the elevations which were not windows were dividing walls between family activities and groups. Construction and materials were taken for granted, assuming a steel or concrete frame. The appearance would be unquestionably modern – with happy examples in one's mind of buildings in Scandinavia designed by architects such as Aalto or Ralph Erskine, or closer to home, excellent and recent schemes by the LCC at Alton Lane, Roehampton in London.

So I think we left college with an ability to organise a good plan and section but without preoccupation with style, taking it for granted that buildings were to be built in the image of their own times as part of a contemporary culture. For my generation a large part of contemporary culture seemed to generate from the west coast of America, California, both in art and technology. It also seemed to be the source of a freer and more open society, and in building California seemed to offer a cleaner, brighter, less permanent and more optimistic way of doing things.

Why can't buildings make use of the techniques and materials of industrial production? Why can they not be designed in the same cultural mode as contemporary products? Why can't buildings be more like cars or caravans, refrigerators or typewriters, aeroplanes or yachts? In the early 1970s we had the firm belief, and still do, that the technologies developed for space could filter down and help towards making better buildings and environments. We were not the first generation of twentieth century architects to go down this particular route. Le Corbusier, in the 1920s exhorted architects and builders to look around them at what was being developed in related fields: ship engineering, aeronautical engineering, automobile engineering. Writing in the magazine *Esprit Nouveau*, in 1920, he says, 'Style is a unity of principle animating all the works of an epoch and a result of a state of mind which is its own special



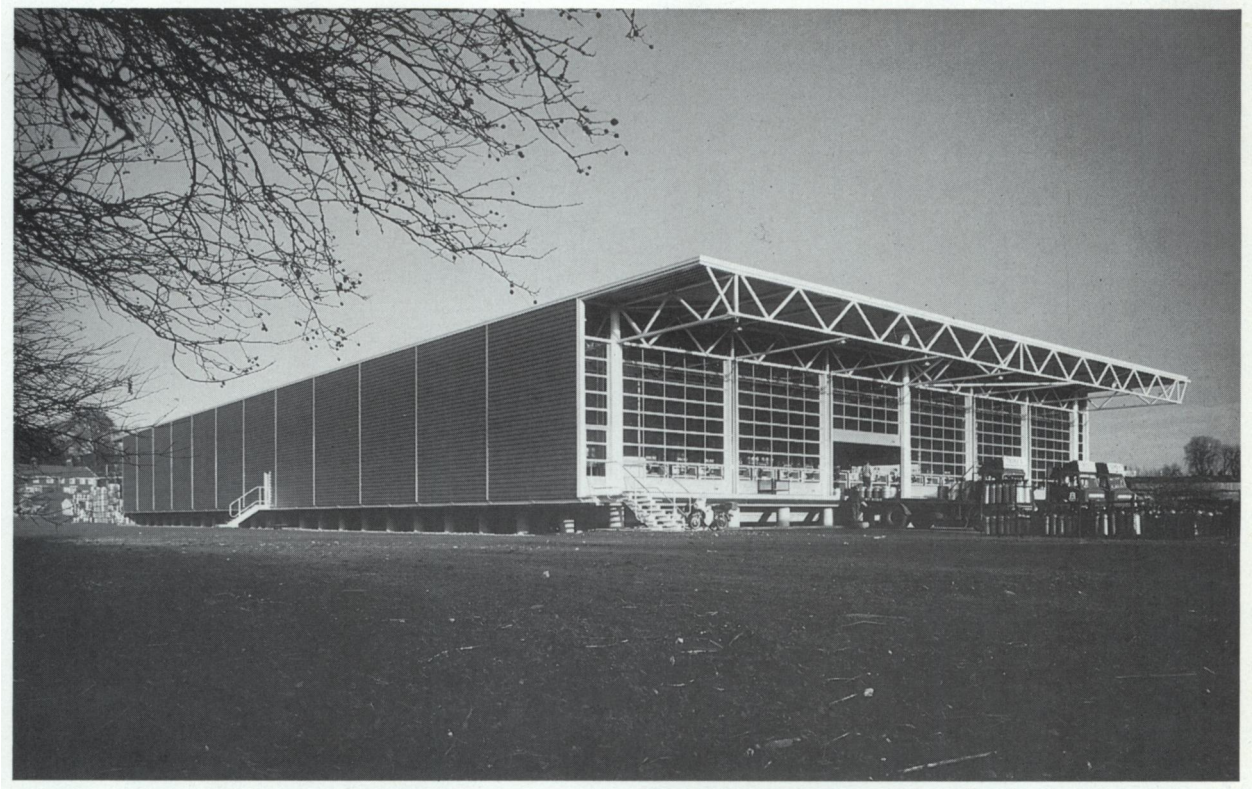
The Hopkins' house, Hampstead, London. Architects Michael and Patty Hopkins, 1976.

character. Our own epoch is determining day by day its own style, our eyes are unhappily unable to discern it'. I think that is great stuff.

Then after the Second World War there was a growing interest in harnessing means of industrial production to make buildings. In France, Prouve began to develop lightweight systems for housing in plywood and aluminium. In England, in a rather more pedestrian way but very successfully, the Arcon group built more than 40,000 houses from a steel and asbestos system. In America, Buckminster Fuller sought to use the surplus aircraft production capability after the war, by developing a high performance lightweight house that could be produced at the rate of 200 a day from the Beach Aircraft Corporation Factory. This was the Witchita house. It never got beyond the prototype stage but, nevertheless, the dream persists to encourage the next generation.

A little later in 1949, Charles and Ray Eames built their inspirational house in Santa Monica from building catalogue components. This was a different idea, the idea of an open system, not an individual product, a demonstration that it was possible to make architecture out of readily available components and products. It went with the reality that in Southern California it was possible to find every conceivable form of product from the lowest to the highest technologies, if only you could source it. Many of you might remember something called the Whole Earth Catalogue which came out during the mid 1960s and was a wondrous fund of information. During the 1960s, the Eames experiment became codified into the Californian Schools Building System, known as SCSD, whereby a large building programme enabled the bulk tendering and supply of components specially designed for the system to be made by different manufacturers.

When we came to build our own house in 1976, the first in the series of our projects, Neil Armstrong had been to the moon and back seven years earlier and in a sense the technology of materials had been fully developed for the foreseeable future – all we had to do was adapt it. But, it was the Eames' house, so airy and



Greene King brewery, Bury St Edmunds. Architects Michael Hopkins and Partners.

full of light that was our starting point. Nearly 20 years had passed. Their concern was far more pioneering than ours, to demonstrate that it was possible to make architecture out of standard components. To this end, Eames used as many components as possible, although, as in every thing they did, it was done with great design control.

When we came to build our house, we were not pioneering but were concerned about getting the maximum space possible for the least cost. To this end we sought to use as few components as possible; the same material, folded sheet steel, for the floors and walls, both inside and out, a steel frame and plate glass. Our design enjoyment was to come from fitting these off-the-peg products together as best we could. The corner eaves junction for us is always an amazing achievement because all the systems in the house come together in that one point, and they fit. Although designed for a specific site in Hampstead, the solution was intended to be a general one, applicable to many sites. No particular attention was paid to the site context other than the general thought that this building was to be detailed in the same spirit as the Regency houses in the street.

We then went on to develop a larger, industrial version in Bury St Edmunds for Greene King, with glazed ends, steel-clad sides and roof, and supported by an exposed steel frame in much the same way as our house was. Again, the architecture comes out of good proportion and of carefully putting together a limited number of details and components. We were still able think of the building as a large product parked on its site, without any particular contextual reference to Bury St Edmunds.

The third building, that I have selected from our earlier work is the Patera Building. Here we were asked by a steel fabrication firm to develop a small industrial building for the upper end of the market. A good appearance was an important part of the brief. It was a true product, precision engineered, marketed as a complete package for assembly on almost any site. It was one of those dream projects that you can occasionally get, when someone actually asks you to design what you usually invent as a project in the evenings. The building has a basic span of 12 m with a module of 3.6 m in the long direction. It has three elements, each made up of many components and sub assemblies: the frame, the panel and the glazed ends. Everything was preassembled in the factory, manufactured in jigs to very fine tolerances, assembled on site with purpose-made equipment. We designed special lifting frames to fit onto a standard fork lift.

Patera system. Architects Michael Hopkins and Partners

The important point was that the manufacturing process was moving closer to that of the motor car. Certainly we approached the level of sophistication achieved on secondary car production lines after the First World War. At that time there was a myriad of manufacturers in Europe and the US assembling cars, fitting standard and interchangeable components into 'home-made' chassis and panel-beaten coach work. Best of all our process achieved something that a number of us had been after for a long time. It answered the question 'Why can't the panel on the roof of the building be the same as the panel on the side, with the same rain exclusion system on both, just like a car?'

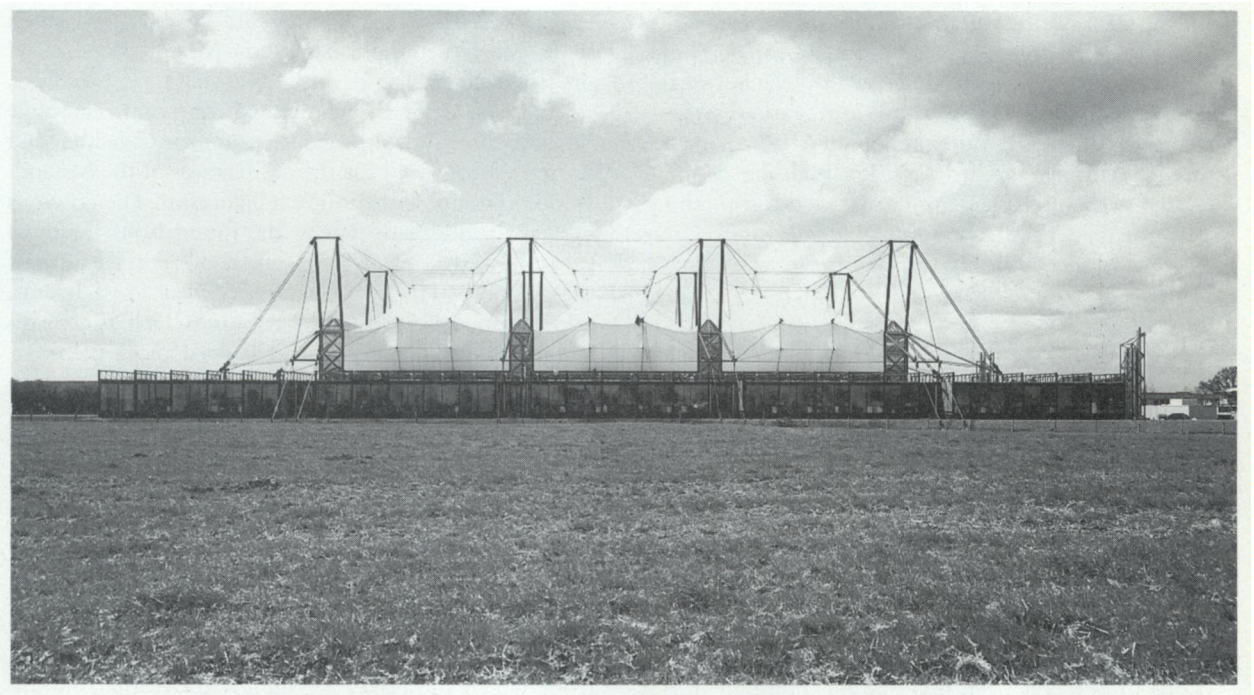
The architecture of this small building and its hierarchical ordering rely on the quality of detailing of the basic elements – the frame and the panel. Just as with buildings in stone, light and reflection on the

surface details explain and enhance the whole concept. The illustration shows the whole assembly – frames, panels and glazed end wall, assembled and parked on this occasion at Canary Wharf for the LDDC. The same building had previously been erected as a prototype in Stoke on Trent and since then it has been dismantled and rebuilt at the Royal Docks, made twice as long by joining the components for two buildings together.

It speaks well for the accuracy of manufacture of the basic elements, that they were taken apart and put together again without having specific numbered locations. We then went on to develop the product for our own office in Marylebone, this time using a conventional truss and column system spanning 18 m rather that the 3 pin hybrid portal of the Patera Building which spanned 12 m, but the same structure to panel, and panel to panel, connections of the original system. However, the system was now four panels high allowing the introduction of a mezzanine. And on this occasion we introduced two new elements – side wall and roof glazing.

The last building we designed during this period of the type which had enough space around to think of it as a product elegantly parked in the landscape was the research centre for Schlumberger set in open meadows on the edge of Cambridge. Retaining the hedgerows and underlying field pattern, it somehow deliberately avoids setting up a formal relationship with a new landscape as a country house of the same size would have done in the 18th century. The illustration shows the side elevation of the building – five small single storey buildings with an external structure developed from the Patera Building but this time fully glazed, making individual studies for scientists overlooking the countryside. In the middle are three great pavilions enclosed by membranes. They house the test station, the reception, the library and the restaurant: the research and social heart of the building.

The three pavilions, two for research and one for social contact, also show drill pits, one going as far as 20 m into the ground. Had we done this building 140 years ago, we might well have done it differently – the spans and height are very similar to Paxton's Crystal Palace. He used the best and latest technology available, a cast iron frame, lots of small pieces of glass and a very large labour force. Today the labour content would make his methods impossibly expensive. The covering



Schlumberger Research Centre, Cambridge. Architects Michael Hopkins and Partners.

of large spans, letting in daylight but with limited solar gain, are best achieved by the use of fabric membranes. In this case we used a teflon coating on a glass fibre grid weave. These membranes are manufactured into very large pieces off site in the equivalent of sail lofts, using computer generated and controlled cutting patterns, and then assembled on site with a limited team of perhaps only half a dozen people. These membranes can be supported in many ways, provided adequate tension is induced into the fabric to be able to make it act compositely with the rest of the structure and withstand the normal loadings that come to bear on any roof. The need to have a clear 24 m span for the travelling crane meant that the fabric loads have to be picked up externally. This gives rise to the masts and their angles of deployment which are characteristic of this scheme. Finally, and most enjoyable, the third pavilion covers the social centre of the building with its café, library, winter garden and reception. The quality of light through the membrane is enjoyable on both bright and dull days. The mixing in of small amounts of unmodified daylight through the structure seems to make the light more lively even on a dull day.

The Schlumberger building has no formal relationship with the landscape and there are no surrounding buildings with which to make a connection. It must stand alone as a piece of architecture in its own right. It's ready to move off at any time but I for one hope that it is there for a good while yet. It is the last of the buildings of what I might call our earlier period. Architects often start out in the countryside, maybe doing something for an aunt, or building a small cottage for themselves. Coming to town is something that happens later. In our case we gradually worked our way into dealing with more urban projects.

URBAN PROJECTS

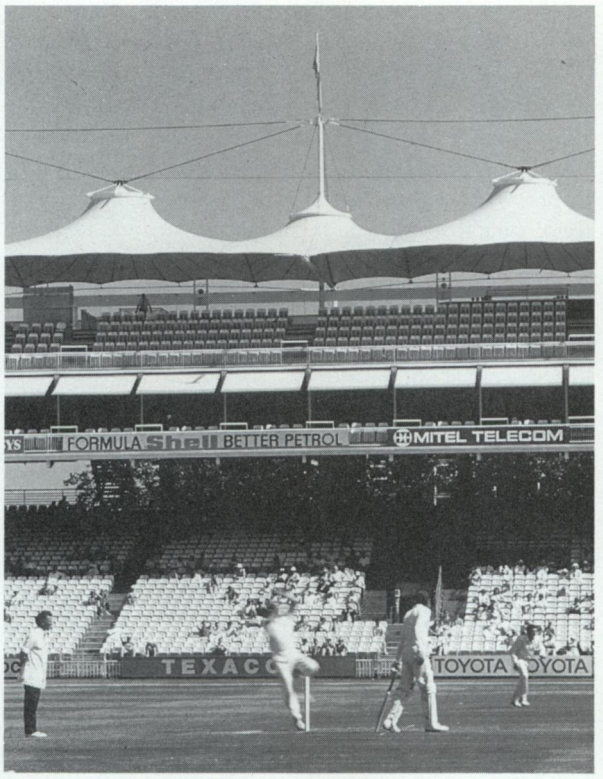
Our first urban project was the redevelopment of the Mound Stand at Lord's. The inspiration for our building, the source of it in a way, was the MCC Pavilion at Lord's, designed by Verity. I find it a marvellous summer building, very light and airy. The roof is lifted above the top deck, so you see the sky running under the roof, matching the sky above. It is painted white, it is to do with cricket, it is to do with English summers. They were, I felt, some of the qualities we had to get into our new building.

Lord's has never been just one big building. It has grown up as a collection of buildings around a green. As time developed, the buldings gradually got larger. Interestingly, they always started with small tents. The last thing we wanted to do, although I thank there were some people at Lord's who might have wanted this, was to turn Lord's into a stadium or suggest a building form for the rebuilding of the Mound that could be later on interpreted as a stadium. We felt that Lord's should remain very much a village green, with a collection of buildings around it. Since doing the Mound Stand we've gone on to do a Masterplan for Lord's in which we've kept some of the existing buildings. We have completed our Mound Stand, and some open stands, and made other proposals for doing separate buildings on the ground.

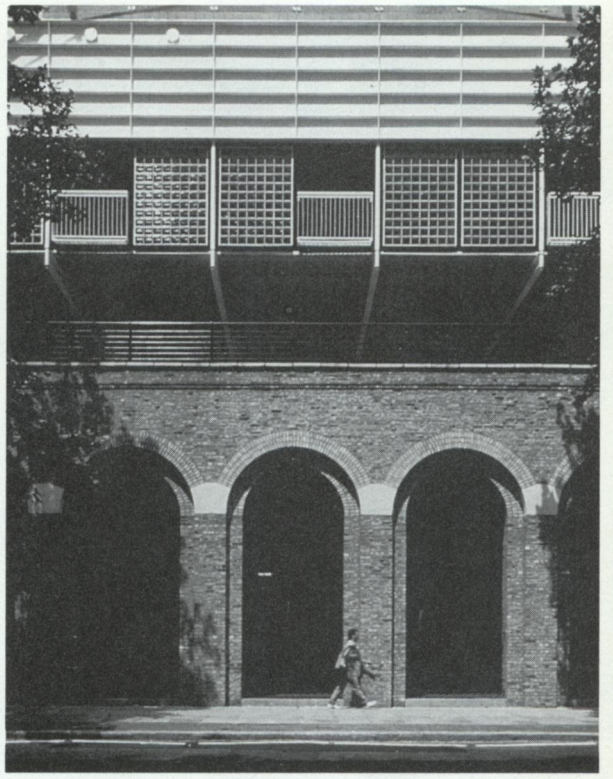
We could not park a building here, as we could park our earlier buildings on their sites. The shape is more complex for a start. When Verity came to do the Mound, he had obviously begun to run out of money. He started to support it on an arcade but by the time he got to the boundary wall, he found it was cheaper and more expedient to support some steel beams on the boundary wall, and prop the rest of the upper terrace off that wall. Over the years the arcading has been filled in with windows.

Our project originally had to be completed all in one season which was, I felt, impossible. What we decided to do, was refurbish the base of the Mound Stand, use it the following year as an open stand, and build a structure on top in the next closed winter season. So we retained the arcade, opened it up, and extended beyond to make a base wall for the old terraces of the Mound. Building resumed the following autumn. The previous year we had already put in the foundations for these great masts that are at 18 m centres down the length of the Mound. The masts support great cross beams, which support the top deck from which the boxes hang, and the whole thing is balanced about the mast. The big tension members at the back might on occasion also have to take a little compression.

The completed building has a brick arch base, which is really an extension of the existing world of Lord's, and then that grows gradually into this new world, my world, of the technology above it. There is the base, the open back of the stand, and above that the back of the boxes in the dining rooms with little balconies out over the street. Then you get part of the great big box girder system which supports the upper part of the stand and from which the boxes are hung. Above that the top



The Mound Stand, Lord's cricket ground. Architects Michael Hopkins and Partners.

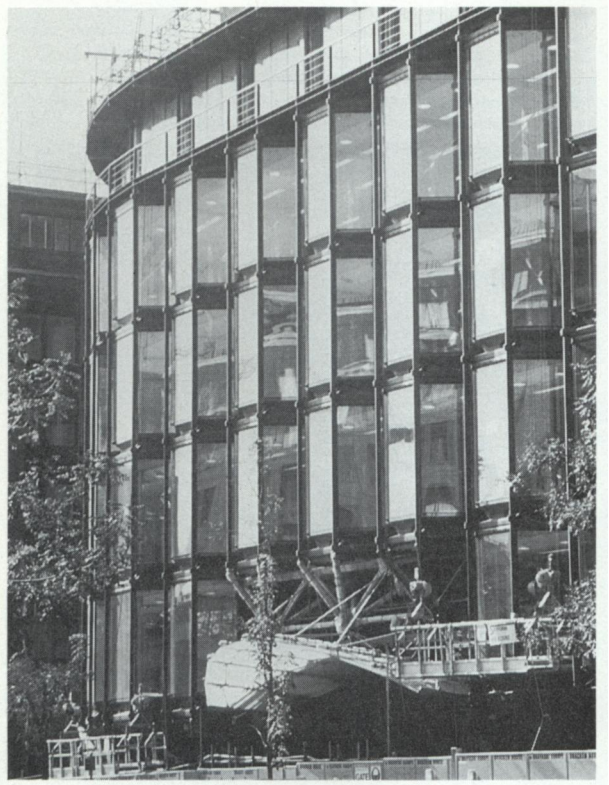


The brick arch base, the Mound Stand, Lord's cricket ground

deck and then the roof above. The illustration is shot along the street. The architecture becomes part of the street, and I find it moves comfortably from the brickwork into this newer technology. I hope from inside we have achieved some of the quality of getting sky through, underneath the roof. We always pay great attention to the detail, try to get out of the engineering architectural details which give pleasure. This stand is one of the best places I know for spending a summer's day in London. There is a marvellous quality of light underneath the roof and it engages with the other buildings in Lord's.

The next project I illustrate is the redevelopment of Bracken House. Bracken House was designed by Albert Richardson in the 1950s, as the headquarters of the *Financial Times*. When we were thinking about our entry to the competition to redevelop it, we were concerned about the idea of expressing the building as one whole city block like, for instance, the Strozzi Palace in Florence. There is a current vogue in city architecture and development to fragment sites into smaller bits and pieces. But there are some marvellous precedents in history for taking buildings which in themselves are really the scale of a whole city block and treating them as one building. This was something that we were determined to do when we came to redevelop Bracken House.

Our other preoccupation at that time, and this is to do with my main idea of what you do when you come to town, was to explore the idea of a structural skin enclosing the building and the tension one gets when the outside wall actually does the work of holding the building up. The department store in Sloane Square, London, Peter Jones is a marvellous early example of curtain walling. Willis Faber in Ipswich, a project close to my heart, which I used to work on when I was a partner at Foster Associates, is perhaps the ultimate curtain wall. It is entirely hung from the top of the roof. It is much easier to hang a piece of glass than support it from the bottom. In a way, Willis Faber is a one off



Bracken House. Architects Michael Hopkins and Partners.

building. Its contribution to contextualism, which is a sort of happy accident, is that it reflects the street pattern around in its glass.

In designing our new building at Bracken House, we wanted to achieve something that was neither a curtain wall nor an expressed structure. Hardwick Hall has more glass than solid in its curtain wall. Everything is in the surface plane and there is a marvellous tension between the openings and the solid of the stone. The area that we explored in Bracken House, and are currently exploring in projects in the office at the moment, like the extension of the Houses of Parliament, is the use of the outside wall to hold the building up. If this is achieved, some character will result from the building. To give some examples, there is a building in St Louis of about 1850 wholly designed out of a cast iron system of columns and panels which work together to make a complete building structure and support the floor loads. The *l'Express* building in the Rue Réamur, Paris, is the earliest example I have seen of a steel structure used externally to support the building. When we came to do our competition scheme we pursued this idea and we even copied parts of the Rue Réamur in our top floor jettied-out balconies with an exposed cast iron frame designed to support the 12 metre span floor slabs. In the middle of it we had an escalator street, an idea developed from Willis Faber earlier. We used the same cast iron structural system on solid stone load-bearing bases on the outside and inside space of the building, giving them each the same architectural quality.

The old Bracken House was 'listed' with full protection when the *Financial Times* decided to move out. So what could we do with this giant building, with a huge printing works in the middle that went down two or three stories below ground? We started to read about Albert Richardson, the designer of the building, and discovered that he had been much influenced by Guarini's Palazzo Carignano in Turin, which he had seen on holiday. It is a marvellous, strong building, much better than Bracken House. One of the things that they have in common is that the Palazzo Carignano is built out of a dark rich pink brick. It is a very bold building. Richardson's Bracken House plan was a muddle. None of the wings was placed orthogonally to any of the others, the printing works were stuck in the middle, the entrance was not in the middle as it should be but around on the Cannon Street front facing St Pauls's. Within this building, which was seven stories high, there were something like 27 different floor levels between all the wings. There was very little to grasp for an architect. Then something fortuitous happened. One of the young men in the office, played with Guarini's geometry on Bracken House, wondering what it was possible to fit onto the site. He put an elliptical shape into the middle of the plan, enabling us to pivot the two wings around a new middle and tie the whole building together in a way that I do not think any other form would have done. So what we did was we cut the middle of the printing works out and put back a new middle or heart into the building, with an atrium space in the middle, using the elliptical form to fit between the two wings.

We needed to develop a form of bay window because there was so much pressure to get the maximum amount of new area onto the site. We looked backwards to Oriel Chambers in Liverpool, which has cast-iron bays. It provided very strong visual and material reference for us and we developed our own version of a structural load-bearing wall. We used

the original Hollington Stone to build a proper masonry base. Everyone insisted that we should use concrete and stick stone on the outside but for us it was most important to build that in solid, load-bearing stone. This supports a system of gun-metal columns between each bay and that in turn supports the whole outside of the building. The column trifocates, supporting the main floor beam and the edges of the bay windows.

The quality of materials and quality of surfaces in the atrium are, I hope, strongly reminiscent of an outside space. It is quite a small atrium divided by the lift shafts but it gives a positive centre to the building. When the building is finished there will be a garden on the roof because it is important in this part of London (or any part of London) to remember that the roof is the fifth façade. Many people go up to the top of St Paul's Cathedral and the view from there at the moment down over its near neighbours is not good. We can make some contribution to improve it by making a roof garden, although it has to be a very flat one, because it in its turn must not interrupt the views to St Paul's.

We have done two recent projects with David Mellor. Back in the country again, this time in Derbyshire, perhaps we were now thinking more about context and opportunities. David Mellor bought an old Victorian gas works at Hathersage, which had two nice little stone buildings. In the middle of the site was the base of the old gasometer, with well piled foundations. The gasometer had long gone and everything round about had become overgrown. It was the excuse we were looking for to do something that was not just a regular factory, so we used this base to build a round factory. David Mellor put a topping on the base to level it up, give it a little extra strength and increase the diameter. Luckily you can produce cutlery in a round building as well as you can in a rectangular or square one.

David Mellor wanted to build a stone building, about which I was a little apprehensive to begin with. I was still thinking almost entirely in metal then. The

The Round Building, David Mellor, Derbyshire. Architects Michael Hopkins and Partners.

David Mellor's building, Shad Thames, London SE1. Architects Michael Hopkins and Partners.

client is always right, so we built a stone building. The important point about it was that it was a load-bearing stone building. The first scheme we designed had some iron pillars around the edge, off which we supported a big clear span roof. But then the whole, marvellous idea came to use it as a proper load-bearing wall. So we built a load-bearing stone wall, and then put a free span 80ft diameter, clear span metal roof on top, of high quality, which we clad with plywood panels and lead. If everything that you build as you go along is what you finish seeing, then you are going to get some arresting architecture. You see the wall, you see the steel structure, you see the underside of the plywood panels and they become the finish of the building, the interior of the building. All there is on the floor is the floor paint which goes straight over the concrete slab. If you can keep the finishes of your architecture near to its original surfaces, the chances are that you may achieve some quality in your building.

Another recent building for David Mellor was a showroom-cum-office building at Shad Thames in London's Docklands. Five, six, seven or eight years ago we would have had much more difficulty knowing how to handle a building in such tight circumstances. Shad Thames is a very tough street, which leads down to the dock on the far side. The problem was to put an object into this space which was clearly modern, full of light and air, but which had a tough quality which was appropriate for its particular environment. It pulled together many ideas from other buildings. For instance, the lift shaft is developed from the one at Lord's, but considerably refined. The shop is on the ground floor looking out on to the dock and the street at night. It is a good, tough building: you feel you can give it a kick and it will do more damage to your shoe than you will do to it.

We are building at present a group of office buildings at Bedfont Lakes near Heathrow airport for IBM. We produced a master plan for a group of six buildings and are designing three at the far end. We have trawled back again through the modern movement, picking up perhaps where Mies left off at IIT, using an exposed steel frame from which to make the building. The client calls the three buildings Darth Vader one, two and three, which I quite like. These in a way return to the concept of the building as a product.