

Studio Interview

This interview, conducted by Yoshio Futagawa, was first published in a GA Extra on Norman Foster in April 1999

GA: Can I ask about your parents. What did they do?

Foster: When I was very young my father was a shop manager in a poor area of Manchester. Later, during the war, he was a security guard. Afterwards he worked in a factory as a manual worker.

GA: What were your interests as you were growing up; did you know that you would become an architect?

Foster: As a child I was always interested in sketching and drawing and making things and, like a lot of people at that age, I enjoyed making models. I was fascinated by model aircraft and construction kits which were called 'Trix' or 'Meccano'.

Looking back it was quite a lonely childhood. At the beginning of my education my parents sent me to a small private school. At the age of eleven I took the entrance exam - called the Eleven Plus - and did quite well. As a result I went to the equivalent of a grammar school, which was quite prestigious in the educational system. Most of the children there came from middle-class backgrounds, so socially I was an outsider, because in the neighbourhood where I was brought up everyone was a manual worker.

There was a strong work ethic and consequently pressure to leave school early and be a wage earner. This manifested itself in my taking a job in the City Treasurer's Office in Manchester Town Hall. For my parents this represented both security and respectability. I stayed there for two years before I was called up for National Service in the Royal Air Force, which at that time was compulsory. Whilst at the Town Hall I studied commercial law and accountancy in the evenings. I realised that this could never be a long-term interest so I opted for electronic engineering in the military and trained to work on airborne Radar systems.

At the same time, however, I was developing a growing interest in architecture. At school I had been good at mathematics and physics. I was also good at art, which was unusual because you were not expected, or encouraged, to cross a number of disciplines. As part of my art studies I took a class on architectural history and discovered modern architecture; gradually I began to read further and explore the subject for myself. I discovered the work of Le Corbusier and Frank Lloyd Wright. I read Henry Russell Hitchcock's 'On the Nature of Materials', and Le Corbusier's 'Towards a New Architecture'. I was fascinated by all aspects of design.

GA: Did your parents encourage you to further your education?

Foster: My parents were fantastic. They were very kind and very loving, but they did not really understand why I wanted to give up a safe job, although they were in every other sense very supportive. I had to discover for myself, in my own way, my ambitions and interests. That took quite a long time. It was really National Service that gave me a wider perspective, and the maturity to enable me to challenge myself.

When I came out of the Air Force, my job in the Treasurer's Office was still open, but I delayed going back. I bought time by doing all kinds of jobs: I worked in a factory; in a bakery; I drove a delivery van; I sold furniture; I did anything to earn money and avoid the Town Hall.

Nevertheless it was an important period for me because I found myself. I put myself through a careers examination to try to establish what options might be open to me. The interviews and tests clarified my interests, which were all creative activities: sketching, drawing, or reading about architecture and design. At that point I decided that I would try to work for an architectural firm, but I knew that the only way I could do that was by using my background from the Town Hall to get an administrative position.

I got a job with a Manchester firm as an assistant to the contracts manager. Slowly I got to know the architects in the practice. At first I was in awe of them. But one day I plucked up the courage to engage one of them in conversation. I picked the youngest person there, a student working part time, and asked him what he thought about architecture. I said 'I'd love to hear what you think about Frank Lloyd Wright', and he looked at me and said 'I don't think I know him, is he a student at the college?'

At that moment I realised that in some ways I knew much more about architecture than they did. I was curious and knowledgeable about aspects of architecture of which they were not even aware.

GA: Was that because of the poor standard of architectural education at the time?

Foster: No. The reality was that I was actually very well read, but it had never struck me as anything special. I assumed that if you were an architect, you knew all that I did and much more besides. However, I had a thirst for the subject that was greater even than that of many practising architects, and certainly much greater than I realised myself.

After that I talked to the people in the drawing office more and more. They were very kind and encouraged me to study. They told me that I would have to go to a school of architecture and show my work. The problem was that I had none; I had never done an architectural drawing. And then I had a bright idea. I began to take drawings from the office at the end of each day and do my own versions of them. Each morning I would put the drawings back. I was always the last to leave and the first to arrive in the office, so nobody knew that the drawings had disappeared overnight.

I was actually very naïve, but I had done enough research to know that if I was to stay in Manchester the University was the best place to study. I had visited the studios and talked to the students. There was no doubt about it. Before I applied, however, I decided that I would have to tell my boss. One day, I knocked on his door and I said: 'I just wanted to tell you that I am trying to get into the University.' He said: 'But you have to have work to show.' I told him that it was not a problem, that I had lots of drawings. He asked how that was possible. So I explained, and he was amused, and asked to see what I had done.

When I showed him he said, 'You're a square peg in a round hole. Come with me.' There and then he produced a drawing board, a T-square, a book of standards, and a project. That afternoon I became part of the office. And he then tried very hard to persuade me to stay with him and not to study.

That experience was a boost, but there were other obstacles. The first and most significant was that, because I had left school early I lacked the necessary academic qualifications to apply for a place on a university degree course. However, at that time the University had what was called a 'diploma' course, the only difference being that you did not have to study a language. My next problem was the Manchester Education Authority. They would give me a grant to study at the College of Art, but not at the University. In fact they pressured me to go to the Art College, but I was determined to go to the University even though I had no money, because I knew that it offered a better education.

And so I worked my way through university in order to pay the fees. I was a bouncer in a rough cinema; I sold furniture on Saturday afternoons; I did presentation drawings for other architects. During the vacations I worked in a cold store; I drove an ice-cream van; I worked overnight in a bakery. I worked very long hours. It was a very American way of going to school; something unheard of in Europe. And then, to my great good fortune, I was lucky enough to win major academic prizes every summer, which were worth quite a lot of money. For example, in my third year I won the RIBA Silver Medal for measured drawings, which was worth one hundred pounds. In 1959 that was a lot of money, probably the equivalent of several thousand pounds today.

I was so highly motivated that when I got into architecture school, nobody was going to stop me. For me, the opportunity to study architecture was the most incredible privilege. I would have paid to do it, which is effectively what I was doing. And so to compete for any prize was quite a challenge.

I used that prize money to fund my travels. I studied Italian Renaissance architecture and visited the Tuscan hill towns as well as exploring work by contemporary Italian architects. I also went to Scandinavia and saw early projects by Jørn Utzon before he did the Sydney Opera House. I saw the work of people who did beautiful pitched roof buildings with slate and brick. I saw all the work of Arne Jacobsen from his earliest buildings to the latest.

GA: Now that you mention some of the architecture you were looking at in your travels, can you tell me if there were any particular styles or trends you were exposed to in school, or were you given a broad range of architectural examples? Earlier you mentioned Le Corbusier and Frank Lloyd Wright; were they the figures you were interested in?

Foster: Manchester University was very traditional. It was nothing like, say, the Architectural Association, or what was then the Regent Street Polytechnic, here in London: I remember visiting the studios there and finding an unbelievably creative environment. Manchester, on the other hand, was very conventional, very disciplined. It was frustrating because you never had the opportunity to debate. You would know what was expected, you would produce the work, it would be assessed, and maybe a week or two weeks later you would get it back with a mark. You would never present your work. There was no dialogue.

We were still studying the Classical orders and drawing in ink on linen. In the fourth year we had a three-day test and you would be given, say, an auditorium to design. You had to produce all the drawings, including acoustic diagrams, in just three days. It was very tough in a traditional academic sense, but stylistically it was very limiting.

But it is interesting that even in some of those early student projects I had begun to investigate themes that would become important later on. For example, my very first design project was a boathouse and retreat in the Lake District. The expectation was that you would design a shed for the boat and a little cottage alongside to stay in at the weekend. But my design was different. I integrated the boathouse and retreat to form a single building on the waterfront. The boat went directly inside the building and the living accommodation was located behind a glass screen facing out onto the river. I was the only student who integrated the project in that way.

If you look at the projects in the office today and study their history - whether you take a mid-career project such as the IBM Pilot Head Office of 1970, or an early one such as the Reliance Controls factory, completed in 1967, or a very recent one, such as Hong Kong International Airport, you will find that they are all about integration.

Reliance Controls was a very simple pavilion, but one that allowed the building to grow. It was the opposite of the 'management box' and 'workers' shed' idea of a factory which you cannot expand because it is fragmented. You will find these ideas in many of our current projects. At IBM we challenged the conventional wisdom that the computer should have its own separate 'shrine' and integrated them within our office building. We anticipated the fact that the computer would grow and change, that it was not a sacred object.

The Sainsbury Centre for Visual Arts, a commission we won in 1974, also sought to unify a number of disparate functions - an art gallery, a faculty of art history, a senior common room, a public restaurant - within a single, open, top-lit space. Essentially we thought that these buildings would be richer if they were flexible and if the edges between functions were broken down.

It has also been suggested that some of the social dimension in our work comes from my own subconscious, thinking back to the environment in which I grew up, and seeing the possibility of transforming and improving the quality of life for everybody. This might be true. At any rate, I think that irrespective of personal circumstances or environment, if you are passionate about an idea, something can come of it.

At the end of my time at Manchester I applied for a Henry Fellowship, which allows students from America to go to either Oxford or Cambridge, and students from British universities to study at Yale or Harvard. I also won a Fulbright scholarship, but the Fulbright would only pay for my travel expenses if I went as a student. The idea back then of being just a student was inconceivable. I had always worked while I studied and I was determined to get a full immigrant visa. That meant I could not accept the Fulbright, so I worked until the last possible moment for that same architectural office in Manchester, and then I flew to the United States on Icelandic Airways, which was the cheapest way to fly.

GA: In some ways it may seem that your time at Yale was the beginning of your career as an architect.

Foster: America was an incredible experience for me in many ways. It was like coming home, because instead of being the odd one out, I suddenly fitted in. School was open from the first day of term to the last, which for me was the greatest luxury. I thought it was fantastic. There were wonderful people at Yale at the time: Paul Rudolph, Serge Chermayeff and Vincent Scully. The grant was very generous, but I was so used to working and studying, and so curious and eager and desperate to see everything, that I worked at a furious pace.

Yale is also where I got to know Richard Rogers, and we became very close friends. Students would work round the clock towards the end of a project, but while everybody else would then collapse and relax, Richard and his wife Su, with another friend Carl Abbot, and I would set off in a car and sometimes travel huge distances to visit buildings. And I saw a great deal. I visited other universities, and met Louis Kahn at Philadelphia. I saw all the Frank Lloyd Wright buildings in the Mid-West. In fact I travelled so much that I spent money at an alarming rate, and had to work even harder to maintain my studies.

GA: Did you and Richard know each other before Yale?

Foster: I first met Richard at a reception for Fulbright scholars before I turned the scholarship down. He had his leg in plaster as a result of a skiing accident. The next time we met was at Yale. We got along very well. We had a kind of shared unspoken language. We even worked on projects together. One was a house for a friend of Richard's, which was very Khan-like. It was really the beginning of our later collaboration in Team 4, which lasted from 1963 until early 1967.

GA: What kind of work did you do while you were a student?

Foster: I worked on urban renewal schemes for a firm in New Haven. I had studied city planning at Manchester in parallel with architecture and had a planning qualification, so I was able to use those skills on real projects for the first time. Then, in 1961, I got my Masters. I left Yale and set off across the States, as did many of my contemporaries. I ended up in San Francisco where I worked on a large-scale university project for UC Santa Cruz with a group of architects.

I worked for one particular practice but we were in contact with other offices so I was exposed to the work of many people. I got to know the architecture of the whole California school. Occasionally I would travel back to New Haven to advise on some of the renewal projects in the office I had worked with before. Throughout this period, of course, Richard and I kept in touch. We exchanged ideas and talked about working together. Eventually, in 1963, I decided to return to England to make that a reality.

GA: Can you tell me more about what it was like to practise architecture at that time?

Foster: Well, Britain is a very strange place, but I think it has changed a great deal since I started studying and practising. For example, it is a far more open society now than it was then. And although Britain is ambivalent in its attitude towards Europe, there is no doubt that a lot of positive influences and pressures have come from a more confident Europe on the other side of the Channel.

There are always pluses and minuses in being influenced in this way. On the plus side Britain provides an extraordinary working environment. It is free of the bureaucracy that you find in some European countries, and it is a very balanced society. Therefore, in terms of maintaining an office, it's fantastic. People here have great skills and there is a great spirit. London at the moment is a very lively, interesting place to be.

The architectural profession is now very open in all kinds of ways that it was not when we formed Team 4. At that time, for example, there were those architects who did university work, those who did new town work, those who did commercial work. There were very different kinds of architects who in most cases specialised. Architecture was a closed shop. There was no way of breaking into it.

I remember the early days of the practice. After Team 4 split up my wife Wendy and I formed Foster Associates. We had so little work that we came very close to leaving Britain. The question was whether or not we would emigrate to North America or Canada. We survived by appealing to a niche where architects had not traditionally been involved, which was industry. In order to do that we had to demonstrate that we could offer three things. Firstly, we demonstrated that by playing the open market we could actually build a good building for less than a builder would produce a bad building. We could use our professional skills to research and shop; we could buy a structure here, a cladding there and since we didn't have a commercial axe to grind, we could justify a fair fee to do it.

Secondly, we proved that we could do all of that very quickly. And thirdly, we were able to bring a dimension to the project that a builder never would. We could speak to industrialists in their own language. A client's needs will change, and we were able to use that fact to our advantage by stressing the importance of flexibility. We said: 'You cannot know what you will need tomorrow; the fastest you can build a new factory is a year, and your requirements could be very different in a year from now, or over the life of the building.' Typically we tried to develop a project without permanently locking in how much space was designated for administration, or production and so on.

Our work was also socially focused. We explored the idea of a democratic workplace, one that would be rooted in the social realities of the present rather than the past. Of course, as architects, we also wanted to bring these things together in a way that would produce memorable architecture. It is no accident that the Reliance Controls building - which, at 120,000 square feet, was built in nine months, for £5 per square foot - won the first Financial Times Award for Industrial Architecture. It hit every button.

Our work for the Norwegian shipping line Fred Olsen, in Millwall Dock, was to take these ideas a stage further. We did a number of projects for Olsen and it was a very interesting company. Its main trade was with the Canary Islands. On the outward journey from Europe its ships would carry a mixed cargo, and they would return with things like bananas. In order to get the maximum use out of their ships, however, Olsen very cleverly combined this trade with cruises and holidays and integrated these two apparently contradictory functions in a complementary way. Interestingly, that was exactly the strategy we advocated for the organisation of their buildings, which is perhaps why they were so receptive to our ideas. The diagram, of course, goes back to my first-year project for the little boathouse. In our Amenity Building for Olsen we placed the workers and the management together in one building, which was unheard of in the docks at that time. We broke all the social barriers.

Our first challenge, however, was to win the client over from the competition which was not easy. We were not up against other architects, but contractors. The building industry was impenetrable, very different from how it is today.

Typically our competitors would come in and make a presentation, and they would talk about how their building would look. Our approach was very different. We would ask questions, listen to what the client wanted and go away. Then we would come back to ask more questions. We made sure we understood the client's objectives both in terms of the functional and the social organisation of the company.

The development period for that first Olsen project was incredibly short, and so we had to challenge conventions in other ways too; for example, we could not possibly have designed and prototyped the glazed curtain-wall that we wanted in the time available. And so I went on a research trip to the States and brought back a sophisticated system, which used brand new products such as heat and light reflective glasses. Nobody had ever taken that initiative before.

When they were completed the Olsen buildings attracted so much attention that we soon found ourselves short-listed for projects for major companies such as Willis Faber & Dumas and IBM. And when potential new clients went to visit our buildings, and talked to the managers and workers, they realised just how penetrating our understanding of the needs of those users had been, and the positive effect it had on the design of the building. If you were to ask Fred Olsen himself what makes us different from other architects, I know he would say that we ask the right questions. I think we have a curiosity, a burning interest in the elements and activities that generate a building.

GA: So this kind of questioning and research is part of your architectural process?

Foster: Yes. If you jump forward ten years to 1979, when we went out to be interviewed for the Hongkong and Shanghai Bank project, the same sort of thing occurred. After our competitors had left, we stayed on in Hong Kong to discover how banking worked there. We wanted to establish what we could put inside a banking hall. It was only after undertaking that research that we came up with the idea of putting the banking hall up in the air so that you have this glass showcase, with a glass underbelly, that creates a public space at ground level.

That space also created a new social focus in the city. Whenever I go to Hong Kong I always take photographs there. At the weekend it is the liveliest picnic spot in the city. Significantly, it also allowed the bank to develop the site at a better than 18:1 plot ratio, which is an extraordinarily efficient use of land. At that time experienced developers in Hong Kong could not achieve better than a 14:1 ratio. We were outsiders but we managed to beat that at our first attempt.

GA: Your early buildings used industrial components partly out of a search for economy. In other words your research into building technology seemed to be related to a cost-effective way of building. But now it appears that your architectural ideas go far beyond what prefabricated parts can give you. We have talked a little about the Hongkong Bank, which to some degree is a prefabricated building; but it is also one of the most expensive buildings of the century. Has the idea of prefabrication in this case become somewhat ironic, since the use of customised parts tended to make the cost the building so much higher?

Foster: Your observations are not entirely accurate. Let me try to explain. The thread that I identified at the beginning runs through the history of the practice and continues today. At Reliance Controls, for example, by using a high degree of prefabrication we were able to raise standards and lower costs. But prefabrication was not - and never has been - a goal in itself. It was simply a means to achieving higher standards for the building and its users in an economical way. The fact is that all of us spend a very large proportion of our time at work; so anything that can help to raise the quality of the workplace is worth investigating. I might add that we were the first architects to introduce into this country the idea that the workplace could have higher standards.

We pioneered the notion that the workplace could be a pleasant environment, that, for example, you could have views to the outside, or have high-grade amenities. At Olsen we did not just provide the basics, such as showers, but also facilities for table tennis, billiards and television; and we put art on the walls. That might not seem radical now, but in the context of the 1960s these were startling new ideas. In the docks at that time, the toilet facilities were disgusting. Workers in industry were treated little better than animals.

In a way, over the years, we have reinvented the workplace, we have reinvented the tall building, and we have reinvented the nature of the airport. If you look at our terminal building at Stansted, you will find that the standard of finishes is astonishingly high compared to what the British Airport Authority had done at Heathrow or Gatwick. Yet, remarkably, it cost only eighty per cent of what BAA had been spending per square foot until that time. Stansted was a revolution. It has become the model for airports the world over, including Stuttgart, Hamburg, Kansai, and Terminal Five at Heathrow.

Airports after Stansted are very different from those that went before. Hitherto, with very few exceptions, most of them had heavy structures, their roof levels clogged by mechanical equipment. They were basically sealed boxes, lit by fluorescent light, with heavy ducts concealed behind suspended ceilings; and they were huge consumers of energy.

Stansted literally turned that idea upside down. We put the infrastructure on the bottom and not on the top. So, just like a modern office building where you have a raised floor containing all the wiring and so on, at Stansted you have a big flexible void beneath the public concourse. We created a space where you can even accommodate a train station. What happens when you turn the diagram upside down like that is that you free up the roof. Of course, it keeps off the rain, but it can also let the sunlight in. In the old model you could not do that.

In addition it allows you to make the entire structure much lighter because all the heavy stuff stays on the ground. The roof can therefore be very light. It can be like a tree. Suddenly you can bring daylight in, you can model the form of the roof in relation to the light so that it reflects up or down, and using the airport can be an uplifting experience.

Now the case in Hong Kong was spectacularly different. But again it was revolutionary in terms of a tall building. For the first time you had a skyscraper with no central services and circulation core. As for the economics of the project, you have to understand that the Bank was built during a very sensitive time in Hong Kong's history. It was politically very important for our client that the building should be created without compromise and that it should meet previously unheard-of performance criteria. To this day there is only one building in the world that offers that degree of flexibility and capability as a headquarters tower, and that is the Hongkong and Shanghai Bank.

In short the Bank set performance goals and we had to meet them. Cost did not come after the fact, it was largely determined by the brief. Another major consideration was the fact that Hong Kong produced nothing in the way of building materials. Everything had to be shipped in. Many components were even flown in. And so it was bound to be expensive. Even so, if you take another office building with a very high specification - the new administrative block opposite the Houses of Parliament here in London - you will find that it is costing considerably more per square foot than the Bank. Other buildings, like Stansted, have used prefabrication to achieve better performance at lower cost, but the circumstances were quite different.

Interestingly, the Bank still regards the building as a very good investment. Since we completed it there have been several changes of senior management, so we now deal with a completely new generation. What is fascinating is that, looking back, they continue to link their consistent financial growth as a bank, and their strong world rating, directly to the success of the building and the way it has been able to adapt to suit their changing needs.

I should also say something about prefabrication. You might imagine an architect looking for a suspended ceiling system, for example, and finding one in a catalogue. You might think that he can just call up and order it off the shelf: wrong. What you do not know is that your ceiling does not yet exist. It is there in the catalogue, but if you want to buy it you have to wait while someone manufactures it. The same is true of furniture. If I want an Ottoman, a Mies van der Rohe design, I cannot go to Vitra and pick it up with a truck. It exists as a series of drawings and they will make it and deliver it. It is a catalogue item but that does not mean that they have it in stock.

Therefore, if you have enough curiosity and interest in the production process, you very soon discover that you can specify your own ceiling, or your own chair and have it made in the same way. The chances are that you will end up with a better product, and the cost will probably not be that different. If you come up with a good design, the likelihood is that your product will appear in someone else's catalogue for another architect to specify in a different context. If you understand that, then you start to realise why, if you go to Jim Stirling's Staatsgalerie in Stuttgart, you will find the studded rubber flooring that we developed for Willis Faber. Or go to shopping malls the world over and you will find escalators where you can see the insides moving. They did not exist before we did Willis Faber, but now they have become part of a universal building vocabulary.

GA: What about the high-tech aspect of your work: could you talk more about that?

Foster: We use technology, but not just for its own sake. It is the same with prefabrication. For instance, although you might be able to demonstrate the benefits of prefabricated concrete in the South of France, you cannot build any more economically with it than you can with in-situ concrete, which is why all our projects in southern France are poured in place. If you go down to Nîmes, to our Carré d'Art, you will find that no concrete beam spans more than six metres. It is very traditional stuff. Local building techniques have determined the outcome of the buildings. The Carré d'Art could not have happened anywhere except Nîmes.

The same is true of other projects. The daylighting concept that forms an essential part of our strategy for the Reichstag was suggested by the uninterrupted skyline of Berlin, where there are few tall buildings on the horizon; the same approach would never work in Frankfurt. The daylighting strategy at Stansted, on the other hand, was a response to a northern climate, and it could never work in Nîmes. Furthermore, the form of the Carré d'Art comes out of the Roman geometry and the cultural roots of Nîmes, in the same way that the shape of Willis Faber, which is amorphous, comes out of the irregular, winding geometry of its medieval market town. They are all very specific to their sites.

That fact is often not appreciated. Instead people prefer to talk about technology. But if you actually look at it and analyse it, I think that you will find that what I am saying is true. In all of these buildings you have a sense of the outside, of the changes in nature and the quality of light; aspects that you cannot quantify. It is very difficult to convey in words the act of design; it involves a lot of value judgements, some of which you can quantify, some of which are really quite emotional, quite visceral. In truth, a powerful part of ourselves finds its way into design, whether we can articulate it or not. It is not just about technology and efficiency.

For example, at Stansted, if sunlight dapples the floor at a particular time of day, it is because a conscious decision was made that sunlight should be an essential ingredient of the interiors, even if it brings with it some solar gain. It is not accidental. It has all been thoroughly modelled and explored. It comes out of a passion for the quality of that space. Ultimately, even if an airport successfully addresses the mechanics of circulation, of security, of baggage movement, but is a hostile place for the passengers who use it, then it is a failure architecturally. Interestingly, a lot of people say that they use Stansted because they enjoy the experience more than going to other airports.

A policeman once said the nicest thing I have heard about Stansted. He was on security duty when the Queen opened the building. He told me that he had guarded buildings all his life, but Stansted was the first place where he had realised that a building could actually be a beautiful place.

GA: When you designed Stansted were you thinking about nineteenth-century train stations?

Foster: Of course there is something in that comparison. In the nineteenth century there was a great sense of theatre involved in travel, a sense of occasion. It started not when you got on the train but within the station itself. Typically in a modern airport, you are not aware of the aircraft until you finally arrive at the end of a tube somewhere and see your plane standing on the Tarmac. In our diagram you can see the aircraft on the airside. On the landside you see the landscaping. This combined transparency is very much about the anticipation and the celebration of travel. It brings some humanity into it.

GA: Stansted is a new type of airport, which reduces the scale of older terminals like those at Heathrow. Perhaps the smaller scale allows your ideas to be made more clearly. If you think about Kansai airport, the scale detracts from what might have been a similar idea. I think the scale really changes the perception of the space inside.

Foster: That is a very interesting point. Stansted follows a masterplan where that front-to-back dimension is part of a building zone. You have the landside with cars and coaches, and you have the airside with terminals. If it grows, it will grow linearly. So you always have a human-scale relationship between the airside and the landside.

I agree that the scale of things really changes the effectiveness of this approach. If the building expands you reach a point where the horizontal dimension is stretched so far that its depth does not allow this kind of visual connection. Our terminal at Hong Kong is much larger than Stansted. The solution there was to elongate the plan, keeping the cross-section relatively shallow. That creates more frontage, which in turn allows continuous views out and helps to lead you in the right direction. You always have this sense of orientation and relationship to the outside. The depth is never too great.

GA: What about the vertical scale?

Foster: There are several factors to be considered - the overall sense of scale, the height of the space, the ways in which the structure can give it an order and an orientation. Sometimes when we have had the choice of adopting a completely clear span, or having columns going up through the building, we have followed the latter course. The feel of the space is better - more coherent - when you see the columns coming through, although structurally it would have been possible not to use them. They give a sense of order and clarity and drama to the space.

GA: How did you determine the size and order of the structure in your buildings?

Foster: Of course today there are all sorts of restrictions that will influence a design. We have to consider structural efficiency. Or perhaps we have to allow for a car park below, which imposes its own discipline. For instance, our studio in London forms part of a mixed-use building which contains apartments above, and car parking below. Somewhere in between the two it had to work for offices - and in the end it has to feel right and you have to feel comfortable with it.

Let me give you another example. Recently we won the commission to renew the Free University of Berlin, a building originally designed in the 1960s. It is clad in metal panels based on the proportional system of Le Corbusier's Modulor. The only building that Le Corbusier himself did in metal panels that comes to mind, is the little Heidi Weber Pavilion in Zurich which I think is a magical building. The sense of proportion, colour, gridding, and modularity is fantastic. The Free University uses the same Modulor system, but in comparison, the proportion of the facades and the way in which they come together does not have the same visual elegance.

There is no system that will automatically give you something that looks or feels right. When Le Corbusier used the Modulor it was obviously of great help to him. But I suspect that this was not the case for everything he did as an artist. Ronchamp, for example could not embrace the Modulor. There is not a vertical line or a horizontal plane in it, and yet it has a wonderful quality of space and proportion. And just as some of Le Corbusier's buildings are better than others, any architect has buildings that are more or less successful. I think it is as much about an intuitive eye as any mathematical formula.

GA: That is very interesting. When I visited the Carré d'Art for the first time, and maybe my reading is influenced by the little Roman temple opposite - the Maison Carrée - the building seemed to me to be extremely classical, even though you have used a lot of metal and glass. Your buildings have a highly developed sense of proportion. I sense that you are as much a classical architect as a high-tech architect. You use technology as a tool but your designs are not governed by it.

Foster: I am happy to hear you say that. It is an observation that has been made before, and I think that it is quite astute. In fact, after the building was completed, one of the project architects did a drawing to compare its proportions with those of the Maison Carrée. It was a playful exercise but it revealed a very close proportional relationship. Later somebody saw those drawings and thought that we had worked out a proportional system based on the Maison Carrée but that was not the case. We designed our building in a way we thought appropriate to its relationship with its context, both in terms of its dialogue with the Maison Carrée and in its own right.

GA: At Stansted the siting strategy had a lot to do with the natural landscape. At Nîmes you found yourself in an entirely urban setting. What was your focus there?

Foster: Nîmes is very different. In addition to the Maison Carrée, which is really the historic focus, the social focal points were the Roman arena and the nineteenth-century water gardens. The building, with its entrance on the corner, grew out of an attitude to the urban grain of the Roman origins of the town. That also allowed the possibility of walking through the building to a smaller portico at the back where there is a shortcut to the water gardens. The urban grain of the city indicated where the entrance would be. It also helped us in reforming the streets around the building while respecting the specific environment of the Maison Carrée.

In overall terms, we tried to create an urban experience where you would move through almost tunnel-like shaded avenues of trees and explode out into this bright sunlit square. The before and after photographs are very dramatic. Before the Carré d'Art was built this area was very run down. There were no cafes and the Maison Carrée was circled with nineteenth-century iron railings. Our strategy was a deliberate attempt to peel away some of these layers of history in order to reveal others which were more meaningful. We reintroduced Roman paving for example, instead of retaining the nineteenth-century paving. We also took away the parked cars to give the area back to pedestrians.

GA: Your siting and landscape strategy for the Cambridge Law Faculty building seems in tune with certain attitudes at Nîmes and Stansted. Would you agree?

Foster: Yes. In fact, I could talk about Cambridge in the context of Stansted. If you look at the East Anglian countryside where Stansted sits, it is essentially flat and wooded. The airfield slopes down, so one important design consideration was to exploit the slope, especially in terms of access, both for passengers arriving at the concourse level, and cargo-handling below, and then access to the aircraft beyond. It is a very rational diagram, but it also grows out of how you sensitively site a large terminal building in the countryside. In that case, the critical thing was to keep the roof below the tree line.

When we came to the design of the Law Faculty we had to ask ourselves; what is the essence of Cambridge? One of the things that makes it special is its trees and gardens. If you look at a photograph of Cambridge you might get the occasional spire and various buildings on the skyline, but essentially it is a low, green garden environment. So our starting point was to preserve the principal trees on the site and the quality of the garden. It is very much about getting a large and complex programme on a site in a very discreet way, which is exactly the challenge we faced in Nîmes.

In Nîmes we placed a large proportion of the building's accommodation underground, in order to respect the historic roofline. Similarly in Cambridge, we sought to reduce the visual impact of the building by a combination of methods. Firstly we dug deep into the site, and then we developed an inclined, curving glass wall system that tends to make the facades recede, so that the building appears very much smaller in this context than it actually is. Our approach came directly from a sensitivity to the site. I think that a sensitivity to, and understanding of, the culture of a place, or the culture of an organisation - whether you are building a museum, a company headquarters, a governmental institution or a high-rise tower - is a crucial part of the architect's role.

GA: You mentioned high-rise towers. This question of sensitivity to site, and particularly the environment, is highly appropriate in that regard. We have talked about the Hongkong Bank, but you employed a different strategy for the Frankfurt Commerzbank project. Can you talk a little about that?

Foster: The Commerzbank really stems from a desire to reconcile work and nature within the compass of one office building. The design of Willis Faber, with its turfed roof garden, for example, was an early attempt at bringing the 'park' into the office. At the Hongkong Bank we proposed 'gardens in the sky' which unfortunately failed to materialise. The Frankfurt tower was an opportunity to design a building that was symbolically and functionally 'green', and responsive to its city-centre location.

It is the world's first ecological high-rise tower. It is also the tallest tower in Europe at the moment, not that I think that's so significant. What is important is the way in which we developed a strategy that allows us to place such a tall building in the city and to break down its scale. It rises from the centre of a large traditional city block alongside the existing Commerzbank building. By rebuilding and restoring the scale of the perimeter buildings we were able to preserve the scale of the neighbourhood at street level.

The tower's plan form is triangular, made up from three 'petals' and a central stem. The petals are the office floors. The stem is a central atrium, which provides a ventilation chimney up the building for the inward-looking offices. That led us to a solution where we were able to pull the cores to the corners, creating green atria, which in turn opened up the possibility of breaking the form of the building on the skyline. The interesting thing about the structural diagram is that it allows you to pull out segments and to develop a kind of 'helix' of open gardens rising up the building. Internally it helps to break down the scale of what is in fact a very large institution. It also allows you always to relate to a window and fresh air, and to have a view of a garden wherever you are in the building.

GA: Developing such a project obviously places great demands on your engineers, for example. How does that relationship work?

Foster: Well we don't have engineers in house. We work with a variety of independent consultants. The same is true across a number of related specialisms. We tend to work very closely with a broad cross-section of talented individuals and we have developed very creative working relationships with them. I like to think that we understand a great deal about many aspects of building, even though we might not practice as structural engineers or in other disciplines.

I believe also that the best architecture comes from a synthesis of all of the elements that separately comprise a building: the structure that holds it up; the services that allow it to work; the ecology of the building - whether it is naturally ventilated, whether you can open a window, the quality of natural light; the materials used, their mass or their lightness; the character of the spaces; the symbolism of the form; the relationship of the building to the skyline or the streetscape; and the way in which the building signals its presence in the city or the countryside. I think that holds true whether you are creating a landmark or deferring to a historic setting. Successful architecture addresses all these things, and many more.

Norman Foster

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