The Tate Gallery Lecture

This is an edited transcript of a lecture given at the Tate Gallery on 20 February 1991.

I want to talk about my work as an architect and a planner, and the work of the hundred-strong, multi-disciplinary team to which I belong. I shall address the issue of the European Community and the coming of the single European market, but I want to try to do so by way of our own experience, gained through working on projects here and on the Continent.

I would like to begin by describing two projects in Britain. One is a building, the recently completed passenger terminal at Stansted Airport; the other is the ongoing planning project for a new rail transport interchange and redevelopment at King's Cross. In their way, both these projects have a European dimension, but what they really have in common is the fact that they are dominated by the same issues. Each one has a history. Each one required a return to first principles. And each one forms part of a continuing search for more environmentally sensitive ways to build in the future.

To take history first. Surprisingly, the design of the new terminal at Stansted was strongly influenced by it, even though the history of air transport is short. Only 50 years ago, for example, Heathrow Airport was a military airfield surrounded by open countryside. In the next decade it expanded its passenger operations and became London's principal airport, with the more distant Gatwick playing a supporting role. Yet even then, as early as 1953, when a transatlantic flight from Heathrow in a piston-engined Lockheed Constellation was an ordeal lasting seventeen to twenty hours the need for a third London airport had already been identified and Stansted had been proposed as the site for it.

It is here that a European comparison first comes to mind. In France, Paris Charles de Gaulle — the third Paris airport — was not proposed until 1965, more than a decade after Stansted, and yet it began operations in 1974 after a delay of only nine years. Stansted will finally begin operations next month after a delay of nearly 40 years — a delay compounded by three public enquiries, three reports and one false start at another site, Foulness.

The history of air travel is very short. The first heavier than air flight took place in 1903 and the basic principles of the airport were established soon after. An aerial photograph of Candlas Field, Atlanta, taken in 1925, shows a large area of grass where the aircraft landed and took off; a dirt road used by arriving and departing vehicles; and a shed between the two. There were no 'orientation problems'. The simplicity of the Atlanta layout makes an interesting comparison with contemporary Heathrow, which looks more like a new town or shopping centre. It is not a place where orientation is obvious. Instead, visitors depend on announcements and a graphic sign language to help them move around. You almost need a guide dog.

One of the questions that we asked ourselves at the beginning of the design process was: notwithstanding the complexity of any modern international airport, how far we could get back to the simple logic of that early arrangement? That question informed the shape of our response.

Two images are of interest here. The first shows a photomontage of our proposed terminal at a very early stage to demonstrate its environmental impact; the second shows the actual building under construction from the same viewpoint. The tree planting programme at Stansted has been enormous, but the principal means of diminishing its visual impact was not tree planting but earth movement, a technique which permitted what is actually a two-storey building to appear as a single-storey building from outside.

The model we presented to the board of the British Airports Authority in 1982 and the principle it established held good. You approach the terminal walking towards the aircraft, which you can see, while your baggage is processed through the lower level. One advantage of the simplicity of this arrangement was the way in which direct rail access from Liverpool Street Station could be integrated into the building after construction had started, by using the subterranean floor. Over time, as the design progressed, the flat roof started to undulate and it is now supported by a tree-like formation of columns, but it is still very close in spirit to the original idea. There is an airfield, a big shed, and an access road with car and coach parking in front of it.

The roof at Stansted is unique in its transparency as well as its single level. Its design is dedicated to natural light, with a proportion of the surface glazed to let sunlight in, and 'daylight reflectors' inside that bounce the light back up on to the sculptural shape of the ceiling. At night, artificial light achieves the same effect. This arrangement is quite different to more conventional airport terminals of recent years, such as Terminal Four at Heathrow, where the ductwork, suspended ceilings, roof-mounted air-conditioning units and fluorescent lighting involve a lot of structural and servicing redundancy and a great absence of natural light.

There is an interesting parallel here with the evolution of passenger aircraft. All the heavy servicing equipment mounted on the roofs of conventional airport buildings is actually in the wrong place for easy access. It has to be repaired and replaced frequently, yet the airport itself can never be closed down to facilitate this. In the same way, the engines of the first jet airliner, the de Havilland Comet, were buried inaccessibly in its wing roots. At Stansted we have located all the heavy equipment on the ground where it can be most easily handled — just as the engines of the Boeing 747 are slung under its wings to provide easy access for maintenance and removal. So the unobstructed roof at Stansted is not only about the poetry of natural light, it is also about logistical efficiency.

If Stansted is about space, light and calm in an airport context, I think it achieves these goals in the same way as did the great transport structures of the railway age. The clear spans at Stansted are 36 metres; at Lewis Cubitt's King's Cross station, built in 1852, they were 32 metres. Sixteen years later William Barlow's great train shed at St Pancras spanned 74 metres, the largest single-span structure in the world at that time.

This comparison brings me to the second major project, the proposed redevelopment of King's Cross. The site is a 134-acre stretch of railway land, created by the commercial rivalry between two railway companies in the nineteenth century and running north from their two stations. Our planning proposal for the same area, has been generated in its turn, if you like, by the railway renaissance that will come with the completion of the Channel Tunnel. Our project shows commercial development and a park as the central feature, but the driving force of the project is the new international rail terminal itself. An immense task separates these two images. As architects and planners we are only one of 100 consultancies working on this project, and the programme allows three-and-a-half years of design work before construction even begins.

It is easy to put up a sign saying: ‘It could be the only home they ever own’. It is even easier to say: ‘Let's build in the Green Belt because it's easier there than in the inner city’. But that is not the answer to the problem. There are vast areas of derelict land in inner London, and King's Cross is typical of them in terms of the difficulties it presents. Our masterplan attempts to tackle the issues of inner-city development without taking any of the easy options. It is an immense challenge. How did we approach it?

We began at King's Cross, as we began at Stansted, with a search for the roots of the development. We considered the history of the site, its heritage buildings, the listed gas holders and the intractable canal and railway infrastructure. Then we considered the urban grain of the surrounding areas. London has its own urban tissue, quite distinct from that of other cities, whether Barcelona, Amsterdam, Washington, Paris or New York. London is permeated with green areas. A ride in a double-decker bus will show you: Islington Green, Hampstead Heath, St James's Park, Primrose Hill, Shepherd's Bush — they are all green spaces: large, small, varied, different.

Then if you look at the original King's Cross site, with its canal winding across, and peel away the layers of subsequent railway development, you begin to see how you might bring back some of those freshwater basins in their original form; adapt them for leisure, or use them as a focus for housing. Then the housing could be integrated with offices and slowly a strategy emerges that might knit all these elements together to create a unified community around a 34-acre park, a new addition to London’s historic green spaces and probably the first of such a size to be created in over 100 years.

The focus of the King's Cross development is the rail terminal at its southern tip. In one sense it is the heart of the whole enterprise; in another, it is an entirely separate exercise with a different client — British Rail. The form of the terminal we have proposed was generated by the geometry of the two great nineteenth-century rail termini on the site. It sits between them without touching either — respecting them as historic buildings in their own right. At the same time it opens up new vistas of both these buildings that have, for generations, been blocked by a kind of urban vandalism, typically the temporary structures that still obscure the principal facade of King's Cross.

There is, however, another reason for the transparency of the terminal. It reflects the fact that, like the two great nineteenth-century termini, it too is an iceberg, concealing an even larger complex of infrastructure beneath the ground. What happens beneath King's Cross is a virtual spaghetti junction — far more complex, in fact, and without reliable records of any kind. The first underground surveys are actually taking place at this moment.

It is interesting to digress for a moment on the subject of infrastructure. If you compare the percentage of gross domestic product invested in roads and railways in different European countries between 1982 and 1985 you find that Britain trails miserably behind at less than half of one per cent. The average is about three-quarters of one per cent, and the best performance is West Germany, at over one per cent. A direct comparison between investment in rail infrastructure in Britain and France between 1975 and 1989 tells the same story.

I think it is instructive that, in general, Continental European countries do not look at roads and railways in isolation; they take an overview of all means of transport and think in terms of integrated policies. We, for example, have just over 1850 miles of motorway and plan a small increase that will take us to just over 2000 miles by the turn of the century. France already has 2900 miles of motorway and plans to have 14,000 miles by the year 2000. People object that such comparisons are unfair because of the difference in population, land area and so on. But even allowing for such factors, there is an enormous disparity.

Investing in infrastructure is rather like designing a building: you cannot do it without a client organisation to tell you what they need. Similarly, I do not believe you can design transport infrastructure without a political infrastructure to play the same supporting role. And this has nothing to do with the political leanings Left or Right. If you analyse investment in London's Underground system, for example, it has fluctuated quite independently of the political party in power.

The situation is quite different across the Channel. I will concentrate on France, but I could just as easily compare Britain with Spain, or a Scandinavian country. In France, the political infrastructure, so to speak, starts with the President of the Republic, who involves himself actively with architecture and planning at the level of the *grands projets*. Nor is this merely a nominal involvement, as I know from my own experience as a competition assessor. The president awards the commissions for the design of official buildings through a very well developed competition system dedicated to the achievement of high quality. This pursuit of quality permeates French society. It reaches back through the French system of architectural education so that talented young designers are invited to compete for small-scale projects in local government competitions. In this way young talent is exercised and developed, and it is focused upon architecture centres, such as the Centre Arsenal, one of three such centres in Paris.

There are other architecture centres in France, and throughout western Europe, although Britain thus far has none. The Centre Arsenal was opened in 1988 by the mayor of Paris, Jacques Chirac. Its construction was paid for by commercial developers and the City of Paris, and the city pays the wages of its employees and meets its running costs. In its first year this architecture centre attracted 60,000 visitors to fifteen major exhibitions displaying the work of 570 architects. One of its most popular features is a large model of Paris where any major development project can be displayed and discussed, a process that reflects the intensely democratic nature of the whole process of patronage in France.

My personal insights into architecture in Europe are inevitably confined to those areas where we are currently active. In a number of these places, such as Nîmes and Cannes in France, we are responsible for masterplans as well as buildings, but in all cases the main difference with the way things are done in England is that we are responsible to a single person in authority, frequently the mayor of the municipality. In Continental Europe a mayor is not a figurehead with no real power, as is the case here, but an active politician who can get things done. I would like to give an example of what this means in the case of Barcelona, where we have designed a new communications tower.

Barcelona lies at the foot of a range of mountains, which forms a backdrop to its whole urban development. In order to meet the enormous communications requirements of the 1992 Olympic Games, the expansion of local television and the Spanish telephone service, plans were being made for the erection of something like 30 individual transmission masts on the mountains, with all the problems of electronic shadowing that such aerial 'farms' can lead to. It was the mayor of Barcelona who resolved the problem. He said: 'This competitive approach won't work. You must form one company and together we will build one great communications tower. It will also be a public building, open to the citizens of Barcelona. And because this will be such a large project we will throw it open to international competition'.

Now it is impossible to describe the potential for conflict when rival companies are ordered to co-operate in this way. The first thing they did was to try to sabotage the umbrella company by demonstrating that it could not work. There were resignations — I think there were 40 or so changes in the composition of the board in the first year — but the mayor would not be dissuaded. Somehow, he drove this great project through. It would not have happened without his drive and determination.

The outcome of the mayor's vision was the competition to design a single tower, which we won. We won it with a design that, like our work at Stansted and King's Cross, started with a historical survey. We looked at the evolution of communications structures over time and discovered that they had almost always been modifications or additions to structures built for some other purpose.

Our own approach to the design broke new ground. We proposed a mast that was also a symbol of a new age in that it broke conclusively with the adapted structures of the past. Instead of cantilevering from a base with a diameter of 25 metres, our structure rested upon a central needle 2.4 metres in diameter. The fact that the tower was sited in a national park meant that this tiny footprint was a great advantage. The tensile guys supporting this needle were anchored some distance away and the whole structure was conceptually no more complex than a suspension bridge, like the motorway bridge proposal for Rennes in France. Interestingly though, in the Barcelona mast design, the tensile supports began as steel but then became Kevlar, a product which is electronically transparent and so does not interfere with signal transmission or reception.

Another unorthodoxy is the way the various decks for satellite and microwave communications, and the public viewing gallery, are confined to a glass tube in the central section. This gives the Barcelona tower a unique appearance. It is, in effect, a piece of public sculpture as well as a complex of technical equipment, but that does not mean that it sacrificed any element of practicality. The British Telecom tower in London took eight years to move from conception to completion. The Eiffel Tower, that miracle of nineteenth-century fast-track construction, was conceived and erected in four years. The Barcelona tower was conceived and authorised in one year, and built in the following two, a performance that I attribute in large measure to the tenacity and forward vision of the mayor, and to a structural concept which allowed the tower to erect itself, in much the same way that a car aerial does.

Another field we have been involved in recently, in Europe, concerns urban redevelopment. The city of Duisberg, in Germany, has about 26 per cent unemployment at the moment as a result of the withdrawal of heavy industry from the Ruhr valley. Krupp, Mannesmann and Thyssen have all left, leaving an industrial void and a community in decline. We have been working for a developer and local community groups to explore ways to encourage new micro-electronic industries to relocate in the area. The site is presently an industrial wasteland, part of which is used as a bus park.

Our proposal in this case hinged on the way in which modern non-polluting electronic industries can be combined with residential development without any harmful effects. Thus we proposed linking an existing small park on the site with a business development, housing and a new area of parkland. In this project there is a historical element, as in the other schemes that I have talked about, because we discovered that such mixed-use urban areas were the norm in Germany and elsewhere until the intervention of heavy industry with its concomitant transportation problems, which led to the era of separate zoning. We thought if we could knit together something like the old, pre-industrial zoning relationships, where working and living share the same environment, there would be some very exciting possibilities.

Apart from the mixed-use zoning principle, there were three small but important buildings at the heart of our proposal: a Telematic Centre, a Business Promotion Centre and a new Micro-Technology Centre. The Telematic Centre, is the 'brain' of the whole development: it houses all the building management systems, but is also a major public concourse, so it is the focus of interaction between the new industries and the community. The Business Promotion Centre contains exhibition space, a bank on the ground floor, and offices for research institutions and the local authority to use.

Although these buildings could be described as symbols of a new urban fabric, they also reflect a good deal of environmental thinking. The Business Promotion Centre uses a new material with an extremely high U-value patented by the developer, who specialises in low-energy products. Combined with an extensive use of glass and computer-controlled blinds, it gives an excitingly translucent quality to the building but, more than that, because of its excellent insulative properties, it also offers the prospect of a building that can be heated by ambient energy alone.

From northern Germany we move to Nîmes in the south of France, where we won an international competition several years ago to design a public arts and media centre, the Carré d'Art, for a site adjacent to the Maison Carrée – one of the best preserved Roman temples. Our response was, inevitably, historical again. We uncovered and analysed the ancient Roman planning grid, and respected the surprisingly uniform height and massing of the later buildings that surround the temple. To reassert the original street pattern we designed a very simple rectangular building for the site.

This project has been a long time in gestation, but the time has not been wasted. Since that first project, the city of Nîmes has uncovered a great deal more of its Roman past. In the area surrounding the building, a lot of nineteenth-century additions have been removed to expose Roman paving, and the streets have been pedestrianised. Like the mayor of Barcelona and so many other enterprising mayors across Europe, Mayor Bousquet of Nîmes is a tremendous force for development and investment in the city. When the arts and media centre project finally received government funding, Mayor Bousquet printed hundreds of posters celebrating the courage and determination of the city in pressing for the building. It shows, I think, the spirit that animates the city.

Nîmes is also advanced in its understanding of the needs of modern transport planning, and we have been able to help here too. An existing motorway curves around the south of the city but this is due to be replaced by a new motorway following a better route, as well as a new high-speed rail service, the TGV — a reflection perhaps of what I said earlier about French infrastructure investment and its enviable reputation for speed of implementation. Our role in the planning of the new infrastructure at Nîmes has been to study an 8-kilometre stretch of land along the new railway line and explore the possibility of new public parks and lakes, residential areas, as well as a new transport interchange and an enlargement of the airport.

Coincidentally, just as our arts and media centre at Nîmes is now nearing completion, so is our much smaller addition to the Royal Academy here in London. Both these projects began with the challenge posed by an existing historical building, in the case of the Royal Academy, Burlington House itself, together with its nineteenth-century additions. Now an art gallery may not be as complex a building as an airport, but it imposes the same discipline of being required to remain open while building works take place, and thus in some ways it poses similar problems.

Our task was to provide new galleries on the top floor, using the light well between the two existing buildings of the Academy both as a means of access and to provide extra accommodation. What was exciting here was the possibility of working within this light well — a space that would never normally be seen by visitors — and not only using it functionally but, in the process, exposing the garden façade of Burlington House for the first time in more than a century.

The original windows of this façade still open on to the light well, while the lift and staircase that we have installed permit ease of movement between all levels in a way that does not detract from the function of the grand staircase of the Academy itself. The new Sackler Galleries were designed to provide every advanced technology climate control and lighting modulation features, but within the context of a traditional gallery shape appropriate to the age and status of the main building.

Environmental controls are increasingly important in all buildings, not only art galleries. We trace our interest in the subject back to the formation of the practice, and what we call our oldest thatched roof. It is the grassed roof of the Willis Faber & Dumas building in Ipswich, which is 7000 square metres in area yet acts as a kind of insulation quilt in much the same way as a traditional thatched roof.

This kind of approach can be seen at our new extension to the Sainsbury Centre for the Visual Arts at the University of East Anglia. The new Crescent Wing is effectively an underground building, and for this reason it achieves a rate of heat loss only about one third that of a conventional above ground structure. By exploiting the slope of the land away from the original building towards the lake, it has been possible to gain an extraordinary lightness inside the building. The crescent of glass provides an uninterrupted view without itself constituting a visual obstruction, rather like the eighteenth-century device of the ha-ha wall.

The internal spaces of this underground building will constitute an art conservation laboratory, entirely privately financed. Museology and lighting researchers will be able to examine objects under infinitely varied lighting conditions using special installations that do not exist anywhere else in the country. I am sure that nowhere on the Continent would such a project have to be privately funded if there was no equivalent national facility.

The subject of comparative Continental and British methods and achievements is fascinating and a whole talk could be devoted to it. There are some interesting comparisons. For example, The National Gallery extension was first projected more than 40 years ago. The British Library, the Mappin & Webb site and the National Theatre, those too are all 40 to 50-year projects. In France they would all have been accomplished in five or six years, and that would have included a competition phase — often an international competition — which we tend to omit over here.

Even if we ignore buildings and concentrate on infrastructure alone, we discover that in Britain the average time needed for the passage of an Act of Parliament to build a railway line or a bridge is five years. Five years from now, in Spain, having won an international competition for a new Underground system in Bilbao, we will almost certainly be riding on the trains.

But just as disturbing as these international comparisons, are comparisons over time in our own country. It is instructive to apply the same sort of analysis to nineteenth- and twentieth-century projects in Britain. In a most shameful way, the nineteenth century emerges as far more capable age than our own. For example, our motorway network, which was late starting by Continental and United States' standards, only extends to 1850 miles after more than 30 years of desultory construction. Yet the Victorian railway system covered the 10,700 miles of the present Intercity network only twenty years after the introduction of the first fare-paying passenger train service in 1829. Today, in Europe, they are introducing the TGV network at a similar rate.

The currently much-discussed East London River Crossing, a totally non-contentious scheme, was first projected 45 years ago and still no bridge has been built. Even the London Crossrail route, which we are assured has the highest Government priority, will — if it proceeds according to plan — take as long to drive a seven-mile railway tunnel under London
as it took the United States to develop an entirely new technology to place men on the moon. And coming back to that five-year lag for an enabling Act of Parliament: it was not always like that in Britain. In 1840, at the height of the Victorian railway boom, Acts of Parliament for new lines were being passed at the rate of one every 1.2 days. Over the whole of the first 20 years of railway construction in Britain, an Act was passed, on average, every eight days. We, in this country, have a great deal to learn from our own past.

I will finish with an object that has a certain abstract relationship to the theme of my talk this evening: the Vulcan bomber. It is a transitional object — a jet aircraft that marked a quantum leap from the era of its propeller-driven predecessors, but also one that marked a less well-known transition from one system of navigation to another.

Prior to the jet age there was no difference between navigating aircraft or navigating ships, because aircraft were slow enough not to press the navigator to work faster than his methodology allowed. But when the speed of aircraft doubled and trebled, the old navigational system could no longer cope. By the time the navigator had worked out where he was, he was somewhere else. It is a fate that reminds me of today's planning enquiries, legal procedures that go on so long that those taking part forget what the original issues were because the circumstances have changed and a totally different set of issues has to be faced. So things move on.

Norman Foster
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