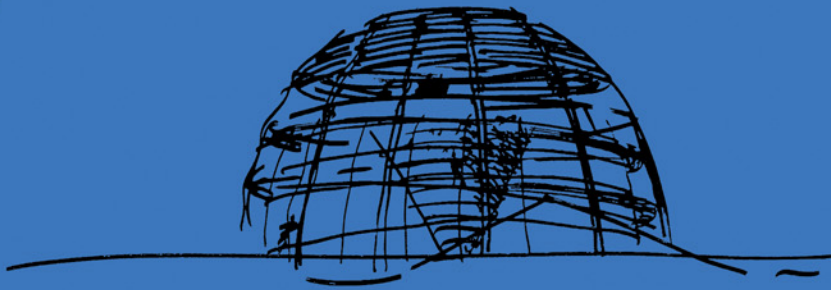


# The Norman Foster Studio

Consistency  
through  
diversity



Malcolm  
Quantrill

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# The Norman Foster Studio: consistency through diversity



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consistency through diversity

*Malcolm Quantrill*

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# Preface

Shortly after my arrival in Tokyo in April 1991, Toshio Nakamura, editor of the Japanese journal *Architecture and Urbanism*, telephoned and invited me for lunch “to meet some other architects”. Both were from Foster Associates: Chris Seddon (one of the Foster directors) and a Swiss colleague, Hans Brouwer. The next day, I went on site with Chris Seddon for a tour of Foster’s Century Tower, which was close to completion. I had first become acquainted with the work of Foster Associates in the late 1970s through the Willis Faber & Dumas building and the Sainsbury Centre for the Visual Arts—both in my native East Anglia—but it was in Tokyo during May 1991 that I really came under the spell of Foster’s architecture when I visited Century Tower.

As a result of a subsequent visit to Tokyo in September 1991, my article “Century symbol” appeared in *The Architectural Review*, and I met Sir Norman Foster for the first time. In July 1992 I received his permission to prepare this monograph, and early in 1993 I began working in the Foster archives. Throughout the entire process of dialogues, correspondence, selecting pertinent projects, reviewing possible illustrations, and the gathering of material for the writing of this book, I have had the invaluable collaboration of Norman himself, as well as that of his partners Spencer de Grey, David Nelson, Graham Phillips and Ken Shuttleworth.

From the outset, I believed it was essential to include a personal portrait of Norman Foster, not simply as an extended review of his career decade by decade, but as an insight into his extraordinary talents and accomplishments. I persuaded Norman of the value of such a contribution, which could be shaped only if he agreed to share his early recollections with me. The result of this sharing, through his notes and our discussions, appears here as Chapter 1, “The emergence of an architect”.

My narrative based on Norman’s memories extends only to the early days of Team 4 Architects and the design of Reliance Controls (1965), executed in the original Hampstead practice. Four of his present partners have been with him for over 20 years, and Chapter 2, “The body of practice”, is based upon discussions with all five, focusing mainly on the past two decades. “The body of practice” fixes upon realities recalled by the individual partners: these vary from describing transformations in the practice structure in the case of Graham Phillips, to observations about design strategies by Norman, Spencer de Grey and David Nelson. My intention was to reveal within this chapter the anatomy of the Foster practice, but this exposure of skeleton and nerve has no direct relation with chronology. Chapter 2 is not a “linear progression” but rather, in the Lichtenbergian sense, “a doctrine of scattered occasions”.

There are three further chapters. Chapter 4 is a review of the most recent *Fosterwerk*, while Chapter 3 attempts to place it within a different theoretical context from that of critics who wish to confine it to the “high-tech” pigeon-hole. My original intention was to place this theoretical chapter at the end, as a coda, but Norman and his partners have persuaded me that it belongs “up front”. I believe this change, together with the other

additions and reorderings that took place during our discussions of 1994–95, makes for a more balanced structure.

In Chapter 3, “Construct, context and subtext”, therefore, I have aimed to place *Fosterwerk* properly within the total span of modern design and its preparatory exercises—that is, from Brunelleschi and Alberti in *quattrocento* Italy, right through French rationalism and late nineteenth-century masters like Eiffel and Dutert, to the twentieth-century models of Mart Stam and Mies van der Rohe—all of them linked by Alberti’s concept of structure and lineaments to the source of *Fosterwerk*. Chapter 3 goes on to review Foster’s first truly significant building, Willis Faber & Dumas, and continues through the Sainsbury Centre, the BBC Radio Headquarters, the King’s Cross master plan, the Hongkong and Shanghai Bank, Stansted Airport, and Century Tower in Tokyo to the Carré d’Art at Nîmes. In reviewing them I have attempted to explore the complexity of their subtext or undertow, the continuity of hidden concerns, or what Norman has dubbed “consistency through diversity”.

My objective throughout, from Norman’s revelations about his early life to the design watershed provided by the Hongkong and Shanghai Bank and developments beyond at Nîmes and Barcelona, has been to discover the man or “the team” responsible for evolving a project’s design philosophy and expression. Chapter 4, although not a dialogue with the partners as such, represents my discussions with them about more recent work, including: a house in Japan; a house in Corsica; the Lycée Albert Camus at Fréjus, France; the Torre de Collserola, Barcelona; the Commerzbank Headquarters, Frankfurt; the Business Promotion and Telematic Centres at Duisburg; and the new German parliament in the Reichstag, Berlin. Because my largely theoretical Chapter 3 concentrates on the first two decades of the canon (the Carré d’Art at Nîmes, for example, dates from 1984, although the building was not completed until 1993), Chapter 4 is intended to provide a balance, by reference to more up-to-date work.

Finally, when this study was virtually complete, Norman invited me to London in March 1997 for a final dialogue with him, which appears here as Chapter 5, “Prospect”. I am grateful to him for making this coda possible. In this way, the “Emergence of an architect” is complemented by the architect’s last word in mature response.

Malcolm Quantrill

Distinguished Professor of Architecture

Texas A&M University, USA

January 1998

# Acknowledgements

My greatest debt here remains that to my dear parents who, by overcoming substantial obstacles and difficulties, made it possible for me to study architecture. Their many sacrifices for this purpose have allowed me to experience moments of true happiness and fulfilment in my professional life, notwithstanding architecture's intrinsic uncertainty of patronage and prospect. I must next thank Norman Foster who, by sharing with me the trials and uncertainties at the commencement of his career, brought back parallel memories of my own early days as articulated pupil and student. He devoted many hours to talking with me and to writing about his apprenticeship and the evolution of the practice in more recent years.

Norman Foster's partners—Spencer de Grey, David Nelson, Graham Phillips and Ken Shuttleworth—all gave unstintingly of their time and counsel. My former student, Graham Phillips, was my host in Hong Kong, and my visit there in 1994 provided an opportunity to close the gap of almost a quarter-century when we were last together at the Liverpool School of Architecture in the early 1970s. Spencer de Grey became both a valuable ally and my sternest critic during this study, demonstrating with his combination of boyish enthusiasm and seeming unflappability in crises the reason he is the key player in the line-up of Norman Foster with the rest of the practice teams.

It would not have been possible to sift through substantial amounts of the Foster archives without the vibrant assistance of the practice archivist for the past fifteen years, Katy Harris. Sir Norman's personal assistant, Jane Denholm, was always sensitive to the delicate balance between the daily life of the practice and my research. Without Jane's cool coordination of our international itineraries this undertaking would have been more prolonged and difficult. In her diplomatic matching of our diaries, setting up essential dialogues, and gathering of information, Jane was ably supported by the partnership's secretaries, Lucy Highton and Sally Partington.

The Foster practice could not survive its 24-hour/365-day year without its *café*. For all those 'late lunches' saved for me, and the countless *cappuccini*, I want to thank the kitchen staff, who almost every day enquired: "How's it going?" and "When can we see it?"

The late Gordon Graham, a Past President of the Royal Institute of British Architects, kindly shared with me aspects of his involvement in setting up the Hongkong and Shanghai Bank project and his subsequent participation in the Foster practice, and I am grateful for this courtesy.

When this project was barely conceived it was enthusiastically grasped by my editor at E & FN Spon, Caroline Mallinder, and she has watched over it like a 'mother hawk' ever since, smoothing the way with her colleagues and ensuring that the transatlantic bridge between London and Texas was always kept open.

The international travel involved in this project was facilitated in part by my Professorial Bursary from Texas A&M University; and I am also grateful to my

department head, Julius Gribou, for arranging additional leave during the summer of 1994 when I was involved in an extended period of research at the Foster studio and in Hong Kong, Fréjus and Nîmes.

My son, Christopher, took some of the photographs of Sir Norman and the Battersea studio and it is a pleasure to join his efforts with my own here. My wife, Esther, and my daughters, Francesca and Alexandra, are normally excluded from my work but on this occasion both daughters visited the Foster practice, and all three of them experienced the Carré d'Art in Nîmes. Throughout these past five years they always cheered me on from the sidelines, and I thank them warmly for that.

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## Chapter One: The emergence of an architect (1936–1966)



Laboratory Complex, Yale School of Architecture: drawing by Norman Foster, 1962



Market Street, Manchester in the 1930s

When Sir Norman Foster arrived at Philip Johnson's Sheldon Theatre on the campus of the University of Nebraska at Lincoln early in the afternoon of Saturday 12 November 1994, his appearance in that context signified a number of cultural contrasts and epiphanies. There is little doubt that Foster is one of the world's most significant as well as successful architects.<sup>1</sup> Yet, until quite recently, Foster's work has been largely ignored in the USA. Certainly a crack in the ice appeared when Sir Norman was given the Gold Medal of the American Institute of Architects earlier in 1994. Perhaps more significantly, however, Foster was in Nebraska on this occasion to celebrate the opening of his firm's first building project in America.

Foster sauntered into the entrance lobby and on through to the auditorium: his head tilted characteristically on one side, his sports jacket draped casually over his left shoulder. Norman Foster exudes a quiet confidence as he glides through space: the kind of confidence one associates with an experienced airline pilot, someone you could trust to take you up there into the great blue yonder. A pilot himself, he is passionately addicted to flying, and his seemingly effortless progress as he moved through the anteroom had all the unassuming power of modern flight. On that grey and rather cheerless day in Lincoln

there was a feeling that overcame weather doldrums and any other sense of depression, because Nebraska—not exactly a cultural leader among the American states—had succeeded in lassoing one of the world’s top ten architects to design a new gallery extension to the Joslyn Museum in Omaha. When Foster arrived in the auditorium he triggered a spontaneous round of applause from students and townsfolk alike.

Sir Norman is a no-nonsense person. He wanted to get on with his lecture. Cecil Steward, Dean of the University of Nebraska School of Architecture,<sup>2</sup> made a brief but formal introduction. Norman was now itching to get started. Since, as is his normal practice, he had “lots of slides”, he proposed to launch straight into them. The expedient Foster just didn’t have time to elaborate on a theme for his talk. It was more important to let the architecture flow out of his projector. And once started, as though the stream of images actually puts him on automatic pilot, he glided smoothly into a skilfully woven narrative, telling how Foster ideas and designs happen in the first place, then how they eventually get refined and built.

Perhaps we should not be surprised that Norman Foster is nervous of lengthy preambles and elaborate explanations of his firm’s work. For his debonair style and self-confidence are not a genetic inheritance. His is no silver-spoon patrimony; rather it derives from his struggle to overcome the disadvantages rooted in poverty and ignorance of just how the worlds of commerce, power and opportunity are controlled and sequestered from the lives of ordinary working men and women. A modest ambition, based on the faint suspicion that he might actually have above-average ability, enabled Foster to persevere and, seemingly against all odds, become a truly outstanding leader not only in his own profession, but also in the larger community of international industry and development in the twentieth century.

Norman Foster was born in the Manchester suburb of Levenshulme, in the county of Lancashire, England, in 1935.<sup>3</sup> Manchester was a great centre of world cotton trade in the nineteenth century, and its splendid Free Trade Hall symbolizes its commercial and political importance during the Victorian period. An equally celebrated product of the Victorian era is the famous Hallé Orchestra, for many years inseparably linked with the Free Trade Hall, and its renowned conductor, Sir John Barbirolli. Of great significance, too, is Manchester Grammar School, which came to the fore after World War II as Britain’s leading non-public school breeding ground for producing successful applicants for student places at Oxford and Cambridge universities. Norman Foster did not attend Manchester Grammar School, however. In the postwar period, it became an essentially private school (or “public” in British parlance), with only a small number of scholarship places. Norman did not obtain one of these highly prized places; he went instead to Burnage High School. Burnage did eventually become a grammar school, shortly before grammar schools were eliminated by a democratizing process that turned them into “comprehensives” under the influence of the American “high school” model. During Norman’s time at Burnage High, however, the school was rated second only to Manchester Grammar in the city, although it had no wider reputation to speak of.

After the required five years’ attendance at Burnage High, Norman sat the examination for the General Certificate of Education (GCE) at the age of 16. He passed in seven subjects: English language, English literature, mathematics, physics, chemistry, geography and art. In spite of the fact that he had been top of his class in divinity during

the previous year, he failed both this and French in the GCE. Foster recalls that there had



Norman Foster (held by his mother) when on holiday with friends in Wales

been a change of teacher in both courses, and he connects this fact with the sudden discrepancy in his academic performance.<sup>4</sup>

Norman Foster was in the top or A stream at Burnage High. He nevertheless believes that he was not encouraged to think of himself as being bright at school: a perception that has certainly been challenged in recent years. Foster blames what he calls his “social isolation”—the feeling he had that, while he no longer fitted into his working-class background, he was also outside the essentially middle-class ethos that prevailed at Burnage High. He believes this isolation was also the cause of his being bullied at school, saying: “I was the odd one out.” The result was that he increasingly spent a lot of time in his own company, because “there was nobody I could measure myself against”.

Before going to school at Burnage High, Norman had never played any organized games. He remembers his extreme embarrassment, therefore, on the occasion when he was first confronted by a cricket bat at Burnage. Norman held it in front of the wicket but the wrong way round—back to front. To understand the intensity of his embarrassment it is essential to appreciate that Lancashire is one of England’s foremost crick-eting counties. This incident had the effect of turning Norman against all forms of physical activities while he remained at Burnage High. One can just imagine what sadistic pleasure it would have given a master to remark upon Norman’s ineptitude and stupidity. How Norman must have hated the already self-evident class bias of cricket after that incident with the bat. Partly as a result, Norman for example did not learn to ride a bicycle until he was 14.

Within a year of leaving Burnage, however, Norman had cycled through France,

Germany, Austria and the Swiss Alps; and now in the late-1990s, over 60 years old, he is an enthusiastic jogger and physical-exercise fanatic, with *Langlauf* skiing among his many sporting pleasures. Affectionately, he recalls that he took part in the first London Marathon in 1981, although he readily admits that he probably didn't appreciate the pleasure of regular exercise until 1979, more or less coincident with the start of the Hongkong Bank project. He points out that in the 1970s long-haul travel was still a difficult procedure, with fuel stops extending the already considerable flying time. For Foster, regular exercise simply became "a question of survival". He says he was astonished to discover how many architects have succumbed to physical or mental collapse over the past century because they did not permit themselves relief from fatigue and other stresses of work. While at Burnage High, Foster acquired many of the hobbies and enthusiasms of his generation. These were dominated by the collection of cigarette cards, and the romance of such symbolic European events as formula car racing (marked by the fierce competition in the 1950s between Britain and Germany), and the Tour de France cycle race. Significantly for his future career development, he was obsessed as a young teenager by both Trix and Meccano construction sets, which led in turn to his involvement with clockwork motors and pulley drives. Eventually he was to discover, too, the great excitement of assembling model aircraft. In this absorbing hobby, he progressed from the primitive rubber-band mechanics of balsa airplane kits to those with CO<sub>2</sub> motors, and then on to diesel engines and glow-plugs.



As a child Norman Foster was addicted to construction kits such as Meccano

Throughout his teenage years, however, the questions that preoccupied young Norman centred on the construction of bicycles. He was fascinated by their frames, their working parts and details and, of course, the essential art of assembling everything with the appropriate screws and precisely the right colour of tape! The 300km round trip from Manchester to the Trough of Bowland in England's Lake District (of Wordsworth fame) was a regular Sunday treat for young Norman, as part of his membership of the Tame Valley Road Racing Club. He obviously enjoyed both the physical challenge and the cheerful companionship of those outings, frequently negotiating the Snake Pass from Macclesfield to Buxton with a colleague from Manchester Town Hall, another young lad named Stan. Foster remembers, too, Sunday lunches that the cyclists enjoyed at the New Inn in Langley, which were washed down with pints of Ind Coope pale ale. But all this stimulating exercise and pure pleasure came to an abrupt end when Norman was called up for National Service at the age of 18. After a break of more than 30 years he was to take up cycling again in the mid-1980s, progressing in the early 1990s from road-racing

cycles to a high-tech “cannondale” mountain bike.

In the period immediately before he went to school at Burnage High, life at home presented various difficulties for Norman. His father had served in World War I and had been invalided out of the Army because of his wounds. He was therefore excused from active service in World War II, and was able to continue his work as the manager of a furniture and pawn business. The shop where he was employed was in one of the poorer districts, and closed down soon after the outbreak of the hostilities. Norman’s father was then drafted to work night-shifts in an aircraft factory. In order to help support the family, Mrs Foster was also obliged to take a job. With one parent working and the other sleeping during the day, Norman found himself being looked after mostly by neighbours. The young boy seldom saw his father because of his night-work pattern. Inevitably, under such adverse conditions for family life, Norman spent much of his time alone, wrapped up in a fantasy world of his own where he would steer his way through images of flight as he sat hunched at the controls of a craft that was something between a rubber-powered balsa model and a real airliner.

Mr Foster suffered a severe illness and came very close to death during the 1939–45 War, but by the end of hostilities he had recovered his health. After the war, he went to work in another factory—Metro-Vickers in Trafford Park—as a painter. His long work hours continued unabated by this change of employment. He would leave home in the early morning while it was still dark, and because he needed the overtime to supplement his wages, he almost always returned late at night. Norman was brought up in an atmosphere entirely dominated by the need to exchange manual labour for ready cash. Even after his father retired, his mother went out to work as a waitress in a café in a local shop.

Art was Norman’s favourite and strongest subject at Burnage High. Of the other classes, he believes his best performances were in writing, mathematics and physics (in that order), while assessing himself to be “OK” in chemistry. He did not find that particular teachers were influential in his development. For example, he found the art teacher he had to be somewhat detached and remote. He characterizes most of his other teachers by their dependence on inculcating fear of physical punishment as their principal educational technique. His other scattered memories of Burnage High include “sketching military forts for the history of architecture”, which formed part of the art syllabus. He confesses, also, to still possessing a copy of Frederick Gibberd’s *A History of Architecture*, which he had somehow neglected to return to the school library.

Norman seems to have had few friends at Burnage High, and he describes himself as having been a true loner. One friend, Arthur Whittaker, was the son of a butcher, whose shop was in a more affluent area of the city. These were still the days, of course, when the working class did not own cars, so Norman had a long bus journey, plus a substantial walk at either end of it, to get from his house to Mr Whittaker’s butcher shop. But he undertook this tedious journey every Saturday, so that he and Arthur could wrap meat and deliver it in the neighbourhood on their bicycles. Saturdays always ended with scrubbing down the wooden butcher’s blocks in Mr Whittaker’s shop. There was a further celebration of the end of the week—the Fosters always ate meat at Sunday lunch.



Norman Foster at Burnage High School in Manchester (front row, third from left)

Norman remains convinced that Sunday was the only day of the week they ever had meat on their table.

The Foster family lived in the end house of a terrace known as Crescent Grove. At the front of those houses were tiny gardens, while the rear looked onto the small yards with outdoor water closets. The front step was scrubbed regularly with the aid of a “donkey stone”, and there was a clear understanding that the step should not be walked on. Like the front room to which it led, it was intended only “for show”. Within the house there was a marked emphasis on communal use of space and facilities, while the notion of privacy hardly existed. The Foster home was customarily entered through the back door, which led straight into the kitchen. Doubling as the bathroom almost all the time, the kitchen was next to the living-room. The livingroom was the heart and core of the house: it had a fire-place and a hearth, with its symbolic kettle. But the hearth in the Fosters’ house was hardly ever used for its intended purpose: instead, it served mainly as a niche for their ageing cat, Tommy.

All the cooking was done by gas. This required regular visits to the otherwise unused front room, where the gas meter had to be constantly fed by the insertion of individual pennies. With the exception of the occasional use of an oil-burning Calor stove, the living-room—when the fire was lit—was the only heated room in the house. Norman’s paternal grandparents and his Uncle George lived only five minutes’ walk away. In their house the living-room fire was still used to heat the kettle for their “lukewarm tea”. They also had gas lighting, with its acrid smell and eerie green effect. With very few exceptions, everyone in the Foster neighbourhood was a manual worker.

Within this framework, family values and ambitions were simple and straightforward. Although Norman seldom saw his father, he nevertheless felt securely loved by him, and he believed that he was both spoilt and doted on by his mother. Mr Foster’s notion of respectability may be summed up in two ambitions:



Manchester Central Library, 1936



Manchester Town Hall, 1877

“the prospect of a secure job at the Town Hall, with a pension on retirement”; and “living out your days in your own semi-detached house in some posh suburb”. These clear social and material imperatives were accompanied by strong parental pressure to take the Town Hall Entrance Examination at the same time as the General Certificate of Education or “O-level” examination was sat.

The possibility of staying on at school in the sixth form was never mentioned. Such an idea was quite remote from the world of Norman’s parents, and entirely foreign to them. The tradition they understood required that you start working for a living as soon as possible, so you could begin paying money into the household budget. Norman’s failure to pass all of the nine subjects he took in the GCE examination—his sudden fall from grace not only in divinity but also in French—presented him with a distinct sense of anticlimax in his education. Getting only seven passes out of the possible nine suggested to him that the sixth form, universities and academic success were the territory of people other than himself—of another more intelligent, and therefore superior, class.

Already, in his last years at Burnage High, however, Norman had begun to reallocate his spare time, formerly dominated by cycling and model aircraft, to take account of his new-found interests and pleasures, particularly the public library. He notes with irony that it was located right across the street from the public baths—baths for cleaning the body, not swimming for pleasure. Browsing in the library in the evenings and at weekends, Norman discovered the power of Tolstoy and Dostoyevsky, as well as the world of architecture that exists beyond those “medieval castles”. He found himself particularly attracted to two twentieth-century architectural books: Le Corbusier’s *Towards a New Architecture*, and Henry Russell Hitchcock’s *In the Nature of Materials*. Le Corbusier was particularly magnetic for Norman, because he was so decidedly modern and accessible: and as for those provocative pairings of illustration—for example, the Athens Parthenon side by side with racing cars and aeroplanes—they bowled him over! Freed from the inhibiting walls of those old castles, Norman became unconsciously aware of the connection between the *technos* of ancient Greek architecture and the speed and diversity offered by modern technology. In contrast to Le Corbusier’s modernist appeal, however, Frank Lloyd Wright as portrayed by Hitchcock seemed to be an anachronism, fundamentally old-fashioned in his view of architecture. Furthermore, Wright’s furniture suggested extreme discomfort, with its bizarre angularity and hard edges.

It was with all these provocative and contradictory thoughts in his mind that the young Norman began his employment at Manchester Town Hall. If he had been preparing himself for a life of the mind, however, the daily routines and rituals soon disabused him of all such illusions. In fact, his daily labours seemed to him quite mindless, as he went on errands from here to there, carrying pieces of paper along those endless corridors from one department to another and brewing tea for his superiors. Yet the Town Hall was not totally a mental desert, because it brought the lonely Norman the much-needed companionship of new friends. These included Ian Murray, who introduced Norman to an expanded world of classical music, particularly the Hallé Orchestra’s concerts in the Free Trade Hall. The young Norman was so stimulated by all this new musical activity that he attempted experiments with the limited potential of his parents’ home radio, thrusting his hands into the back of the set to search, among the valves, for the then elusive Third Programme and such delights as the world premiere of Vaughan Williams’ *Antarctica*.

After he had overcome his sense of boredom, running up and down the corridors of Manchester Town Hall, Norman became quite deeply impressed by its architecture. He admired the complexity and diversity of its spaces and details, and he was intrigued by the extraordinary variety of its staircases, both great and small. In particular, he found the men’s urinals to be “heroic great objects in space, ascended by steps”. His musical sense now daily gathering strength, he enjoyed the gurgling of water in the glass cisterns above as they discharged their cascades, at regular intervals, onto the sombre porcelain monuments below.<sup>5</sup> He looks back to Waterhouse as an architect who involved himself in the details as well as the grand vision.

While working at the Town Hall, Norman was keen to expand both his horizons and his knowledge of the city around him, and he therefore occupied his lunch-hours with walks around the centre of Manchester. He soon realized that in the city’s essentially Victorian centre, there was only one modernist structure, the Daily Express building, designed by the engineer Owen Williams. In addition to his frequent visits to the Central



Library, the other principal building in the city centre, what he remembers most is the Town Hall annexe by Vincent Harris.<sup>6</sup> It was in the long curved hall of Harris's building that the Fosters paid their annual property tax or "rates". Other prominent monuments in the city centre included the Kendal Milnes department store, St Anne's Church, and two magnificent arcades—the Barton Arcade, and the long-since demolished Lancaster Arcade. Manchester Town Hall was framed by the facades of Albert Square, their grimy black, shadowy anonymity providing a distinct but neutral foreground to the public centre-piece.

While he was working at Manchester Town Hall, Norman enrolled for night classes at the local technical college, where he studied bookkeeping, commercial law and commercial general knowledge. After the repetitive tedium of his day in the Town Hall, he found this evening ritual to be an extension of his boredom. At the same time, he was also aware of a new breed of public servants making their appearance in the Town Hall. These were the university graduates, who impressed Norman with their unashamed youth and ambition. He could see that they were less resigned and less condescending than the older generation of employees. This was an enormous relief to him, because his own increasingly wide range of interests had begun to make conversation more and more difficult with the majority of his older colleagues.

With the exception of these new university graduates, Norman found it possible to talk to only one of the older men. Mr Cobb was the father of an architect; and perhaps because Norman confided in him, or possibly because Norman was always out sketching, the two got together and talked about architecture as a career. Foster acknowledges the influence that Cobb had upon his decision to become an architect, for it was from these conversations that he realized he would have to pass advanced or A-level examinations in order to study at a university. He therefore decided to change the subjects he was taking in evening classes from those in the commercial area to English literature and geography, increasing his study load to three evenings a week. The workload at the Town Hall also increased at about this time, however, and Norman felt the strain of an uphill struggle, which also seemed rather hopeless. He was almost 18 by this time, and he realized that the compulsory National Service in the armed forces would offer him just the breathing space he needed.

Considering Norman's early love of model aircraft and the whole idea of flying, he was fortunate to be conscripted into the Royal Air Force. Once they were in the armed forces, however, very few recruits were allowed to pursue the specialisms of their choice. Again, Norman was lucky. Conscious of the future role of television in our lives, he applied to be a radar technician. His request was granted. While the expertise and enthusiasm of many was pointlessly squandered—it was quite typical for a blacksmith to be assigned to the cookhouse—Norman entered the world of theoretical electronics and their application in servicing radar units GIII and Rebecca. When this became boring to him he would escape into the camp theatre, creating a role for himself designing and painting stage sets. The required two years of National Service passed all too quickly, and at the age of 20 he found himself back in Manchester. He certainly did not want to return to work at the Town Hall, so he put off any decision on that. On the other hand, he was not all that sure what he really did want to do with his future.

One thing was certain, however. Norman remained fascinated by architecture and

design. He bought all the latest magazines he could afford, and his spare time was spent in libraries. But to earn a living he had to resort to working in a garage as a mechanic, changing oil and servicing cars in a pit beneath the vehicles. He also drove vans, delivering bread, as well as working Saturdays as a furniture salesman. At one point he even worked the night shift in a bakery, making muffins. While he was doing all these jobs, he took time to write to various specialized companies, such as G-Plan and Gordon Russell,<sup>7</sup> seeking some employment more related to his interests. But his enquiries were all to no avail: without experience he couldn't get a job in industry, and without a job he couldn't get the right experience.

In Britain at that time—the mid-1950s—an income of £1000 a year and the ownership of a small car represented a certain level of affluence. The realization of this fact marked the beginnings of our acquisitive society. An “office revolution” was also beginning to take place. Primitive copying machines, that had to be cranked manually, made their appearance in the workspace. Briefly, Norman thought, he might have a place in selling this new technology, and he applied for a job with one of the copying machine companies. When he was called for an interview, however, his interviewer immediately saw through Norman's intentions. Foster was not only told that he was unsuitable, he was also counselled to set about the task of finding himself. The interviewer directed him towards the Careers Guidance Bureau, an agency established after World War II to help ex-servicemen to adjust back into civilian life. After being tested and assessed for aptitudes and skills by the Bureau, Norman was told what he already knew—that his interests in architecture and design pointed towards a creative career, and he should therefore follow this direction. The difference, however, from getting such advice on a casual, intuitive basis, and having it imparted by the Careers Guidance Bureau was that the full panoply of possibilities and strategies for their achievement was now made available to him. Furthermore, the Bureau was able to open for him a number of doors to those opportunities.

One of the openings offered to Norman was employment in the architectural practice of John Beardshaw and Partners, whose office was in one of a row of Georgian houses close to the university. The firm was looking for “an assistant to the Contracts Manager”. Norman applied, and he was told at the interview that part of the Contracts Manager's job was to “lift off manhole covers to see whether the contractor had actually put any manholes underneath them”. To his great surprise, Norman found that his experience at the Town Hall was smiled upon, and he got the job. Looking back on this opportunity, Foster remarked: “This really was the turning point of my life.”

When he first started work, Norman occupied a tiny room under the roof at the top of the Georgian house. To reach this upper level he had to pass the large front room that was known, grandly, as the “drawing office”. It was inhabited by half a dozen architects, who betrayed their calling by their uniform white, canvas smocks. This apparel seemed to confirm them as some sort of high priests, and young Norman was in awe of them. He was very shy in asking them questions, because their answers were inclined to be unhelpfully monosyllabic. For example, when he asked them “How do you get into a school of architecture?”, they responded, cryptically, “Show *them* your drawings”. Norman, however, took every bit of advice he could lay hands on, however flimsy or cryptic. He began to borrow drawings from the office, taking them home overnight to

copy them. He also tried to capture the atmosphere of the industrial North, painting scenes in the style of Lowry,<sup>8</sup> freshly daubed in poster-colours. The scene framed by his bedroom window attracted his particular attention, because it included one of the few trees in the neighbourhood.

Norman soon came to the conclusion that he had enough drawings to persuade a school of architecture of his seriousness, but he first wanted to pay his boss the courtesy of telling him about his intentions, so he asked to see Mr Beardshaw. When Norman revealed that he intended to study architecture, the principal was quite incredulous. Once again it was a question of “Where are your drawings?”. Although Beardshaw was surprised by Norman’s news, he was clearly delighted to see that his young employee was in earnest. The senior partner equipped Norman’s attic room with a drawing-board, T-square, brick supports for the board, and a spiral-bound book on dimensional coordination by Burnett, Tait and Lorne. All this was not, however, just to encourage him, but to allow Norman to tackle the problem of designing a house for an important client. One of the difficulties was that the client’s wife wanted to transfer every single curtain intact from her old home to the new one. This automatically dictated that the new house must have the same window sizes as the old one. Quite incredibly, this absurd problem was to be Norman’s introduction to architectural design.

Eventually, Norman was given an interview at Manchester University, and a chance to present his portfolio of drawings to the professor of architecture, R.J.Cordingly. Cordingly very much liked the Lowry-style paintings, and told Norman that he thought the view from his bedroom window, with the tree, would make a good Christmas card. Norman was subsequently offered a place on the Diploma Course of the School of Architecture at Manchester. In the 1960s, diploma courses at British universities were still in every way equivalent to degree courses in terms of professional recognition and qualification. The principal difference between the two courses was in terms of entry requirements: no A-level subjects were required for the Diploma, and the foreign language requirement was also normally waived, as at Manchester.

Two further obstacles remained, however, before Norman could accept the university place offered him by Manchester. The first came in the form of his boss and supporter, John Beardshaw, who tried to persuade Norman to stay on in the office, stressing that many distinguished practitioners had built successful professional careers without the aid of formal qualification, with some of them even becoming Royal Designers for Industry (RDI). The second was a more substantial barrier, because without those precious A-levels Norman could not qualify for a local authority grant to support his higher education. Not to be fobbed off by what he saw as a mere technicality, the rapidly maturing and more experienced Norman asked for an interview with the chief education officer of Manchester.

The education officer was, however, totally unsympathetic to Norman’s entreaties. He quickly pointed out that all Norman had to do was enrol in a course at a local authority institution—in this case the Manchester College of Art—and he would automatically qualify for a grant that included both academic fees and maintenance. Having earned himself a university place, however, Norman was not about to settle for second best. He had no interest in compromising on the quality of education he had his heart set on. He had what he considered to be reliable information that the university course was in every

way superior to that offered by the College of Art. Already, by the age of 21, Norman had developed a resoluteness that has become a hallmark of his life and work. He decided that he would “go it alone” and, if necessary, he would take jobs to finance himself through the architectural course at Manchester University.



Norman Foster (far right) with student colleagues at Manchester University, 1959

As a student, Norman found that he was “consumed by a passion for architecture and designing”, although he had to face long hours of work in the evenings, at the weekends and during the university vacations in order to meet the cost of his infatuation and ambition. His various jobs ranged from being a freelance perspective artist, to acting as a bouncer on Sunday evenings at a local cinema that was known for its rowdiness. But Norman’s thirst for knowledge, education and advancement was not shared by his parents and neighbours. In the interests of economy, he was living at home, and when he returned from the university after his first day of classes, he was completely mystified by his mother’s total silence. He had expected her to be waiting to hear all about it, anxious to know how things had gone. It was only some years later that he came to understand her underlying fear that, in spite of all his ambition, effort and determination, Norman would not actually arrive at the destination he had set for himself in life. One of the young men in the neighbourhood would often take Norman to one side, displaying his rough hands proudly and stressing that those were the hands of a working man. There is a legend among the working classes that what educated people have mostly learned is how to avoid hard, physical work. The neighbours would reinforce this point of view in their own way, asking Norman if he was not ashamed to see his father coming home late every night from such a hard day’s work.

Far from discouraging him, these pointed asides about his ambition to acquire an education and social mobility only urged Norman on. As evidence of his determination, in each of his first four years at Manchester University, he managed to win enough scholarships and prizes to underwrite his extensive European travels as well as further studies. As a result he got to see the hill towns of Tuscany, Palladio’s villas in the Veneto, the recent architecture of the Italian office BPR (Belgiojoso, Perussuti and Rogers), the architectural treasures of Florence, the splendours of Paris and, not least, the works of Le Corbusier—especially the pilgrimage chapel of Notre Dame de Haut at

Ronchamp—and those of Utzon before Sydney Opera House. He also admired Arne Jacobsen and such traditionalists as Kay Fisker. He did not, however, neglect his own English heritage, making several expeditions to measure barns and windmills in the English countryside. A set of these measured drawings won the RIBA Silver Medal, which he received together with a cheque for £100 as prize money from the hands of Sir Basil Spence; at the time, this was a small fortune for a struggling architect. Among other things, the RIBA Silver Medal stipend facilitated Norman's tour of Denmark, Norway and Sweden, and he was also impressed by the work of Danish architects Jørgen Bo and Wilhelm Wohlft.

Norman maintained close contact with John Beardshaw, and undertook freelance perspectives for Beardshaw's former partner, Eric Daley. It was while he was in his final, "thesis" year at Manchester that Norman decided to apply for a Henry Fellowship to undertake postgraduate studies in the USA. Henry Fellowships offer a reciprocal arrangement whereby American students are given places at Oxford and Cambridge while British students have access to Harvard and Yale. Norman decided to apply to do a Master's degree at Yale, where Paul Rudolph was then Head of School. He was called to a qualifying interview at University College, London, which he remembers as being "icily formal before a sea of distinguished faces". Norman was quite terrified by the experience, and totally surprised when, after his return to Manchester, he received a letter telling him that he had been successful. He had also applied for a Fulbright Travel Scholarship, which would pay his fare to and from the USA. It was Norman's ambition, however, not only to study at Yale, but also to work in an American architectural office. In order to have permission to work in the USA, Norman had to apply for an immigrant visa. The terms of reference governing awards made by the Fulbright Commission were quite specific, requiring Fulbright recipients to return to their own country at the end of the period of study or exchange. This meant that the Fulbright scholars could avail themselves only of a limited-term "exchange visitor" visa, within the conditions for which professional employment was not allowed. Norman therefore withdrew from the Fulbright programme.

On the flight to New York, Norman met Brian Bagshot. Brian was also going to Yale, to study city planning. They travelled together across New York by subway, eventually arriving at New Haven by Greyhound bus. Norman then went on to Jonathan Edward College, where he was to be a Guest Fellow. Crossing the leafy courtyard of the college, he arrived at the Master's House, where he found a party in progress. There, amidst the jovial clinking of glasses, the Master greeted him. It quickly emerged, however, that the Master was not expecting Norman's arrival. When Norman explained how he had written three weeks earlier to confirm his acceptance and the date he would arrive, the Master denied all knowledge of such an arrangement. The result was that Norman was initially assigned to a small and dusty attic room. As yet unaccustomed to the poor service provided by the US Post Office in the early 1960s, Norman could not conceive that his letter would have taken so long to arrive. When it turned up a week later, however, the situation in Jonathan Edward College changed radically for Norman. His Guest Fellow status was confirmed by the Master, and he was given a small suite of rooms in place of his original, shared accommodation. But Norman soon realized that this privilege was more honorary than of practical value, because the long hours he was required to spend at

his desk in the graduate studio meant that he had little time left to enjoy the academic privileges of his Fellow's rooms.

Norman's compensation came in part from the variety and quality of the students with whom he shared that studio. Carl Abbott from Florida, for instance, has remained a good friend. Abbott greatly admired Yale's Head of School, Paul Rudolph, who was also from Sarasota. Jim Alcorn hailed from the West Coast, and he became renowned at Yale as a skilled presentation artist, who was capable of brilliant sketches. Steve Oles from Texas has become celebrated for his beautifully drawn and shaded pencil renderings, and he has made a substantial contribution to the major projects of I.M. Pei.

Most importantly, perhaps, was the fact that another British architect, Richard Rogers, was there with his wife, Su. Richard had just finished the diploma course at the Architectural Association in London, while Su was at Yale to study city planning. Norman and Richard had originally met in London at a reception hosted by the Fulbright Commission. Yet another British architect, Eldred Evans, also joined the Yale graduate class briefly. Evans had recently won the competition for the Civic Centre in Lincoln, and this meant that she would have to cut short her visit to the USA, returning to London to establish an office for this important project.

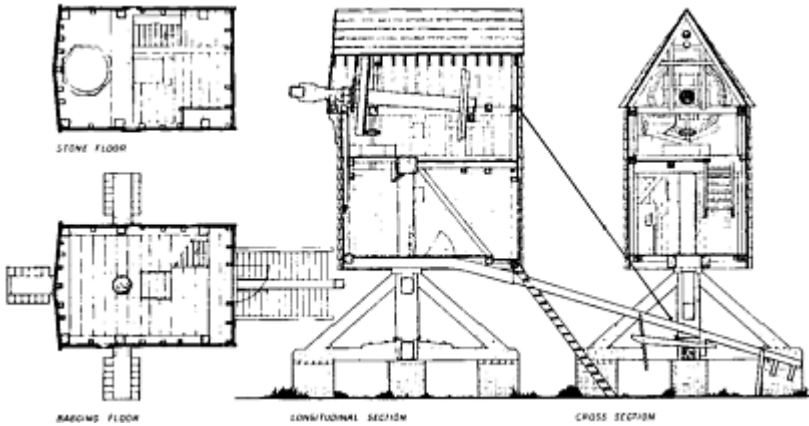
In addition to being Dean of the School, Rudolph also had an architectural office in New Haven. Norman recalls that the boundaries between the two were sometimes unclear, because Rudolph made a habit of basing studio design projects on the latest commission in his office. Norman found this free exchange of contexts to be entirely beneficial, and he and his fellow students eagerly awaited Rudolph's anecdotes about his clients and their wish lists. Eventually, Norman went to work in Rudolph's New Haven office as a part-time draughtsman, finding himself mostly employed on the elaborate and meticulous cross-hatching of presentation drawings for the modest reward of \$2.50 an hour.

In Norman's view, Rudolph was a demanding teacher, "a hard taskmaster...and always full of surprises". It was common practice for the Dean to call a last-minute "crit" on a project—as late as the fifth week of a six-week exercise. Because, in his own words, Norman always paced his work "to allow for continuous exploration, redesigning, rethinking and redefining", his constant process of reassessment of what he was doing right up to the last possible moment meant that he would have little material of consequence to display at such short notice. Others, like Jim Alcorn for example, might be in the final stage of touching up their presentation drawings. But Rudolph was no respecter of persons or the degree of finish they had achieved. What interested him was the underlying quality of an idea, and at the end of the day on those surprise crits, almost everyone had to start again from scratch.

Another Rudolph strategy was to set a 24-hour design exercise for the entire school, which meant that the first-year students were pitted against the graduates. Also, the environment in which all these surprise events took place was totally unfamiliar to Norman. By choosing Yale he had said goodbye to what he calls "the nine-to-five mentality" of Manchester University. For Yale was quite typical of the majority of North American schools of architecture in its 24-hour, open-door policy. As Norman recalls with obvious delight: "Yale opened its doors on the first day of the semester, and they remained open, lights blazing 24 hours, until the end of the term." He found the licence to

engage in seemingly endless, uninterrupted work to be an unbelievable luxury—it later became a model for the Foster practice.<sup>9</sup>

Between design projects, the students' first priority was to get out of New Haven as fast as possible. Depending on how they had fared in the final crit, their mood might be anything from euphoria to depression, while they would all be "in a state of exhaustion". Carl Abbott had a Volkswagen Beetle, and he would take the Rogers and Norman on a variety of long-range expeditions, for example in search of the work of Frank Lloyd Wright. On those pilgrimages they usually managed to talk their way into private houses and institutions. During the winter, they were often so frozen and travel-worn after many long and cramped hours in the tiny VW that the owners of houses would frequently take pity on them and invite them in for refreshments.



Part of Norman Foster's measured drawings of a medieval post mill which received an RIBA student prize, 1958

The interest that Norman had developed in Frank Lloyd Wright was certainly matched by his enthusiasm for the work of Louis Kahn. At that time, Kahn was still teaching at the Graduate School of Fine Arts in the University of Pennsylvania, known familiarly as "Penn", in Philadelphia. Sometimes, the graduate students at Yale would create a class-wide event, organizing an exchange with Kahn's students in Philadelphia. These occasions brought Norman into contact with Kahn and his influence, as well as providing the opportunity to thoroughly explore much of the Philadelphia architect's output.

By the time they had become thoroughly involved in the Master's course at Yale, Richard Rogers and Norman Foster were truly kindred spirits. This kinship was based not only upon common languages of form and criticism, but importantly upon their shared beliefs. In Norman's view, this closeness stemmed from mutual respect and admiration: that and the fact that they genuinely challenged each other. While she was still a student there, Eldred Evans shared this competitiveness, as did Carl Abbott. Norman remembers the first time they were together at Yale as being stimulating, and generating "great pleasure and happiness and, occasionally, outrageous behaviour". While their antics occasionally irritated their American colleagues, however, the British graduates were

always tolerated, with gentle rebuffs and prevailing good humour.

On one occasion an unforgettable event was provided by Philip Johnson, who entertained the entire class at his home in New Canaan, Connecticut. Norman's admiration for Johnson's celebrated Mies-style glass pavilion dates from that visit, when he watched the sun setting on Johnson's classic composition: "a miniature landscape, complete with its lakeside temple". He recalls that:



Philip Johnson's Glass House, New Canaan, Connecticut, 1948–9

"As the light outside reduced with the onset of dusk, the interior of this delicate and refined room of a house glowed and brightened almost imperceptibly."

Foster believes that the New Canaan house is one of Johnson's outstanding works.

Rogers and Foster began to work together on actual building projects at about that time. Richard had promised to design a house in England for a landscape architect friend, Michael Branch. The large-scale pencil-and-ink drawings on yellow tracing paper are still in the Foster archives. This design was, Foster admits:

"unashamedly derived—like the first projects of Team 4 for the Camden Mews houses—from the work and influence of Lou Kahn—monumentalized perhaps with the hearth and chimney stacks as anchors, and reminiscent also of certain Frank Lloyd Wright houses."

Another treat at Yale was Vincent Scully's weekly lecture on the history of architecture, an event that attracted students of all ages, but particularly young undergraduates: future accountants, lawyers, politicians and chief executives—the coming generations of clients. Norman especially appreciated the broad scope of these lectures, ranging from Ancient Greece to Frank Lloyd Wright and Le Corbusier. Scully was quite unafraid of criticizing the present generation, and he would "comment freely on what the Saarinen office up the road at Hampton might be doing, or the most recent works of Kahn".

Scully's reputation as a popular lecturer was founded on an unique blend of style and content, which frequently included references to such immediate cultural news as the latest film showing at the local cinema. Norman particularly enjoyed Scully's lectures on early modern American masters Richardson and Sullivan, as well as Frank Lloyd Wright, and he believes that:

"Scully fired the enthusiasm behind many of the excursions the Masters' class



was to make in search of historic America.”

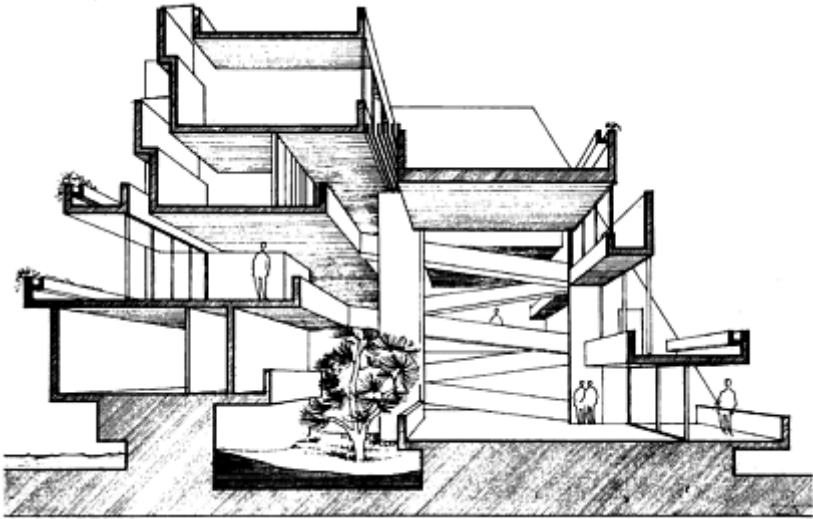
Halfway through Norman’s year at Yale, another professor arrived in New Haven. Serge Chermayeff offered an extreme contrast to Paul Rudolph. Chermayeff, with his aristocratic Russian background, came to the USA by way of England: he was older and more elegant than Rudolph, combining “aquiline features, long hair slicked back, sharp eyes and social graces” with “perfect diction and a razor-sharp intellect”. It was his habit to “saunter around the studio, casually but immaculately attired in European style”, engaging students in conversations about the “why” of things: why a particular building was built in a particular place at a certain time—what Foster terms “all ethics and philosophy”. By contrast, Rudolph had a Southern Baptist background: he was “nervous, shy and almost antisocial”, qualities he combined with being “unrelaxed, brittle and aggressive”. Rudolph had assumed the characteristic buttoned-down, East Coast style. Beyond Rudolph’s mannerisms and appearance, however, Norman remembers him as a “brilliant teacher and mentor by example”.<sup>10</sup>

While Chermayeff seemed content to stop at any drawing-board and discuss philosophy, Rudolph insisted on having concrete evidence of a student’s work: he wanted to see actual drawings and models. If no such evidence existed, there was no conversation, and Rudolph would simply move on to the next board. Norman confesses that he learned about “the power of drawing, of sculpting building masses, of critically appraising elevations, and much more of the three-dimensional stuff of architecture” from Rudolph. In his conversations with Chermayeff, however, he:

“began to sense the power that an underlying philosophy could impart to an architecture, and how that philosophy could inform the design process.”

It seems that while Chermayeff was engaging in these unstructured dialogues with his students at Yale, “lucidly expounding his concepts of the public and private domains”, he was also laying the foundations of the book he was soon to write with Christopher Alexander, *Community and Privacy* (1963).<sup>11</sup>

Chermayeff must have sensed Norman’s affinity with his own approach to architecture, because he asked Foster to read the first draft of *Community and Privacy*, and to make critical comments on the text. Subsequently, Chermayeff proposed that Norman should stay on at Yale as a research scholar, to work directly with his professor on further topics. But Foster must have realized that Chermayeff’s research interests were remote from his own professional concerns. In any case, he did not pursue Chermayeff’s offer. Eventually, Chermayeff acquired a site on Lincoln Street in New Haven and, after Norman’s departure from Yale, he built a house that gave three-dimensional form to his philosophy. In that design, bathrooms became “valves” between bedrooms and corridors, while small courts separated the other domestic activities, all these features confirming the principles of “community and privacy”. Norman did, however, undertake his final Master’s project under Chermayeff’s supervision: this was based upon a free interpretation of the Ruberoid Student Competition for the Design of a New City.<sup>12</sup> Within just a few years, Ruberoid was to manufacture the external cladding for the only major building produced by Team 4 Architects—the Reliance Controls factory.



One of Norman Foster's student projects at Yale—a residence in Florida, 1961

As Norman approached graduation from Yale, however, another problem with his stay developed: he was running out of funds. Although he admits that the provisions of the Henry Fellowship were generous, he had lived so well and travelled so extensively that he came to realize that there was not sufficient income left to last him through the remainder of the year. His work as a cross-hatcher in Rudolph's office was poorly paid, and he therefore started work in the New Haven office of a New York firm called Pedersen and Tilney. In his new employment he was able to exploit his planning education from Manchester, as Pedersen and Tilney were engaged in the emerging field of urban renewal. Nevertheless, he also began to appreciate that it was not just the funds that were running out. Although he was able to trade on his qualifications, he had so little experience that he was, in reality, unqualified.

Norman's year at Yale was full of hard work, as well as lots of travel and conviviality. The time literally sped by, and after graduation he decided to continue working for Pedersen and Tilney in the urban planning field for a brief period. This work involved him in visits to the city of Chicopee in Massachusetts. Chicopee was made up of two distinct communities divided by a river. The Polish settlement occupied one bank, while the French community lived on the other, so that "the city was divided by water, by language and by culture". The historical basis for Chicopee was the textile industry, with its heritage of brick mills and other industrial vernacular buildings that, in their tough honesty, reminded Norman of the best examples of similar structures in the North of England.

By that time, Richard and Su Rogers had succeeded in travelling the trail well-worn by other European pilgrims, setting out from the East Coast and driving across to California to arrive in San Francisco. Eventually, Norman was to take the same path, having acquired an open two-seater MGA sports car for the journey. The MGA was somehow

left over from a wish list in his past, from a time when he couldn't afford such a luxury. But at last America had given him the means to purchase his dream car. This vehicle, however, was not the most appropriate car for this particular adventure, and suffered a mechanical collapse in "a very hostile part of hillbilly country". Nevertheless, it survived the trip to the West Coast, and continued to serve Norman for the remainder of his stay in the USA. In the final analysis, he became convinced that a conventional American automobile would have been more suitable for his West Coast expedition, and he regretted not having bought one at the time.

By the time Norman arrived in San Francisco, however, Richard and Su Rogers had already returned to England. Deciding that he would stay in California for a while, Norman began the rounds of San Francisco offices to show his recently expanded portfolio of work. This was the first time he had been forced to look for a job in this way, but he was fortunate in that he soon found one with the office of Anshen and Allen. Immediately, he was put to work on the new campus for the University of California at Los Angeles (UCLA), in Santa Cruz, and he felt privileged to be involved in designing for such a beautiful site, with its giant redwood trees. This project involved other architects, including James Esherick, Wurster, Bernardi and Eamonns, Carl Warneke, and the office of Ernest Krump. In the course of his stay with Anshen and Allen, Norman met another English architect, Derek Parker. This same Derek Parker was to reappear as the head of Anshen and Allen when Foster Associates collaborated with the American office in the early 1990s.

Norman enjoyed his work on the Santa Cruz campus plan, feeling that this experience was very positive. It was in California, too, that he finally acquired an American automobile. He also paid another visit to the East Coast on a random consultancy job that was related to urban renewal. Throughout his entire sojourn in California, he maintained a steady correspondence with Richard and Su Rogers. For their part, they constantly recalled the conversations the three had had at Yale, when the idea of forming a joint practice back in Britain had been discussed. Then one day Norman received a letter from Su reminding him of the idea of a partnership—Norman had always thought of it as one between Richard and himself. He did have some vague memory of two other "friends", or perhaps they were "sisters".

In any case, Norman booked his flight back to London. He was absolutely determined to squeeze every last mile and ounce of experience out of his return journey, so he chose a roundabout route by way of Mexico City, Merida, Jamaica and New York to Manchester. This itinerary ensured that he would get to see the great Mayan pyramids, those impressive manmade plateaux that he believes are connected with Jørn Utzon's inspiration for the Sydney Opera House, enabling him to design a true landmark. Norman's return journey to England was both lengthy and fascinating. He finally arrived in London, where he was met by the Rogers in their Mini. Theirs was the classic early model of the car, unbelievably small on the outside yet seemingly quite spacious within. It provided an enormous contrast to "the vast, gas-guzzling monsters" that Norman had just left behind in the USA. The Rogers' flat was also small. It was located in Hampstead, beneath the studio home of Henri Henrion, a celebrated and successful international designer, whose corporate clients included such giants as the Dutch airline, KLM. Wendy Cheesman lived just around the corner, in the first floor flat at 16 Hampstead Hill

Gardens. Wendy had studied architecture at the Regent Street Polytechnic, from which school she was a recent graduate. It was Wendy's room that had been designated as the "office" of the new practice, which rejoiced in the cryptic label of "Team 4". The four were: Richard, Norman, Wendy and Wendy's sister Georgie (Wolton). Georgie was actually the only member of the partnership who was qualified as an architect. It was therefore Georgie's professional status that allowed the practice to call themselves architects or more specifically, as they had decided to style themselves, Team 4 Architects. This distinctly fragile legality depended entirely upon Georgie's active participation in the practice, and that was to prove short-lived.

In fact, Georgie was involved in the partnership in name only. She had a very small child, and the pressures of parenthood meant that she was never really free to go to the practice. The result was that the four partners only really came together socially. Nevertheless, although she could not actually work with the other partners, Georgie agreed to lend her name to the practice until one of the others managed to pass the Professional Practice Examination. The only alternative was to persuade another registered architect to join the partnership.

During the time that Norman and Richard had been in the USA, the regulations and procedures for qualification and registration as an architect had changed. The old requirements involved spending a certain period in an office, then sitting a written examination followed by an oral, but these simple rules had been replaced by more exacting hurdles. By the time Team 4 Architects was formed, each stage of a candidate's postgraduate experience had to be recorded in an official logbook. The satisfactory completion of each step in the process was then verified by a qualified, supervising architect, who signed the logbook as confirmation of his or her approval. Wendy Cheesman considered it a backward step to participate in these new rituals, and she refused to do so as a matter of principle. Richard and Norman had no option but to turn to their original school—the Architectural Association in Richard's case, and Manchester University for Norman—and explore with them the requirements and formalities for qualification and registration under the new regulations.

After his visit to Manchester, Norman received a letter from the university that was extremely critical of his attempt to gain experience through employment in his own office, and stressed that such an arrangement was entirely outside the guidelines issued by the Royal Institute of British Architects (RIBA). The writer concluded by advising Norman to find a job with a well-established firm of architects that could, by virtue of its experience, offer him proper training in the profession. In addition, the Architects' Registration Council of the United Kingdom (ARCUK) wrote of its displeasure at the use of the style "Team 4 Architects", pointing out that only one out of the four listed on their letterhead was a registered architect—Georgie Wolton. None of this helped, especially because Georgie herself was becoming increasingly apprehensive about allowing her name to be used to support a partnership in which she was not really involved. Meanwhile, Richard Rogers was having his own problems in trying to satisfy the new requirements being enforced by his old school, the Architectural Association in London.



Norman Foster at Yale—presenting a group scheme to a jury (above) and with Masters' class colleagues, John Chisholm, Richard Rogers and Roy Mason, 1962 (below)

In sheer desperation, the partners of Team 4 Architects invented a strategy intended to lure an alternative qualified architect into the practice. A series of dinner parties was set up. On these occasions Su Rogers acted as hostess, and a friend, qualified as a registered architect, would be invited as guest. The guest would be liberally plied with food and wine, while the conversation was steered in the direction of the world of private practice and how everyone was faring in it. During these discussions, Team 4 was represented as a unique blend of “creative drive, commercial success, and limitless future growth”. Eventually, the guest would exhibit obvious signs of jealousy and envy. At this point he would be offered a chance to join Team 4 and get in on the ground floor of the firm’s promising development. With the bait swallowed, Richard and Norman believed it would then be simply a matter of going to Team 4’s solicitor, Theodore Goddard, and getting the new partner to sign on the dotted line. Norman remembers visits to Theodore Goddard’s, with various names being added to the partnership agreement. In quite rapid succession each was crossed out, to be replaced by another name. Furthermore, nobody actually signed on that dotted line. Meanwhile, pressure was building up from ARCUK about both the style and the structure of the practice.

As they were wondering what to do next, Norman remembered that he did know one well-established architect, and he decided to approach John Beardshaw to ask him if he would be willing to help Team 4 out of their predicament. Beardshaw had moved from his original London office in Bury Street to smaller accommodation just behind Eaton Square, where he employed only one assistant. John Beardshaw still occupied a spacious room, which was entered through large, double doors. On Beardshaw’s command, his assistant, “an impressive Sikh with a silk turban and an immaculate, creamy draughtsman’s smock”, would appear in the doorway. Beardshaw was extremely receptive to Norman’s approach, and it was agreed that Team 4 would work “in association” with his office on a variety of projects. To get the collaboration started, Team 4 would provide assistance on a town centre development that Beardshaw was engaged in. All this meant that Team 4’s association with the practice of an established architect could be incorporated into their letterhead.

When Norman and Richard returned to Team 4’s Hampstead base, they were in celebratory mood. They found their secretary, Sophie Read, reading the latest letter from ARCUK, with its sarcastic comments on Team 4’s failure to answer the Registrar’s previous communication. The letter went on in a similar vein about the necessity for Team 4 Architects to put its house in order. Feeling quite elated over his agreement with John Beardshaw, Norman promptly dictated a letter to ARCUK, directing the Council to address all future correspondence on this topic to the firm’s solicitor. Theodore Goddard was then informed of the firm’s association with John Beardshaw, and this information was then added to the Team 4 writing paper. With this troublesome hurdle behind them, Norman and Richard were now free to sort out the problems attached to preparing for and sitting the Professional Practice Examination.

Naturally, while all these irritations and hazards were being overcome, life did not stop or even really slow down, and the aspirations and desperations that accompany the building of an architectural practice also had to be dealt with on a day-to-day basis. When the practice began, Team 4’s first clients were a series of “trusting friends and relations”. The work pattern involved “hard and long hours, although seldom through the night”. To

make ends meet Norman taught part-time at Wendy's old school, the Regent Street Poly. Wendy, meantime, had a part-time job with Kit Evans on a project for Paul Manouso—“a finely detailed brick housing development in Bayswater, for which the structural engineer was Tony Hunt”.



The Team 4 work space in Hampstead Hill Gardens (left) and the team with collaborators (right), 1964–5



Norman and Wendy Foster in the Covent Garden studio of Foster Associates, 1969

By this time Norman and Wendy were actually living in the Hampstead flat-cum-office, and its combination of functions constantly presented problems of privacy. These were temporarily overcome by boarding up the door between the rear of the flat and the front-room working area. But the original arrangement was reinstated when a genuine client—that is, one beyond the clan of family and friends—came in prospect. This potential client was the contracting firm of Wates, which was very active and well known in the field of housing.<sup>13</sup> Norman and Richard were interviewed by Neil Wates, who asked their opinion about the examples he should be studying and the direction his company should be taking. Without hesitation, they told him that he should go to Berne in Switzerland and look at the work of Atelier 5. This made complete sense to Neil Wates, who unknown to Team 4 had already been to Berne, a visit that resulted in his commissioning Atelier 5 to design a small housing project.

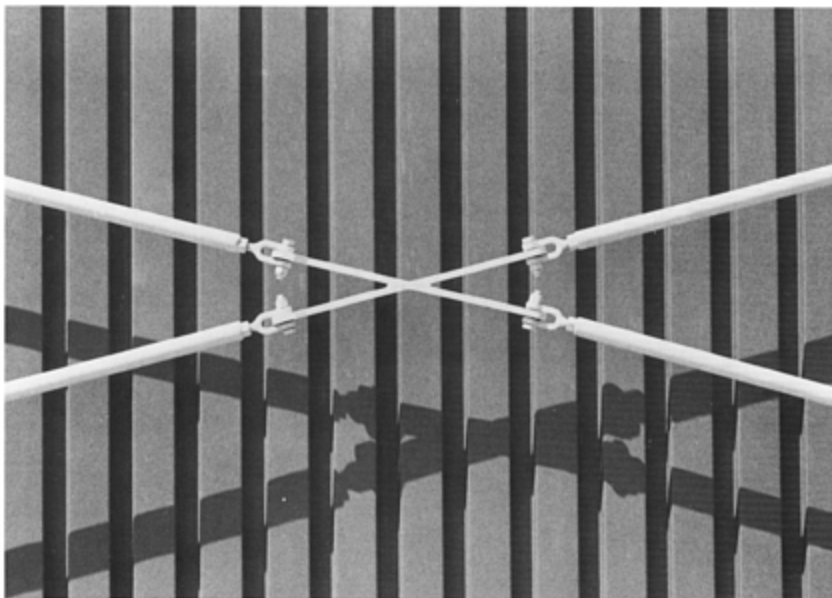
Neil Wates was so impressed by Foster and Rogers on first acquaintance that he decided to follow up their meeting by sending Wates' chief architect, Ken Bland, over to Hampstead to investigate Team 4. Norman and Richard had the idea that Bland was actually "a thorn in the side of the commercial interests of Wates", with the result that he was sent on an endless series of research visits around the country and the world in order to keep him out of the office. Bland's true status and effectiveness with Wates notwithstanding, the prospect of a potential client arriving at 16 Hampstead Hill Gardens was not one to which the partners looked forward. The divider they had built between the front working area and the rear of the flat was removed, allowing the spaced lived in by Norman and Wendy to be turned into an extension of the work area. This involved the construction of a large wooden framework over their bed.

This structure was in two parts to facilitate its handling and mobility. The basic idea was to conceal the bed beneath the two joined boxes. It took considerable physical effort by two people to manoeuvre these heavy components and succeed in lining them up over the bed. The secret was to align the two edges so that they met exactly halfway across the bed, then to conceal this junction by loosely scattering across it an array of magazines, including *Domus*, *Casabella* and *The Architectural Review*.

Hilary Walker, the wife of Team 4's quantity surveyor, brought in a typewriter, and the living-room was disguised so that it would pass for a conference space. Then Hilary set up her typewriter in the kitchen next door, so that she could make secretarial "noises off". When Ken Bland eventually arrived, things had never looked or sounded so busy. He was a large man, and when he was offered the coveted Eames chair, he declined and made instead directly for Frank Peacock's as yet untried wooden plinth. Mr Bland planted himself on the edge of this structure and proceeded to make himself comfortable. Entirely invisible to him, but in full view of the partners, a vast, gaping crevice opened up between the two plywood edges under the impact of Bland's weight. The architectural magazines were sucked slowly into this gap until they had all disappeared onto the bed that could be seen below.

Team 4 never received any commissions from Wates, although they continued to grow, until they filled all the rooms in the flat. At that point Wendy and Norman camped out with various friends, eventually finding another, entirely separate flat that was located about five minutes walk from Hampstead Hill Gardens. By that time they were married.





Electronics factory for Reliance Controls, Swindon, 1965



A design team meeting at Foster Associates in Fitzroy Street, 1972

The turning point for the practice came with the commission to design a small electronics factory for Reliance Controls Limited on a site at Swindon. Reliance wanted to build 3000m, and the budget was a mere £120 000. A number of other architects and contractors were interviewed for the job, and Team 4 had been included in this shortlist because their architect-photographer friend, John Donat,<sup>14</sup> knew the client, Peter Paul-Huhne. It was the Reliance managing director, John Steward, however, who had the responsibility for awarding the commission. Steward was an old-style manager, who was quite removed from life on the shop-floor. To the great surprise of Norman and Richard, John Steward accepted their extremely radical proposals, which did not at all correspond to traditional concepts of industrial buildings. As Norman recalls:

“Instead of the usual management box, with a workers’ shed tacked on, front and back, posh and scruffy; white collar/blue collar demarcations—we proposed a single, democratic pavilion. Production and administration were separated only by a movable glass wall. And there was just one, single, common entrance for all employees.”

Clearly, Norman’s working-class background and his experiences at the bottom of the ladder in Manchester Town Hall had a lasting impact on him and therefore his design thinking.

Recalling the design and construction of the Reliance project, Norman said:

“I can still remember all the critical dimensions by heart, because it was the first, and probably the last, building that I was totally immersed in from the concept down to the smallest detail.”

He also chaired every site meeting from the beginning of the contract to its completion. On his way from Paddington to Swindon by train to take charge of the first site meeting,

Norman asked Team 4's quantity surveyor, John Walker, to describe just what happened on these occasions. Walker could not believe his ears at first. But he soon realized that Foster was being perfectly serious, and that he had no experience whatsoever of actual site procedures. Walker then explained to Norman that it was part of the architect's job to assume authority and actually run these meetings.

The contractors for the Reliance job were Pope Brothers Limited. This company was run by the Pope brothers, known as "Pope Paul" and "Pope Henry", together with Paul's son, "Pope Paul II". Their management strategy was extremely simple. They provided a site hut calculatedly too small to accommodate any regular site meetings. Norman remembers that it was, in fact, so small that it was impossible to get four people standing inside the hut at the same time. The result was that, instead of having everybody sitting down around a table for a proper conference, there was a constant stream of people waiting to get into the hut, where they could be "grilled, humiliated or even physically threatened, depending upon the progress of their sub-contract work".

Norman has clear memories of those meetings, which he describes as "lessons in psychology and life". He was quite spellbound by John Walker's worldliness in the cut and thrust of life on the site, as well as being impressed by the quantity surveyor's thorough grasp of building knowledge and cost accountancy. In a similar way, he confesses to having been "dazzled by, and undoubtedly a bit jealous of, Tony Hunt's engineering expertise".

Since those early days, when he still felt envy of another's professional skills, Norman has travelled a great distance—from those uncertain beginnings in Manchester, when he was first a butcher's delivery boy and then a humble local authority employee, progressing through National Service in the Royal Air Force to become a junior architectural draughtsman in Mr Beardshaw's office in the mid-1950s and finally gaining a place at Manchester University followed by a year at Yale. After three decades of innovative and distinguished practice from studios located first in a Hampstead flat, then in the West End of London and now on the South Bank of the Thames at Battersea, Norman was, in the summer of 1995, recognized by the *Architects' Journal* as the most successful and most envied architect in Britain.

Later that summer, Norman Foster invited me to spend the day with him, on 11 August, at his French home, Fonte Colombo, on the Côte d'Azur. There in his studio, which is set apart from the house in the far right-hand corner of the terrace, Spencer de Grey and I met with Norman to discuss the first draft of my text, together with preliminary designs for the cover and some sample pages of this book. Norman was unusually relaxed in this astonishingly beautiful hideaway, almost another person in this other world of the French Riviera, for Fonte Colombo is remote in every sense from his underprivileged beginnings, and a profound contrast to the liner-like interior of the present Foster studio at Riverside Three in Battersea.

Fonte Colombo is perched high above the valley floor, and its terrace (where we lunched on shrimp and *crudités* with *aioli* washed down by a Provençal rosé) looks out between Roman pines, poplars and oleanders to a distant cascade of villas and apartment blocks. The ubiquitous olive groves thread through the landscape, with individual trees standing like sentinels in the middle distance. In the immediate foreground the gardens of Fonte Colombo, with their serried olive groves and the pergola walk descending between

the haughty poplars, preserve the old-world ethos of this locale. The scattered pantile roofs that peep above this variegated green maze also confirm the origins of these forms of flora and cultivation.



With Buckminster Fuller and colleagues to discuss the Oxford Theatre project at the Covent Garden studio, 1967–71



Foster Associates, Great Portland Street, 1981–90



The Foster Studio, Riverside Three, 1990



Norman Foster, August 1995, France

Across the valley, in the middle-distance, there is a profusion of unkempt buildings, and their image is more one of an industrial suburb than a bucolic landscape. While these intrusions reside at a safe distance from Foster's Riviera home, their presence on the opposing slopes seems somewhat ominous. It is hard to accept their awkward and uncomfortable shapes as neighbourly.

Norman Foster's astonishing progress from his cramped beginnings in a suburban Manchester terrace house, through Yale University, receiving the Gold Medals of both the Royal Institute of British Architects and the American Institute of Architects, to the secure perch of Fonte Colombo provides undeniable evidence of his determination and capacity to take hurdles of both life and architecture in his stride. Nevertheless, that landscape across the valley is reminiscent of images from industrial blight in Northern England as captured by Lowry, a reminder that all our dreams, all landscapes of ambition and achievement, are but fragile structures which, like architecture, are sketched in space and time.

This Southern French landscape, now scarred by so-called development, offers both hindsight and prospect of Foster's phenomenal progress from the English provinces to Central London, from a small English practice to a multi-unit international studio that is indisputably at the centre of architecture's world stage.

Norman Foster's response to these suggestions was predictably quiet and self-assured. Characteristically, he first of all gave a disarming half-smile. Then he allowed himself a chuckle, the sort of reaction I have learned to associate with imminent riposte, not to say a substantial onslaught. He wants to tell me that no obstacle, past, present or future, can impede the further rise and progress of the Foster Studio. I can sense that quite clearly from the set of his eyes and jaw. But instead he says, simply: "I'll tell you all about that later. Meanwhile, our lunch is ready now, and that cannot wait." (See Chapter 5.)

### Notes and references

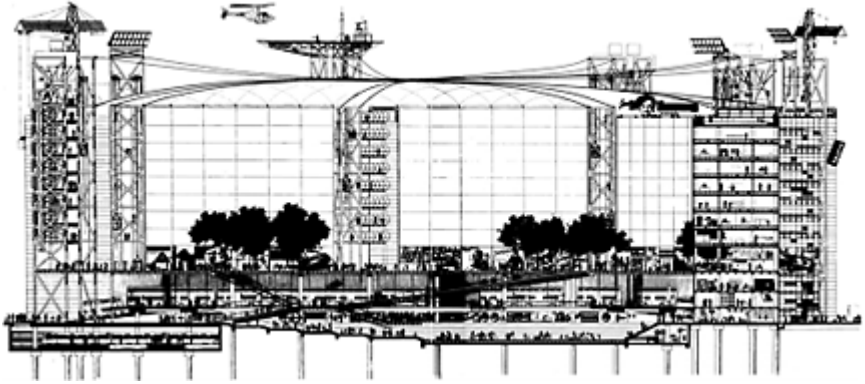
- 1 The practice originated as Team 4, when Norman Foster was in partnership with Richard Rogers, Wendy Cheesman and her sister Georgie Wolton. Foster Associates was then formed in 1967.
- 2 Cecil Steward is the first academic to become President of the American Institute of Architects (AIA). Steward went from being Associate Dean at Texas A&M University's College of Architecture in 1973 to become Dean of the College of Architecture in the University of Nebraska at Lincoln. He was first Vice-President of the AIA in 1991, and he went on to become President in 1992.
- 3 The remainder of this chapter is entirely based on a series of dialogues with Sir Norman, and upon his subsequent notes and correspondence with me. All direct quotations from that documentation are given in quotation marks.
- 4 There were discrepancies, too, in the requirements made by the different examination boards that controlled entry into British universities at that time. Within the category of so-called "matriculation", for example, it was possible to qualify for university entrance by attaining a certain standard of "pass" in an appropriate group of subjects at the GCE level. With the seven passes listed by Foster, for instance, it should have been possible to satisfy the Cambridge University Examination Board. The difficulty may therefore have been with the examination board which was selected by Burnage High School, or it could have resulted from the discrepancy between a pass in a subject and a higher level of performance required for matriculation (i.e. direct entry) into a university by that Board.
- 5 This early fascination with the plumbing of public lavatories perhaps helps to explain Foster's later preoccupation with the design of toilet facilities, culminating in the "unisex" type that Foster Associates devised for Century Tower in Tokyo. In the Century Tower design, the model is appropriately that of amenities found on airliners, where illuminated signs inform waiting users of the availability of the next cubicle.
- 6 Vincent Harris is perhaps the most celebrated designer of British civic centres in the first three decades of the twentieth century. The Civic Centre buildings for Cardiff in Wales are arguably his best and most elaborate.
- 7 G-Plan Furniture and Gordon Russell Limited were among the more successful furniture manufacturers of the post-World War II period. Both produced standardized, semi-modular units that offered better use of interior space, while Gordon Russell especially linked the thrust of modern furniture ideas with the established traditions of materials, form and construction.
- 8 L.S.Lowry (1885–1965) was a Lancashire painter renowned for his unique interpretations of northern England industrial life and landscapes. Although essentially a sophisticated artist, he rendered his material in a naive style that heightened the environmental contrasts he portrayed. The bleakness of his industrial compositions is intensified by the seemingly helpless, emaciated, stick-like portraits of the local population. Lowry avoided the risk of caricature through his sombre reality.

- 9 This sense of freedom and flexibility that Norman discovered in the continuum of working through the uninterrupted time span of 24-hour building opening at Yale is operated today in the Foster Studio. Riverside Three at Battersea is open 365 days a year, 24 hours a day.
- 10 Sadly, Rudolph did not maintain his position as a “brilliant teacher”, nor did he retain his reputation as a leading American architect. During the 1980s and 1990s, Rudolph’s work has been mainly abroad, and mostly in the Far East. Ironically, perhaps, one of his buildings from the 1980s is just down the street from Foster’s Hongkong and Shanghai Bank, and its attempts to create a sculptural effect from the faceted glass planes offer a weak foil to Foster’s masterpiece of Modernist expressionism.
- 11 *Community and Privacy* (1963) is certainly one of the most significant books to be published in the environmental field in the third quarter of the twentieth century. During the 1960s, many people involved in building design, or in environmental design education, became preoccupied with what became known as “Design Methods”. These Design Methodists—and their ranks included Christopher Alexander—sought to rationalize the design process along abstract, frequently mathematical lines, which reduced everything to objective, material and measurable factors. *Community and Privacy*, while seeking an objective and measured view of the residential environment, was at the same time sensitive to human and emotional aspects, establishing human territory as a unique interactive family of activities that is as much environment as the architectural framework that contains it.
- 12 The Ruberoid competitions remain an essential part of student life in the schools of architecture today.
- 13 Neil Wates and his company established and maintained a high standard of estate planning and private residential construction around London and in the Home Counties during the 1960s and 1970s. Neil Wates was renowned for a passion to provide the highest standard of domestic environment in his projects, and for this reason he was a keen student of other related work being done on the continent of Europe.
- 14 John Donat is the son of the well-known British actor, Robert Donat. John edited a number of architectural books, but he is principally known for his architectural photography. He has photographed many Foster buildings.



## Chapter Two: The body of practice

### A dialogue with the partners on the Foster approach to design



Hammersmith Centre, 1977–9: cross-section

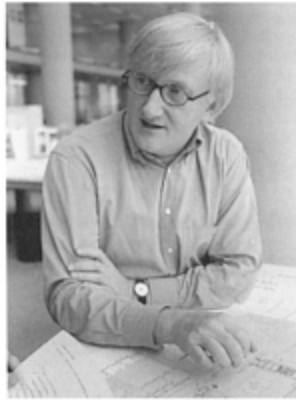
In the spring of 1993, I began teaching a new course at Texas A&M University. Its beginnings in my consciousness, however, went back to the late 1960s when, as Director of the Architectural Association in London (1967–69), I came in close contact with a number of leaders in the Design Methods movement—principally Bruce Archer, Christopher Alexander, Geoffrey Broadbent and Christopher Jones. At that time I had just emerged from a three-year period as consultant (1962–65) to the nationalized British Steel company of Richard Thomas and Baldwin Limited (RTB), in which capacity I had been responsible for initiating the IBIS (Industrialized Building in Steel) project. This involved the appointment of the architectural office of Alex Gordon and Partners to work with RTB and their collaborators, Pressed Steel Limited. The idea behind the creation of IBIS was to facilitate the use of more RTB steel through the manufacture of prefabricated dwellings that would meet the needs of the housing market in the public sector. As it happens, Alex Gordon, who was later to become President of the Royal Institute of British Architects, was himself caught up in a design methods approach to practice, and he is mostly remembered for his RIBA-sponsored study that was published as *The Architect and His Office* (1962). Through my work at the Architectural Association and on the IBIS project, therefore, I became steeped in the twin processes of architectural practice management and design methodology during the period 1963–69.



Norman Foster (second left) with his partners (l to r): Spencer de Grey, Barry Cooke (made partner in 1997), Ken Shuttleworth, David Nelson and Graham Phillips, Riverside Three, London, 1997

I returned to teaching after a four-year gap, when I was appointed as lecturer at my undergraduate school, Liverpool University (1970–73), and it was in that period that Graham Phillips became one of my students. Graham recalls that we had many lengthy and passionate discussions about design in the early 1970s. One focus of those exchanges was our sense of frustration as we realized how inadequate those management and method procedures were for the advancement of architecture as a social art and that, back in the early 1970s, there seemed little we could do to stem the rationalizing tides that inundated architectural practice during the greater part of the 1960s.

I did not meet Norman Foster until July 1991, following my visit to Tokyo three months earlier, when I had seen Century Tower during the last stages of construction. My contact with Foster Associates, as they still were at that time, re-established my engagement with the processes of professional practice. By 1993 it was agreed that I should write this monograph. I began my research by talking to Norman's four partners—Spencer de Grey, David Nelson, Graham Phillips and Ken Shuttleworth—asking them at the outset about their early days in the practice. My first exchange was with Spencer de Grey.



Spencer de Grey

**Malcolm Quantrill:** Spencer, I have had more opportunities to discuss the Foster studio with you than with any partner, other than Norman. You have also been with Norman longer than almost anyone else still here, going back to February 1973—nearly a quarter century. How did you get involved in the Foster world?

**Spencer de Grey:** Before I joined Foster Associates, I had been working for the London Borough of Merton, where I was responsible for the design and construction of a new school on the Pollards Hill Estate in South London. It was the first middle school to be built in the borough. The design was influenced by the California Schools System (SCSD) that the British-trained American architect, Ezra Ehrenkrantz, had introduced to the West Coast. It was also influenced by Norman's submission for the Newport School Competition. As Foster Associates were just starting work on a school for handicapped children in Liverpool—Palmerston School—it seemed perfectly natural for me to join the practice when the middle school was complete.

**MQ:** As you switched from a local authority office to what was already one of the pre-eminent private practices in Britain, what were your first impressions? **SdG:** Well, my earliest memories of the practice are dominated by the Willis Faber & Dumas building, then under construction in Ipswich. I remember quite clearly the occasion when Martin Francis and other members of the Willis Faber team described the development of the detail design for the suspended glass wall that enclosed the building. It really represented a major technical breakthrough, an extraordinary technological feat, which typified for me everything that the practice stood for: the determination to break new ground, both at a strategic architectural level, and also in terms of detailed technical design.

**MQ:** What about your working relations within the existing structure of Foster Associates when you joined the practice—your links with the partners, and team patterns?

**SdG:** On Palmerston School I worked with Birkin Haward, but more particularly with Wendy, who challenged everything! This was a very low-budget project, and she was determined to ensure that every avenue was explored to achieve the best possible

solution. It was a remarkable experience to work with her, because of her extraordinary perception about design. She could always identify the “heart of the matter” with unerring accuracy. The design for the school was rooted in the mainstream thinking of the practice at the time—the perfecting of industrial building elements to create a flexible, humane and all-embracing environment for the user. Here, a five-bay, steel portal frame enclosed a colourful play space for the children, with generous natural light from above.

Brian Forster, a very talented structural engineer from Tony Hunt’s office, worked with us, and Adrian Wilder was responsible for the drainage. I mention this because Adrian’s drawings were some of the most beautiful technical representations I have ever seen. Every inch of the drainage runs was meticulously draughted. It was an exemplary lesson for me in how the design of the services must be carefully considered and coordinated into the building as a whole—an early training for what was to be one of the most important aspects of our work at Stansted, the new third London Airport in Essex.

**MQ:** What happened after Palmerston School? What was your next challenge at Foster Associates?



Palmerston Special School, Liverpool, 1974

**MQ:** But, in spite of all that care and effort, I gather that the IBM project did not proceed smoothly?

**SdG:** After the school was finished, I began work in 1975 on the strategic design for IBM’s new buildings at Greenford, Middlesex. This was the first time I worked closely with Norman himself. I remember striving with him to achieve the best possible master plan for this sizeable industrial complex—getting the right framework for a large site with a major client was crucial to the long-term success of the project. The first phase,

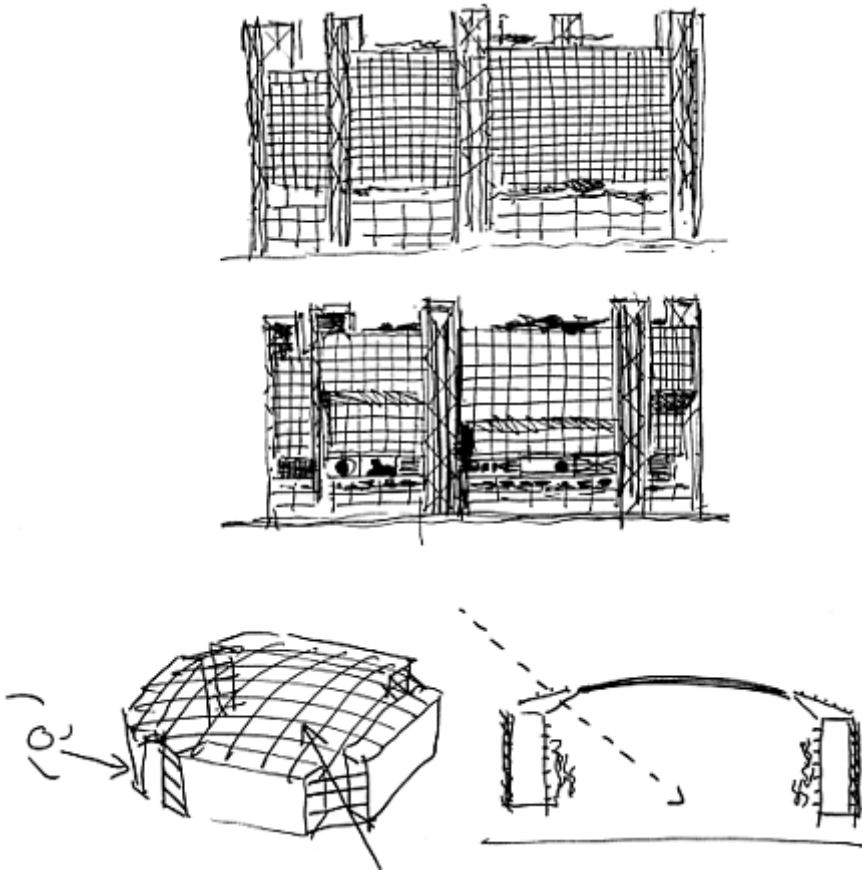
the UKDC, embraced many different activities within a single enclosure. Internal standards were kept consistent throughout, so that office workers and warehouse personnel all enjoyed the same environment. The “many functions under a single umbrella” was again another design obsession of the time, finding its way, as it did, into such diverse buildings as Willis Faber, the Sainsbury Centre for Visual Arts, and IBM.

**SdG:** Well, the original project was successfully completed but IBM brought the next stages to a temporary halt in 1976, and I then worked on a number of other projects. These included the new headquarters for Cincinnati Milacron at Milton Keynes, which allowed us to continue developing our ideas about flexibility for large industrial organizations. These involved the complete integration of office, manufacturing and storage areas to create a seamless container for the client.

**MQ:** Although the Willis Faber building has an urban setting, it doesn't represent urban design in the conventional sense. And IBM at Greenford, Cincinnati Milacron and the Sainsbury Centre are all located in the suburbs or country parks. Did you have an opportunity in those early days at Foster Associates to grapple with the inner city, the urban fabric? After all, there you were working in a studio right in the heart of London.

**SdG:** That chance came in 1977. We were approached by London Transport to design a major transport inter-change and commercial centre on the roundabout site at Hammersmith Broadway in West London. We were the third firm of architects to be engaged by London Transport to study that site, which had a chequered career both with the London Borough of Hammersmith and with the Greater London Council (GLC). We soon arrived at the overall design strategy, concentrating the office buildings around the perimeter to provide a major public space, the size of Trafalgar Square, in the centre of the site. This public space was on an elevated deck above the bus garage and London Underground station. Our ideas about perimeter development on a site, developed from philosophies promoted by Sir Leslie Martin whilst I studied under him at Cambridge, later flourished in the master plan for King's Cross some ten years later. It took a long time, however, to rationalize the exact form of the perimeter ring of offices so that it was fully integrated into the surroundings. It also took time to resolve the impact of the diagonal underground railway lines that bisected the site, and the consequent complexities in the resulting structural geometry.

This was the first occasion when Foster Associates worked with Ove Arup and Partners. It was on this project, also, that we first met Stuart Lipton, who was then in charge of the developers Greycroats. He was representing an important potential tenant on the site. Stuart later became a major benefactor of the practice, with his direct involvement in such projects as King's Cross,



Hammersmith Centre, 1977–9: concept sketches by Norman Foster

ITN and Stockley Park. He also provided invaluable support and advice for the Royal Academy on the contractual intricacies of the Sackler Galleries.

**MQ:** How did you fare with London Transport and the local authority?

**SdG:** We had a lot of constructive discussions with the planning office at Hammersmith, leading to a successful public exhibition and meeting at which our proposals were broadly accepted by the people of Hammersmith—the first time architectural proposals had been welcomed for the site. In fact, when the project came to a halt, there was a public outcry demanding that our scheme be retained. It was at that point, however, that London Transport elected to engage Bredero, a Dutch firm of developers, as their commercial partners. After a fairly short honeymoon period it became clear that Bredero had a totally different approach to the site and were intent on a more conventional approach. At the same time, new ideas were being explored in the practice, which led to a more dramatic, totally enclosed central plaza.

**MQ:** But didn't that downturn of fortunes for the practice more or less coincide with the opening up of a major new avenue of opportunity and development?

**SdG:** Oh yes, because on the same day that Hammersmith came to an end, we received the brief for a limited design competition for the new headquarters of the Hongkong and Shanghai Bank in Hong Kong. This project was destined to completely change the nature and standing of the practice. It was to become, almost overnight, a major international practice.



Koo Pak Ling  
古柏齡

Hongkong and Shanghai Bank: sketch by Feng Shui geomancer Koo Pak Ling, 1980

**MQ:** And didn't it also give you a further opportunity of working with Norman and Wendy?

**SdG:** For certain, yes. I travelled with Norman and Wendy in August 1979 to Hong Kong to look at the site and receive a briefing from the Bank's directors. One of the highlights of our first meeting with our potential clients was a dinner that the Bank staged on their own boat for all the invited competitors. It was quite fascinating to observe the very different attitudes of the seven architects in a highly competitive, yet still social, situation. While others demonstrated their athletic or social prowess, my contribution was to continue talking calmly to the bank's project manager while having a cup of scalding coffee poured over my groin. Interestingly, we were the only firm who stayed on in the city after the briefing, studying the various departments of the Bank and getting to know Hong Kong and the site. This also involved a trip to the New Territories to visit a geomancer in an attempt to understand the significance of *feng shui*—we still have his sketch in the studio today, showing in a quite uncanny way a close resemblance to the final design.

**MQ:** And once again that extra effort, that attention to detail, the Foster sense of ultimate perfection—all this paid off?

**SdG:** Yes, with nearly the whole practice involved in the presentation, we made our submission to the Bank in September 1979, and shortly afterwards we heard that we had won the competition. That was the major turning-point for us: it was by far the biggest building we had ever undertaken—our first high-rise—and it was 13000km from London!

**MQ:** Did you yourself actually live and work in Hong Kong during any stage of this project?

**SdG:** Yes, I was there for one and a half years, setting up the Hong Kong office with my wife Lucy and Graham, and also developing the brief with the Bank. I liaised with the

London studio, coming back to London many times during that period to work on the design.

**MQ:** But that didn't mean the end of Hong Kong for you, did it? Just one and half years, then the cord was cut? Could you elaborate?

**SdG:** In December 1980, a year after going to Hong Kong, the British Airports Authority approached the practice to do feasibility studies for the third London Airport at Stansted, to strengthen their evidence at the public inquiry. I returned from Hong Kong in February 1981 to head up the design team for Stansted, a project I was to remain responsible for during its ten-year duration.

**MQ:** But you remained involved with Hong Kong for a while, didn't you? How did that work?

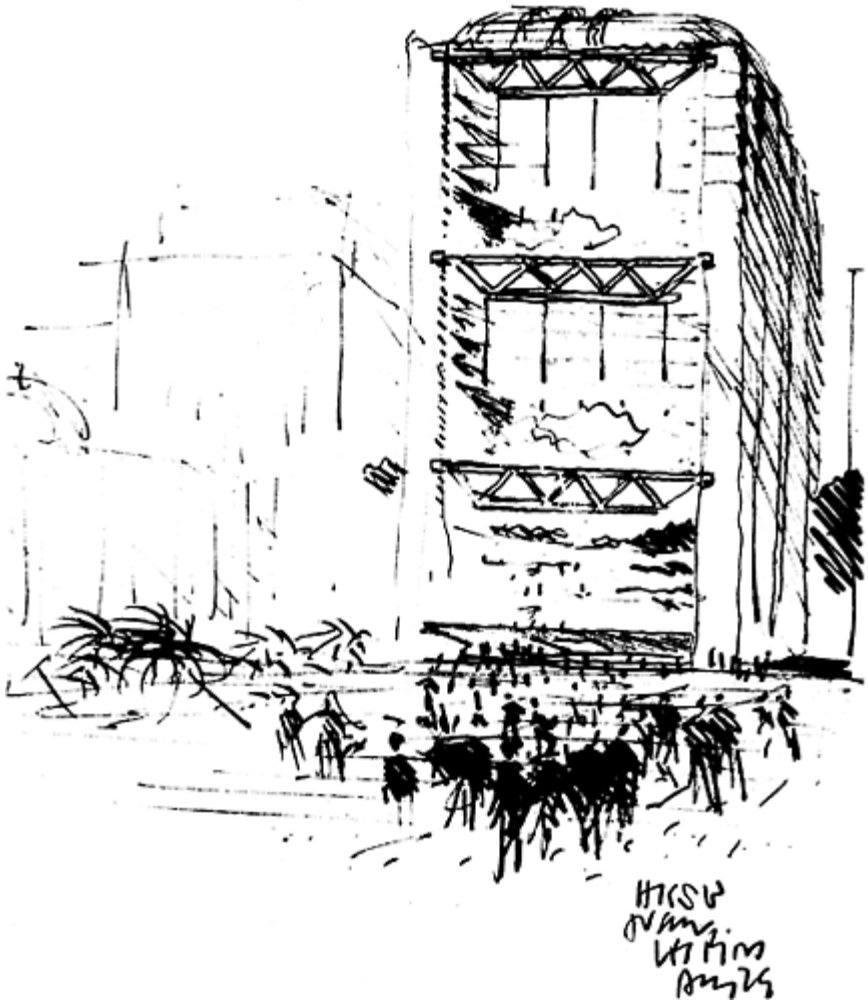
**SdG:** Oh, the next year, 1982, was a frantic year all right. The demands of the Hongkong Bank intensified, while Stansted took up plenty of time. It wasn't at all an easy period. By the end of 1982, however, I had relinquished my role on the Hongkong Bank to Chris Seddon, who was resident in Hong Kong. A few months later, by the beginning of 1983, the entire Bank project team moved to Hong Kong to continue the detailed design, and supervise the construction on site. Having been made a director in 1981, I then remained in London to run the studio with Norman, Wendy, Birkin Haward and Loren Butt.

**MQ:** But another exciting opportunity in the sphere of urban design was yet to come: first Hammersmith, and then the new headquarters for BBC Radio on the Langham Hotel site opposite the BBC's Broadcasting House.

**SdG:** We were naturally excited when we won the BBC Radio Headquarters competition in 1983; Mark Sutcliffe returned to the practice to work on this project with me and David Morley. The BBC was another watershed project, alas never built, where the ingenuity and skills of the practice were tested to the full. Over 100 models were produced to study the impact of this key building on its historic surroundings. The brief was developed from scratch, a fascinating project in its own right, carried out with Dieter Jäger of the Quickborner Team from Hamburg, who had worked with us on the Bank. The late Dick Francis was an inspired client, but in the end the project was aborted after its "architect", BBC Chairman George Howard, died and a new chairman, Stewart Young, took over. The London studio therefore continued to be hectic. While we were finishing off the Renault building at Swindon, we were also working on Stansted, the BBC, the Frankfurt stadium and then, in 1984, we entered and won the competition for the new Médiathèque at Nîmes, in the south of France.

**MQ:** By then Stansted had already been under way for some four years. Can you tell me something about the way it developed?

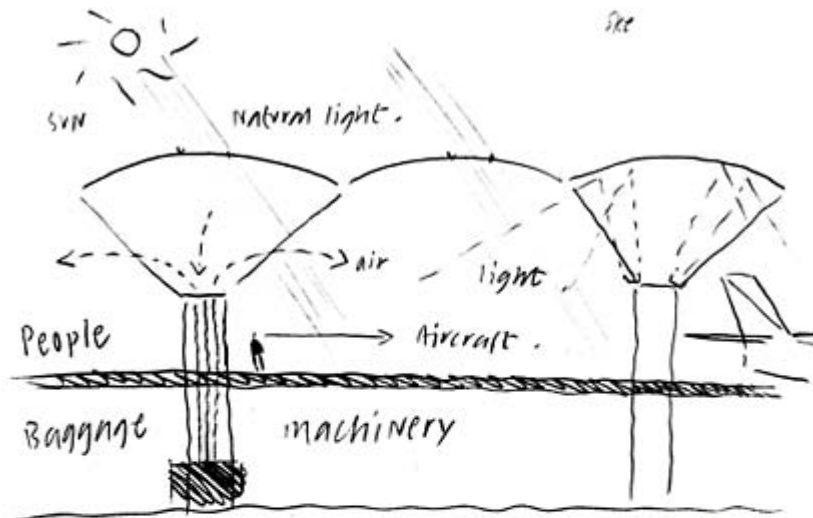




Hongkong and ShanghaiBank: sketch for the competition submission by Norman Foster, 1979

**SdG:** In June 1985 the British Government announced the go-ahead for Stansted; London's third airport then became a real job with a fixed completion date. Over five years later, in March 1991, the new terminal was opened. In our design, the normal arrangements for airport terminals are literally turned upside down. At Stansted all the services are below the main passenger concourse. This strategy was developed with Loren Butt, a highly creative environmental engineer who had worked in the practice since 1971. Passengers then circulate at one single level, moving in simple, straight lines from landside to airside in a bright and lofty "room", some 200m by 200m. The roof, supported by tree-like structures and devoid of any services, allows the building

to be generously lit by natural light from above. Natural light is a key part of the design of this space.



Third London Airport, Stansted, 1981–91: concept sketch by Norman Foster and the terminal at night

The structure, with its tree-like forms, provides everyone with clear orientation. In a way, Stansted can be seen as the culmination of many of the earlier ideas and philosophies of the practice. It provides a single, elegant enclosure, housing many diverse activities under one roof to give the client great flexibility but above all, through economy of form, to create a memorable space clearly ordered by its striking structure.

**MQ:** Ten years is certainly a long time to spend on one project by modern standards. But I believe that Stansted was not the only job you were involved in during that period.

**SdG:** In addition to Stansted and the BBC Radio Headquarters, I was also responsible for the Sackler Galleries at the Royal Academy of Arts. It was our first significant work

within the context of an important historic building. The challenge of the Royal Academy was to peel away the layers of history so that they were revealed for all to see. We then inserted new elements of structure and architecture to bring life and light into the very heart of the Royal Academy. This interweaving of the new with the old was an extremely complex problem to resolve, requiring close collaboration with both English Heritage and the client. It was very rewarding to develop and refine the design, so that the old and the new each benefit from the presence of the other.

**MQ:** If involvement with the Hongkong and Shanghai Bank provided one watershed in the evolution of the Foster studio—with the dramatic change from a domestic to an international practice—did the completion of Stansted Airport create a similar landmark achievement?

**SdG:** Oh yes, because in 1991, the year that brought the completion of Stansted, our portfolio of completed buildings became considerably enlarged. Stansted, Century Tower in Tokyo, ITN, the Crescent Wing at the Sainsbury Centre, the Barcelona Tower and the Sackler

Galleries all opened within that year. Also, it was a watershed for me personally, because after Stansted I became responsible for a much wider range of projects. They included the new Law Faculty at Cambridge University, the Lycée Polyvalent at Fréjus in the South of France, the British Museum, the new Commerzbank headquarters in Frankfurt, a major new medical building for Imperial College here in London, and a new regional centre for EDF in Bordeaux, together with such competition entries as Cardiff Bay Opera House and the World Cup Stadium for Paris.

**MQ:** Well, that amount of responsibility has kept you fully occupied over at least 15 of the 25 years you have been with the practice. It has also made you an important, I should say virtually indispensable, force in Norman's high command. Yet while a number of the young designers who came to Foster Associates to cut their teeth subsequently left to set up their own practices, you seem not to have had that temptation. I have heard Graham Phillips refer to Norman as "a very extraordinary man who is not only my partner, he is also my friend". This speaks of a special kind of loyalty within the partnership. Is your own loyalty similarly motivated?

**SdG:** Yes, of course. As I have mentioned before, there is something quite unique about this practice, which I don't believe can be imitated. At the very heart of the work and philosophy in the practice there is an intense desire to create something special and of high quality. For this reason, each project is taken on its own merits. We believe that it is necessary to build a strong relationship with the client and the client's brief. For us, a unique solution can only grow out of the close interaction between client, brief, site and architect. Preconceptions are challenged, and new avenues are explored to ensure that our design direction is securely founded. While the actual appearance of our buildings differs widely, there are a number of common themes running through our work, which are:

- 1 the *urban context*, which embraces the "physical context" as the "spirit" of the place;
- 2 the *social context*, which acknowledges the fact that architecture is about people;
- 3 *lighting*, especially natural lighting, which is one of our really dominant themes; it is the poetic dimension of architecture;
- 4 *design clarity*, which ensures that the building concept is reinforced by the use of

appropriate materials and the attention to detail throughout the work;  
5 *reinvention* of the building form—as Norman puts it: “our buildings reinvent the building type—the Microelectronics Building at Duisburg totally reinvents the concept of a building where people make things.”

**MQ:** Fascinating. I look forward to their elaboration.

**SdG:** Oh, they’ll be self-evident. I assure you.

[David Nelson joined Foster Associates in 1976, and he was originally employed to work on the Sainsbury Centre at the University of East Anglia.]

**Malcolm Quantrill:** What impressed you during your first days at Fosters?

**David Nelson:** One of the things that struck me most about the place from the very beginning was the amount and intensity of effort focused on design. Perhaps my astonishment at this was due in some part to the fact that I had come to the practice direct from a college environment, where life goes at a very different pace. But I still think this special quality is unique to the Foster studio.

**MQ:** Did you work with a particular architect from the beginning of your time in the Foster studio?

**DN:** I was employed initially to work with Tomm Nyhuus, an associate, on furniture for the Sainsbury Centre. My background from Hornsey College of Art locked me into this kind of work for the first few years in the Foster studio but it did have its rewards. Then, not long after arriving in the practice, I was able to see Norman at work with Sir Robert and Lady Sainsbury on the new Sainsbury Centre for Visual Arts at the University of East Anglia, when they met to discuss carpets, display cabinets, turnstiles, and other interior details. I was really amazed at the sheer amount of effort required at that level to explore, convince people, and to develop a design. I also saw how very good Norman was at doing it. This early experience in the Foster studio left me with a conviction that has remained true over the years, which is that the design of interiors is by far the most difficult task in the entire building process.



David Nelson



Foster Associates Studio, Fitzroy Street, 1971–81

**MQ:** You suggest that there were intra-team rivalries, and even rivalries between teams, but how did you find relations and communications across the practice as a whole?

**DN:** One thing I remember most about that period was the way communications, particularly between Norman and the rest of the team, actually worked. The practice was, is and always will be based on a group of individuals. These individuals possess their own quite strong personalities and ideas. Nevertheless they have an overriding desire to work as a team: their common intent is to focus their collective ability on a problem rather than display some individual heroism.

**MQ:** How did it all work, then, when you all had these apparent conflicts of interest and purpose?

**DN:** Conversations about design would take place with Norman and Roy Fleetwood. Norman would come into the area of the studio where the team was sitting, and then discussions continued that never quite seemed to reach any precise agreement. More often than not these were general, exploratory design sessions that provided a whole range of ideas. At that time, I never really understood how Roy got enough information to take away and build upon. It seemed to me that Roy would just go off and develop what he thought was right. I realize now that what was taking place was far more complex. Teamwork really is a process of shared thought; this takes place between people who are like-minded, with shared experience and knowledge of each other. Although the individuals involved saw things from their own different positions, the result of their teamwork was well coordinated and consistent: their buildings don't look like the work of six individuals who were fighting each other throughout the design process. On the contrary, they demonstrate that six individuals have been working together, all of them focused on one goal.

**MQ:** Would you say that this process, as you have described it, is the secret behind what Norman expresses as “consistency through diversity” ?

**DN:** Oh certainly, because there is no doubt that, over the years, one of the keys to success in the Foster studio has been just that. Although individual projects are very different from each other, the body of work is very consistent as a whole. Also, the size of the practice at the time I joined it is quite significant. I believe that a practice of about 30 people is probably an optimum team. You know everybody, not only by their first names, you know their wives and their children. The interrelationship between

people is therefore much closer. When I joined the practice, what was known as “Thursday lunch” was already flourishing. I think that this was originally seen as a morale-raiser for everyone. On Thursdays, around lunchtime, the tables would be pulled together in the centre of the studio, and the coffee girl, maybe with some help, produced a salad lunch. Everybody would sit around and talk for a while. This meant we got to hear about each other’s projects, and the various issues that were in the air. It was a great way of communicating. But as the practice grew larger, the “Thursday lunch” inevitably became a victim of size.

**MQ:** But why, if it was so important and successful, so much a part of the Foster family as it were, was it abandoned?

**DN:** I seem to remember that some years later, during the warm-up for the Hongkong Bank, there were so many people one Thursday for the weekly lunch that Norman and Wendy didn’t manage to get enough food. It became obvious that the original idea wasn’t really working any more, and it was abandoned. Our café in Riverside Three is a direct descendant of “Thursday lunch” and serves a similar purpose as a social focus.

**MQ:** But I have used the present café on a daily basis over several months, and you certainly couldn’t describe it as a focus of communication. Its long, drawn-out form is surely against that.

**DN:** Oh, I don’t agree—it works well even though we are now seven to eight times larger than that cosy little studio of 30. We have more teams, yet we manage to be more integrated. The basic problem with a practice of 30 people is the difficulty in guaranteeing the necessary flow of work. Although it’s a very enjoyable size, you have to accept that every few years, particularly if a project goes down, you are going to lose a percentage of the friends you have made. A practice can lose expertise in an instant, but it takes a long time to repair the gaps and build it back up again.

**Malcolm Quantrill:** How about you, Graham? You were one of my best students at Liverpool. I’m not at all surprised to find you here as one of Norman’s partners. But let’s have your impressions. How did you get involved with the Foster studio, and what did you find when you got there?

**Graham Phillips:** Well, apart from your giving me an introduction to the broader academic context in the world of architecture, at Liverpool I benefited mainly from two other teachers: David Brock, who taught me about form; and Christopher Riley, who told me everything he knew about contractors and the real world outside. The three of you imbued me with a complete and unshakeable confidence in my own ability. Getting a job in the practice I admired most therefore seemed to present no problems. All I had to do was apply. Then, if they needed a young architect like me—after all, I had a first-class honours degree and an RIBA medal—I would certainly get an interview. The rest seemed to be simply a formality. It never occurred to me that I might fail the interview and be rejected.

**MQ:** But I understand that you were turned down on the first occasion?

**GP:** We’ll come to that in a moment. At least I got an interview. I well remember receiving the invitation on that wonderful, original headed notepaper with “Foster Associates” printed in neon green. The plastic shell chair in which I sat in the reception area of Fosters’ black-windowed studio in Fitzroy Street was also green. It wasn’t any

normal office; it was more like a starship, with its rubber gaskets, bulkhead doors and a crew wearing carefully coordinated day-glo tank tops.

**MQ:** And what sort of preparation did you have for such an intimidating experience?

**GP:** In my last two years at Liverpool I had naïvely chosen “A search for form” as my thesis topic. My purpose had been to discover the meaning of architecture. While still at Liverpool I had formed very clear views on the design process and the significance of the “creative leap”. In getting to that stage I had rehearsed the arguments for virtually all the current design theories and methods. I was not at all surprised, therefore, to be asked at my interview: “What special skill do you believe you will bring to the practice?” My answer indicated that it just had to be my conceptual design ability. Apparently, I should have quoted some specific expertise, like “syphonic drainage” or “network analysis”. Anyway, from that point in the interview things started



Graham Phillips

to go downhill. I was told that no particular person in Fosters was responsible for conceptual design. Instead the practice depended on a collaboration of people with different skills—a team approach, a merging of inputs.

**MQ:** And how did you respond to this point of view?

**GP:** Unfortunately, I allowed the interview to deteriorate into a heated debate. I attacked what I thought of as just a lot of architectural jargon. It seemed to me that this stance belied the real truth about the design process. I sensed that what was actually going on behind the scenes was not being properly acknowledged.

**MQ:** And was that the end of the matter?

**GP:** In one sense, yes. But during the interview I met various senior people in the firm, and for me they all took on a sort of superhuman quality. After all, they had made the grade, and they were in command of this amazing starship. They might talk about teamwork, but these men were real heroes. Whatever they said, there was no mistaking their heroic bearing.

**MQ:** But, in the final analysis, as they say, you didn't get a job offer?

**GP:** I got a more-or-less standard letter of rejection, although there was just a faint ray of

hope in the line that told me: “Your details will be kept on file for future reference”. But my old world of youthful self-confidence collapsed at that point, and the hard realities of professional life began to gain my attention.

**MQ:** So, with your first choice of practices eliminated from the list, what did you do next?

**GP:** Well, my resolve was unchanged. I planned to get into the Foster studio sooner or later. In the meantime, I took a job with Arup Associates, and I spent five years with them before I succeeded at my second Foster interview in 1975. Two things were different the second time round. First of all, I guess I was a more humble and worldly-wise candidate, who knew what *not* to say. Then the interview structure had changed, and I was seen by Norman himself, which is what I had always wanted. All the time I was with Arups, which was like attending a very good university for professionalism, I still longed to work for my first love and join the crew of my architectural starship.

**MQ:** Did you maintain any contact with the Foster studio during those five years at Arup Associates?

**GP:** In a manner of speaking, yes. I regularly pored over the architectural magazines that contained Foster schemes, and, with my colleagues, I tried to fathom how it was that Foster somehow managed to break the rules or benefit from some special element of the brief.

**MQ:** And did you solve this mystery after you had finally gained a place in the Foster studio?

**GP:** Well, I soon learned that there were no special tricks or concessions. Instead, everything was the result of sheer determination driven by a very remarkable man—Norman Foster. But that lesson came the hard way, and my first experience of working with Norman was as surprising as my failure to succeed at that first interview five years earlier.

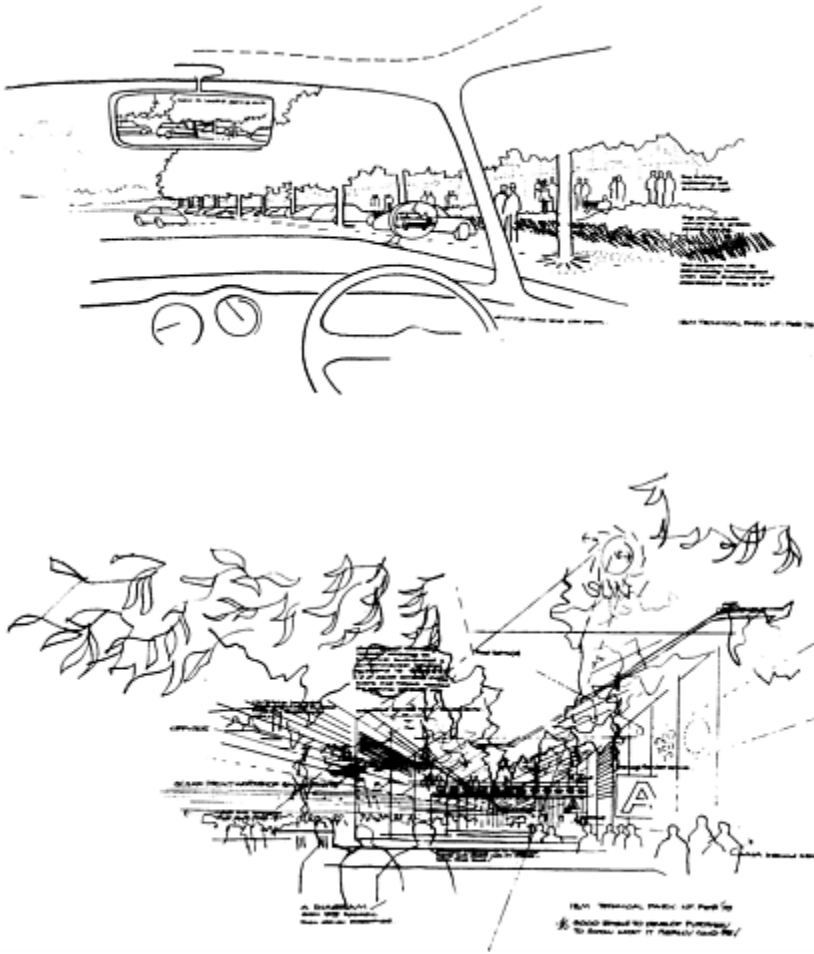
**MQ:** But how exactly does this later incident relate to your original, early experiences in the practice?

**GP:** Well, from the outset there were very few encounters with Norman that turned out as expected. At Arups, among other things, I had spent considerable time learning to detail roads, pavements and the whole range of external works. When I arrived at the Fitzroy Street studio, I was assigned on my first day as a “package architect” to Fosters’ IBM Greenford project. When I was given the “external works” package to develop, I was completely confident. Immediately, I got down to producing detailed cross-sectional drawings through roads and kerbs, indicating all the necessary layers of tarmacadam, British Standard kerb dimensions, drainage falls and invert levels! About three weeks later I was asked to put up all my work on the magnetic panels that stretched full width across the back of the studio.

**MQ:** And what happened then? What was the outcome of that display of your talents?

**GP:** Well, you can imagine my surprise when, instead of being complimented on a wonderful set of drawings I was told to just forget everything I had ever learned at Arups. The result of that review was that the entire three weeks’ work was torn up. I had detailed a road scheme in a “classic” yet traditional style, using more





IBM Greenford, 1975: concept sketches by Norman Foster

refined, rather shallow kerbs. My conversation with Norman that day began with his reference to country houses, and to the fact that country roads did not have kerbs at all—which perhaps provided a more appropriate model for the “technical park” we were designing. Norman’s initial mention of a country park “style” developed into his vision of an entirely flush, hard and soft landscaping scheme, which at one point included green tarmacadam! And whenever anybody challenged this vision with such practical problems as those of cars driving on the pavement, or lack of definition under snow cover, he simply generated such amazing suggestions as “rows of bollards”, or “reflecting fluorescent-pink cats’ eyes” to delineate hard surface areas.

**MQ:** After five years’ work in Arups’ fine office, and then being more or less told to start again, you certainly must have felt somewhat chastened and confused?

**GP:** In a way, yes. But, it was in that first encounter with Norman on a project that I

began to understand why his work was so exceptional. It was then, too, that I came to realize how phenomenally difficult it would be to keep pace with him, or for that matter with everyone else in the practice. Eventually, I came to learn that the Foster style was not a “style” at all: not some “solution” or “treatment” that you could predetermine. The design process at Fosters involved re-examining everything from first principles. If the possibility arose of a new interpretation that “designed out” traditional elements (like my kerbs!), then almost invariably this more efficient route, the “leaner and keener” solution, would be adopted.

**Ken Shuttleworth:** I was born and brought up in the suburbs of Birmingham—we lived in a semi-detached house in a cul-de-sac. I had little confidence as a boy except in one thing—I could draw—and this became the most important thing in my life. I was also passionate about working really hard. My parents taught me the value of work and, although I was not the brightest of kids, I found that by working hard I could do better at school than some of the brighter ones.

**Malcolm Quantrill:** And when did you first think you wanted to be an architect?

**KS:** I wanted to be an architect from the age of six. I used to stop on the way back from swimming with my dad on a Sunday morning and draw a house at the corner of Warren Farm Road—I was designing houses from a very early age. The only thing I was sure about was that I didn’t want to spend the rest of my life in Birmingham. I went to Leicester Polytechnic School of Architecture, and I gained a lot from Leicester. At the end of my first and second years I took summer jobs in two small Birmingham practices, where I really learnt the rudiments of traditional buildings, which I’ve always considered to be a very valuable experience.



Ken Shuttleworth

**MQ:** Do you recall when you first became aware of the Foster studio?

**KS:** I remember my first introduction to Foster Associates very well. I was in my third year at Leicester, and I went to an evening lecture by Loren Butt from Foster Associates. I had never heard of Fosters. Loren started off with slides of the Olsen Millwall Dock project. The first slide showed a corrugated tin shed on the left of the

picture and another on the right, and nothing seemingly in the middle. The next was a similar view from a lower level—why had they designed two tin sheds with a hole in the middle? The third slide revealed what was going on—it was a mirror glass building linking the two tin sheds with reflections of large ships. The rush of adrenalin I got was amazing—I became so excited that I can still remember the feeling to this day. From that very second I was in love with the work. Loren continued, dancing through slide after slide, taking my breath away. I was transfixed. In the end I realized I had never seen anything quite like it—it was the most exciting event of my life. I immediately went up to Loren and asked him for a job—he told me to apply. I did, and I got an interview with Mark Sutcliffe. The day before that I had gone for interviews with both YRM and Arup Associates, my tutor John Lee encouraging me to go to a solid practice rather than the more fly-by-night Fosters. I was ill after the interview at YRM and had to postpone the interview with Mark. Mark set up another interview for a week later. I came up to London, arriving two hours early for the interview, and stood under the overhang of the building on the corner of Clipstone Street, sheltering myself from the rain. I was certainly not going to be late!

**MQ:** So, there you were, with time in hand, on the threshold of the practice where you most wanted to work.

**KS:** I went through the glass doors with my huge portfolio, and felt nervous and overawed. I can't remember a thing about the interview except that I said that I had been to YRM and Arup also. The following day I received a telegram from Mark saying "don't accept any other offers—stop". Then a few days later I got a letter offering me a job at £1300 a year, together with a whole load of photostats of manhole covers destined for the Ipswich site—I was to discover later that the taut efficiency of the glass wall didn't always translate into correctly posting a letter.

**MQ:** How did you react to that offer?

**KS:** I was thrilled. I accepted immediately and started work at 8:00 a.m. one morning in June 1974. My first job was working for Arthur Branthwaite to design the fire seals on the staircase of the Willis Faber building. It was one of those events that you realize changes your life: you are suddenly aware that you have a Birmingham accent, that you've never drunk real coffee before, never seen a pepper mill, never tasted avocado—and that was just the lunch. In terms of architecture, everything you looked at was out of this world. I was soon promoted to the kitchen equipment. I was delighted—my own package. It may not have been as glamorous as the glass wall, but it was mine and it was going to be the best kitchen the practice had ever done.

**MQ:** And how did you first meet Norman himself?

**KS:** I remember meeting Norman for the first time when he was helping Tony Bron rip all the Letracolor off the swimming-pool plan before a client presentation because the client had not been told that the surround was green rubber—even though it was!

**MQ:** But you had to return to college to finish your course.

**KS:** After a year I returned to college to do my fourth year, and in the summer of 1976 I went on a tour of America. The day I got back, Mark Sutcliffe phoned me up and offered me a job. He had moved to the office of Michael Hopkins, Norman's ex-partner. Even though I was still at college, I could work part time, so I said "Yes", and spent a few months doing the kitchen (again) on Trinity Square—doing two kitchens in

a row was not my idea of getting on in life, and I felt unhappy and used. So when IBM Greenford needed a new building in nine months, Norman invited me in for a chat. I borrowed a green leather jacket from a friend (to look the part). Norman talked for about an hour, at the end of which I said, “So are you offering me a job?” “Gosh, yes of course, didn’t I mention it?”—that’s typical of Norman. I said “Yes”, left Michael Hopkins there and then, and started work for Norman again the following day.

**MQ:** What kind of jobs did you get then?

**KS:** On IBM Greenford I did ceilings, floors and partitions—everything that was outside the core. On that job I met Graham Phillips, who seemed to be responsible for a pile of mud around the building. The practice in those days was very sharply divided—on the one side there was Spencer and Loren, who were very much in the role of client liaison, and image makers. On the other side were Roy Fleetwood, David Nelson, Graham Phillips and myself in the muddy boots department.

**MQ:** But how did Norman react to this divisiveness?

**KS:** Norman used to encourage the split—he liked the grit in the wheels, and the sparks between Roy and Spencer used to really fly. But it really *was* divisive. It seemed like a sport at the time, but I must say, looking back, it was the worst aspect of the practice, and all the traces of the split have long since been eradicated.

**MQ:** Do you ever have any regrets—any ambitions to establish your own practice?

**KS:** I was and still am very ambitious about being part of Fosters—I’ve never failed to enjoy myself and have fun there. For me design is everything, and the design has to be absolutely brilliant or it’s not worth continuing. Many of my colleagues feel just the same.

**Malcolm Quantrill:** May we pursue Spencer’s point that the differing appearance of various buildings masks an underlying “structure” of common approaches, a theoretical stability, perhaps—encompassing your own synthesis of “consistency through diversity” ?

**Sir Norman Foster:** “Consistency” can be demonstrated in different ways. For example, we have always been interested in how buildings respond to change. Let’s consider the question of flexibility. Our approach in the case of Willis Faber anticipated the information revolution, and was a commercial lifeline to the company. Because we had provided suspended access floors throughout all their office areas, Willis Faber, unlike their competitors, did not have to embark on a new building programme in the 1980s. When the building was designed it was unheard of to provide this degree of flexibility outside computer rooms. It proved to be a very wise investment, which has paid for itself many times over. Also, it should be emphasized that, at the time of its construction, Willis Faber cost only the same as an average speculative development in rental terms.

**MQ:** And haven’t I heard you say that the Independent Television News (ITN) building was a similar case?

**NF:** Indeed, the ITN office spaces proved to be so flexible they were able to function as studios for broadcasting television news. This released the custom-designed studios for commercial leasing to the industry. In addition, the atrium had commercial as well as aesthetic benefits by giving the basement (below-ground areas) a significant rental

value, whereas these underground areas would normally be worthless except for storage and services.

**MQ:** But I believe that, on at least one occasion, all these advantages in the ITN building counted against you?



Entrance to IBM Greenford, 1980



Norman Foster and Malcolm Quantrill, Riverside Three, London, 1995

**NF:** Yes, because when we recently considered a possible relocation of our practice to the ITN building as part of a wider planning policy for our practice, the estate agents pointed out that we were victims of our own success. Although the ITN building had been created out of a very competitive budget, it now commands rental prices far in excess of other comparable developments. The combination of atrium, flexibility and quality standards had apparently created an integrity that was much sought after. The rents that it now commanded were beyond our own reach!

**MQ:** Are there other links, perhaps, in the philosophy of the practice that span between projects?

**NF:** There is an interesting link, for example, between Nîmes and our King's Cross project, involving an urban landscape based on a kind of master plan view of the area. In Nîmes the new building and its relationship to the public open space and to the Maison Carrée, a near perfect Roman temple, have grown out of a master planning approach. Nîmes has also benefited hugely from an almost obsessive concern about the details of everything from the floorscape to the lighting of the Maison Carrée.

**MQ:** It seems that the across-project philosophy of the practice had a direct effect on the urban space, generating new activity patterns and social links.

**NF:** It's very interesting, for example, to study "before" and "after" photographs, which show the way that particular part of the city has been revitalized. Three new cafés have been opened in the *place* surrounding the Maison Carrée in response to the daily activity that has been generated by our building.

**MQ:** I know how important these across-the-board linkages are to the philosophy and production of the practice. It's very important, therefore, to stress this aspect here.

**NF:** In a way, of course, these concerns were pioneered on a large scale in our project for BBC Radio. That study was very much about learning from history, while not slavishly trying to recreate an historical past. Just what lessons do you learn from researching the historical background to a project, and how does the presence of an historic building—in this case All Souls' Church, Langham Place, which was the knuckle-joint at the intersection of Langham Place with Portland Place—affect the site and the project? The kind of clues we picked up from a review of Nash's plan, especially about short cuts and alternative routes, had never crossed my mind before. But of course the short cut from Cavendish Square to the knuckle-joint—especially in the way it formed an interior public space—has very close parallels with our decision to plant the entrance to the Carré d'Art at the corner of the building. In this way, at Nîmes, you explode out from the green tunnel of trees on the diagonal into the building's entrance. You can then follow the diagonal short cut through the building to the water gardens beyond, which are on the same axis.

**MQ:** Although I have made my own interpretation of your solution for Nîmes, I'd like to hear your own reasoning. So far, whenever I have questioned a decision for Nîmes, you have simply replied: "Oh, that was intentional". Perhaps we could explore a little the nature of those intentions.

**NF:** Naturally, quite interesting analogies can be made between the decision to create on the one hand a very traditional solution, in classical terms an elevated main level, and on the other hand, in modern terms, to recreate that important gathering point, a symbolic focus. I believe this came out of observing the way in which these questions were answered in the Maison Carrée. There were lots of similar considerations of form and scale in terms of patterns of movement. An analysis of elements in the BBC design offers interesting parallels that had not crossed my mind until I began talking this through with you.

**MQ:** Should we then think of the Carré d'Art at Nîmes as a traditional solution in part to this complex problem of history and urban space, even though it appears to be something quite other?

**NF:** Certainly, it is a very traditional device to create a large-scale elevation, a three-dimensional elevation to the public space, supported by a more modest treatment of the building facing the adjoining streets and an appropriately scaled-down, smaller portico to the sub-ordinate route at the rear of the building, which leads to the water garden. I think that's more or less right!

**MQ:** I was intrigued to find, when I looked at the slides of the Nîmes project, that one scheme was included that didn't appear to conform at all to the built solution or, for that matter, to any other solution on record. The one I'm thinking of has the open, pointed arms that stretch towards the *place*. I couldn't really understand this mysterious solution, which clearly abandoned the idea of maintaining the edge of the

public open space.

**NF:** I would have to remind myself of that particular period. It was about eight or nine years ago in the history of this project. Certainly there were a number of different approaches over that time.

**MQ:** The other two questions I have concern the fact that the stylobate or podium on the Maison Carrée is so strong. I therefore wondered why you weren't interested in creating a similar platform here, in front of the Carré d'Art, overlooking the *place*, to provide a vantage point where people might sit to view the Roman temple. The second question relates to the function and significance of the columns on the front of the building; because, when I studied all the project slides, I found that one proposal had no columns at all supporting the canopy, while at another stage there were only two columns—then, suddenly there were five.

**NF:** This kind of evolution has happened on a number of schemes. For example, at one point there were no columns in the centre of the studio here in Battersea, because we could have had a bridging structure above. But I believe that the continuity of the columns, and the fact that they plunge through the full height of the space, actually give it a scale, a sense of dimension and overall order. I'm convinced the decision to introduce the columns into the portico at that phase of the Nîmes design was a very considered one. It was a judgement related to how it would feel to walk along the pavement, looking at the square from the other side of the street. That decision went hand in glove with the idea of a constant expression of the roof edge, solid or louvred: it would simply provide another layer. The line of those columns defines a kind of invisible wall: it encloses the space. It's a space-making device. Coincidentally, it also continues a very fine line all the way around the building, tying the whole thing together and making one total entity of its disparate parts.

**MQ:** I take the point you made about the space-defining quality of the columns. But I still don't find the external podium to be really effective as an edge.

**NF:** That's very deliberate, to make sure the building is inviting. When you climb the steps on the Maison Carrée, they're quite intimidating. Also, it's not just enclosure that the columns provide, it's definition. There is no span in the Nîmes project that's greater than 6m. That's more intimate than the studio here at Riverside, where the structure has a 7.2m span.

**MQ:** Another thing I'm not sure about is the fact that you've made the columns on the street much more slender than those on the inside.

**NF:** Absolutely! That's quite deliberate.

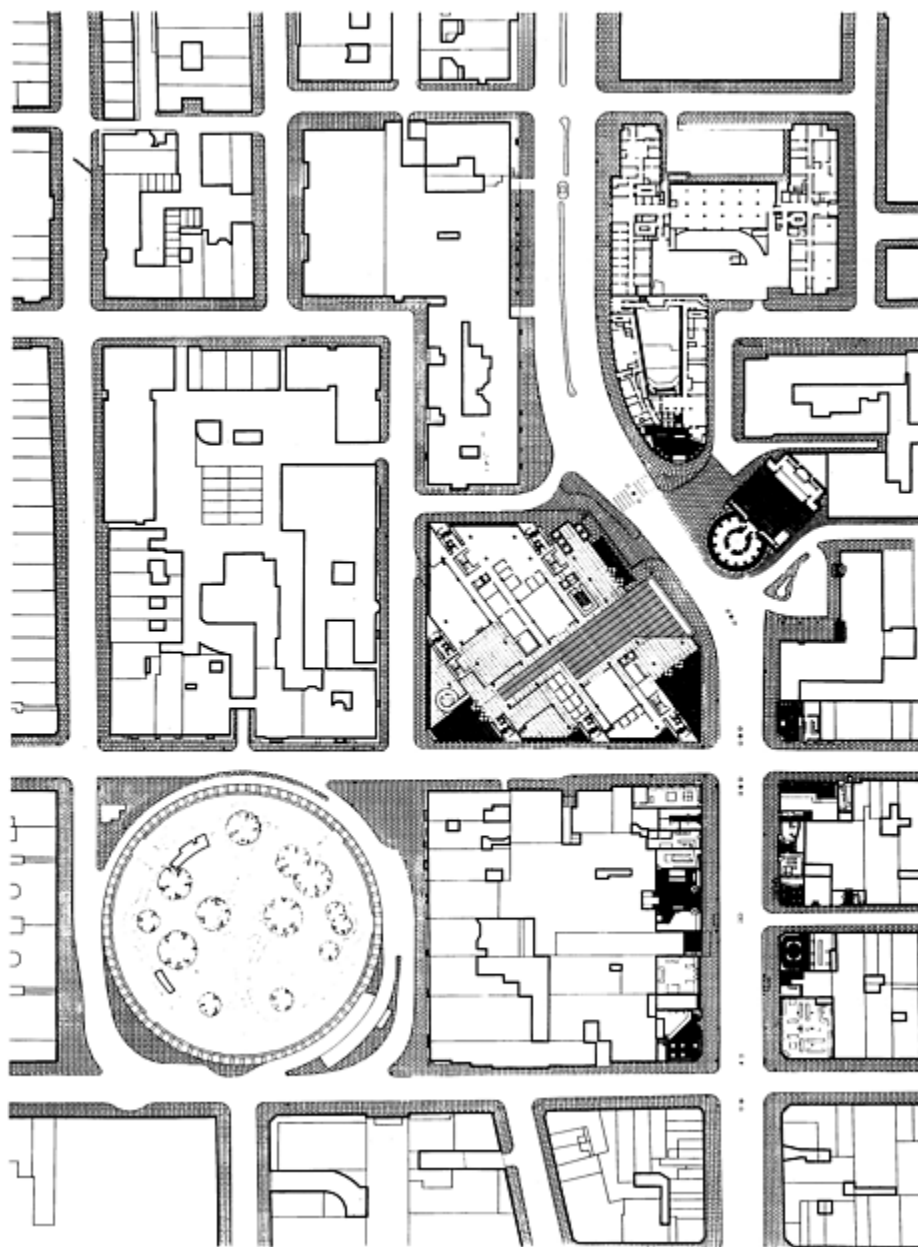
**MQ:** And they are not really carrying any weight... those external columns, are they?

**NF:** Yes. They are also working structurally. But primarily their role is to define the space.

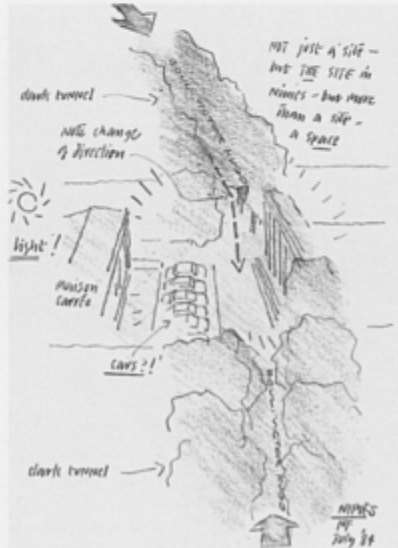
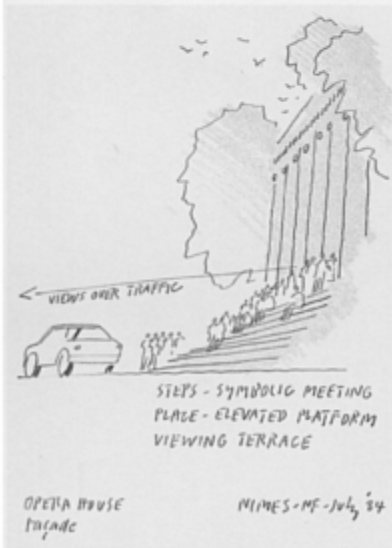
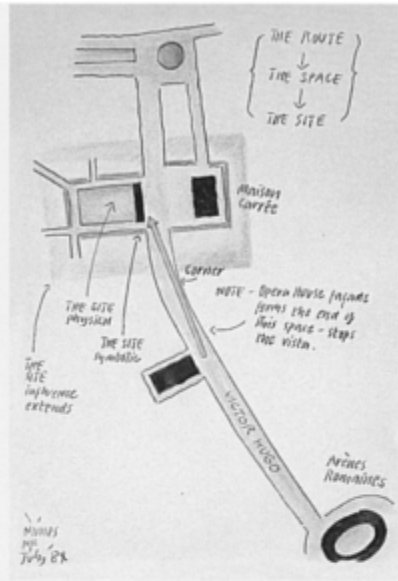
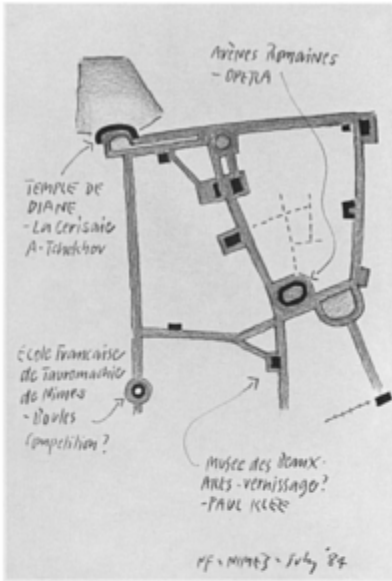
**MQ:** You've mentioned the generation of new social life, the opening of three new cafés. But these might be thought of as secondary effects of the Carré d'Art. Is there some evidence of a direct response to the building from the citizens of Nîmes?

**NF:** Oh yes. Nicholas Soulier, who works for the Agence d'Urbanisme in Nîmes, has a young family. And his little boy, who is about seven, came to see me with his parents last summer. The small boy was introduced to me, and he then said something which his father translated as: "Is it *my* Norman Foster? Is it the man who did *my* building?"





BBC Radio Centre, 1982: ground-level plan in site context



The Carré d'Art, Nîmes: a selection of sketches made by Norman Foster on his first visit to Nîmes, 1984

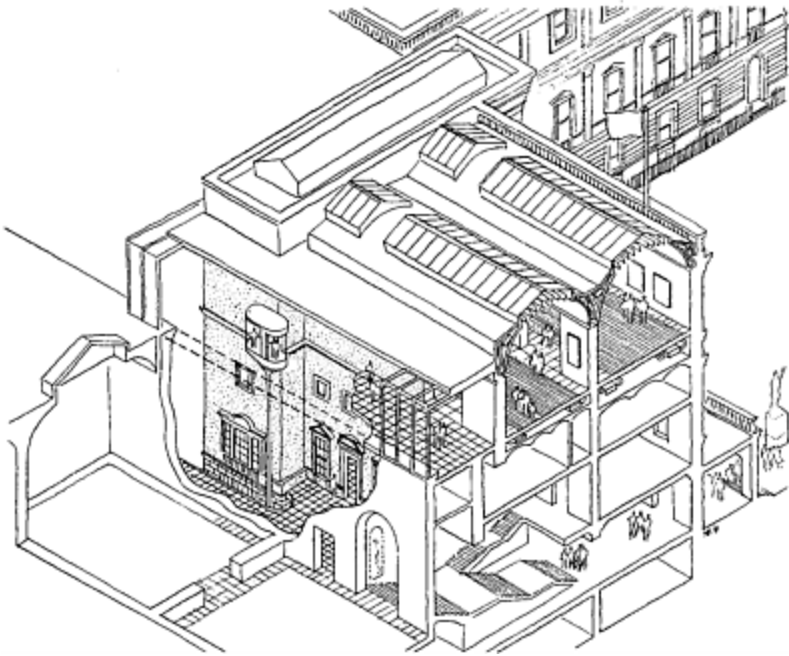


The Carré d'Art, Nîmes, viewed through the portico of the Maison Carrée

His parents explained to me that their small son was in the children's part of the building every day that he was on holiday from school. This is the part of the building that has no publicity and no exhibitions. It consists of the library, the reading-rooms, the children's rooms, the magazine room, the auditorium for talks and meetings, the space where you can listen to discs and tapes—this part of the building receives through its doors every month more than the entire population of Nîmes. I'm not talking about the mayor's favourite project here—that's the other part of the building, with its collection of contemporary art, its space for displaying visiting exhibitions, a facility that is a success for foreign visitors and local intellectuals.



The Carré d'Art, Nîmes, 1984–93: view of site from the Maison Carrée as it was before construction (above) and after (below)



The Sackler Galleries: cutaway drawing by Norman Foster, 1991

**MQ:** And all this activity, this coming and going to the Carré d'Art, a new intensity of pedestrian traffic, has—as I saw in the summer of 1994—had a significant impact on the *place*, which used to be a quiet historic site.

**NF:** Naturally. Because they now have some 115 000 to 120 000 building users every month visiting the basement area alone. And it's not just the young who come: it's a meeting place for all generations. The total effect is a combination of the building and the supporting works we've carried out in the immediate area.

**MQ:** What sort of works exactly?

**NF:** The redirection of traffic, for example, and creating traffic-free streets. Having the ability now to close off spaces next to the building for loading and unloading, diverting the traffic from the front of the building when necessary. Then, there are cafés in the square now that didn't exist before. This was a dilapidated, rundown area. There were so many cars you just couldn't get to the Maison Carrée. Now it's been totally revitalized, not just by the building, but by the urban landscape around it.

**MQ:** Looking at the BBC Centre for London and the Médiathèque at Nîmes, one of the dominant preoccupations has naturally been with the external form and the appearance of the building within its context. Perhaps we could talk now about the Reichstag project in Berlin, Norman, because that seems to be a very different kind of challenge from anything else the Foster studio has ever tackled.





The Sackler Galleries at the Royal Academy of Arts, London, 1985–91: staircase detail

**NF:** I think that the Reichstag does, in fact, have a lot in common with the Royal Academy in the sense of its being a problem of transforming the old. This problem centres on the particular point at which you examine the process of change, and the particular point at which the building will continue to be able to adapt. Maybe you adapt the shell, because it has symbolic overtones of historic heritage, but it needs a new lease of life. How far can you continue that process, however, before it breaks down completely and the building has to be replaced? In a way, I think there are definite analogies between our work on the Reichstag and the Royal Academy.

**MQ:** Are there other linkages you can think of between different projects from the studio?

**NF:** Oh yes, because to stretch the point further, I would say that some of the concerns we've had with the Royal Academy and now the Reichstag leap across to Nîmes, and also to the Joslyn Museum in Omaha, because they are all focused on conserving the relationship between the old and the new—in the case of the Reichstag and the Royal Academy literally within the existing shell, and in the case of the Reichstag also, bursting out of its shell. In the case of Omaha, an external addition was created that defers to the existing and recognizes the importance of the original. I don't quite know how to describe the original Joslyn building style. Is it "Prairie Egyptian", perhaps? And it is obviously important in the case of Nîmes, with the relationship of the new building to the Roman temple opposite.

**MQ:** Although I know you to be an unrepentant Modernist, I am aware, too, of other emphases in the Foster philosophy. Would you care to say something about those "alternative strategies" in design?

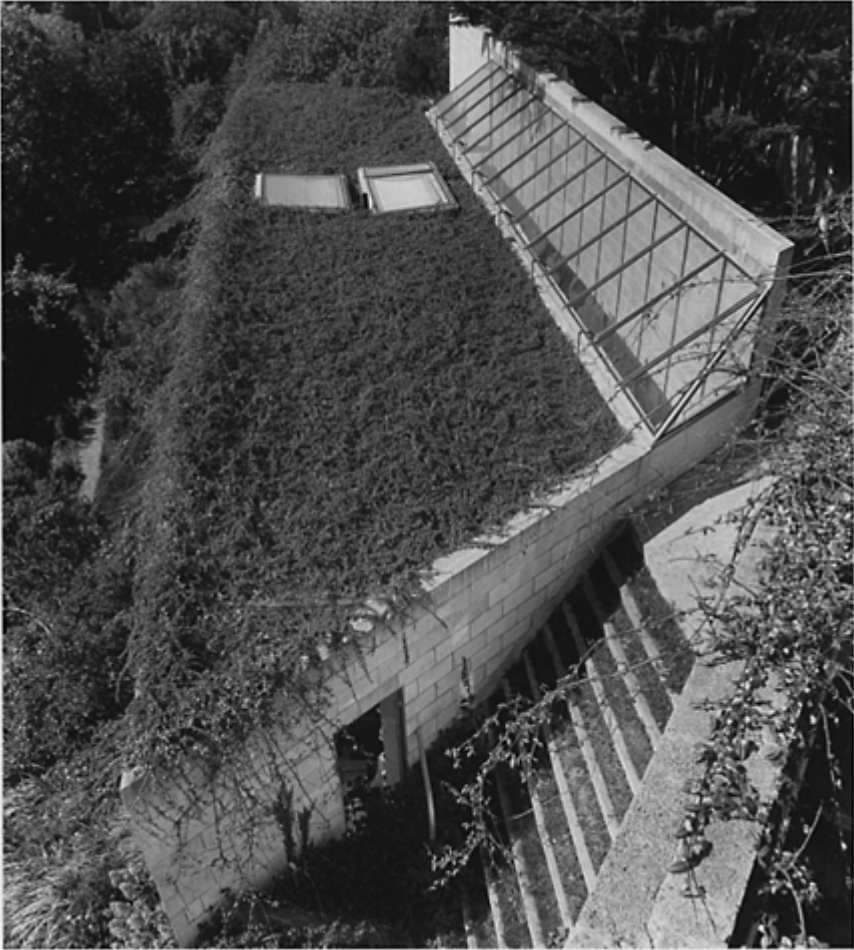
**NF:** There are other schemes, of course, which make other connections. If you take Stansted, the Commerzbank at Frankfurt, Duisburg, and, indeed, the Reichstag, there is another linkage—an attitude to ecology and to natural light. I believe that natural light is something that properly belongs in every project. I mean natural light as a humanizing element. It is something one is aware of in many traditional buildings, mostly anonymous architecture. But it is something that has struck me for a long time in modern architecture, too—in the work of Alvar Aalto and Louis Kahn, for example. There are a number of other architects who would fit into this category, of course.

**MQ:** Even quite improbable people like Josep Lluís Sert, whose Fundació Miró in Barcelona is an impeccable example of what you are describing.

**NF:** We might continue with the analogies that Martin Pawley has drawn between the early Creek Vean House in Cornwall—which was built in blockwork with a turf roof—and the very recent Corsica house, in the sense that both have a rather dramatic relationship with the principal views from the site. Also, you enter both discreetly from behind. The theme, we might say the "personality", of the project is powerfully dominant, quite regardless of the materials used. For this reason, I see no philosophical conflict between any of these projects, notwithstanding the fact that some are conceived in stone—they all make a very strong statement.

**MQ:** When you mention stone, I naturally think of the Joslyn Museum extension in Omaha.

**NF:** It wasn't so long ago that I was in Omaha, and I'll be there again in a couple of weeks—for the official opening. I think it quite interesting that, in deferring to the original stonework that was laid in the 1920s, our extension acknowledges the power of this local symbol. Although the new is physically attached to the old, it is distanced from it by what we call the "conservatory": this has the effect of separating the new galleries from the original "U" block. This is necessary because that original museum is a very tough building, which is quite uncompromising with its extraordinarily well-scaled galleries lit by natural light. In a way, the new building restores the old, taking away a lot of the excrescences and rediscovering the original main entrance. It restores the building to a past era, which was a more noble one, when the museum proudly faced the city. In those days, you would have driven up to the front of the building, got out of your car at the front, and walked up the monumental steps to the grand entrance.



Creek Vean House, Cornwall, 1964

**MQ:** But I understand that, as elsewhere, the parking lot had assumed pre-eminence by the time you won the competition to expand and improve the Joslyn?

**NF:** All the original charm, the intended relationship to the city and visitors had gone. When we first visited the museum, you couldn't actually get to the front of it. Facing the original entrance, there was a very insensitive sculpture garden, which completely dominated the space. We had to drive around the side of the museum and creep in through a back entrance, coming in by way of a very unsuitable small porch that had been added in the 1960s. I believe that in the process of creating the new, and at the same time giving the original building a fresh lease of life, we discovered the true roots of the old museum. We found again the proper way to perceive the building and the correct way to use it. And this could explain why our renovation has proved so immensely popular with both the donors and citizens of Omaha.



**MQ:** That's quite astonishing, considering that the building isn't even officially opened yet, let alone available to the public. [It opened in 1994.] Then there is also the factor that this is your very first work in the USA, which has in turn to be seen in the context of all the rather overt hostility that Foster work has encountered in the aggressively scenographic climate of American post-Modernism—a situation that has persisted, really, right until the award to you of the Gold Medal of the American Institute of Architects in Washington in February 1994.

**NF:** Well, at a local level, it is true to say that almost everybody in Omaha has had something to say about the building. Everyone seems overwhelmed by it. I don't think that it's just a case of people being socially generous in their comments. Of course, one of the things that has been very helpful—as at Nîmes—is that the project has been significantly under budget. At Omaha this is by a factor of 5 per cent, which has been ploughed back into the museum's celebrated Witherspoon Hall.

**MQ:** I understand that one of the competitors actually proposed to convert the Witherspoon into the new galleries?

**NF:** Witherspoon Hall happens to be the main centre for the performing arts in Omaha. It is an irreplaceable facility for the whole community. Instead of scrapping it, we have extended its life. We have done this by bringing forward the stage, which is being faced in matching stone. Also, the stage area has been increased, and we have dramatically improved the acoustics. This means that the Witherspoon will now be available for a wider range of events and performances.

Naturally, everyone in the practice is proud that this is our very first American building.

It was especially important, therefore, to have a satisfied client in Omaha. I'm very much looking forward to the opening ceremonies next month. I believe they plan to make it quite an occasion.

In 1992 I revived a lecture course on design methods at Texas A&M University.

Quite early in the course, my students asked for a basic shopping list of components that make up the design sequence. We soon concluded that there are five “aspects” or “parts” that the architect must recognize and consider within the creative act of making buildings.

First, there is the *Body of Knowledge* about architecture, without which architects would be working “in the dark”, in ignorance of their task. Second are *Theory and Philosophy*: that understanding and interpretation of knowledge that converts what we know from a purely mechanical input to an intelligent structure of thought. Next is the *Design Method*: the ways and means of using knowledge in the actual design process. The fourth aspect is the *Design Process*, the production stage, at which a design is detailed, and the necessary experimental models and construction drawings made. Lastly, there is the *Body of Architecture*: the final built product achieved by harnessing the Body of Knowledge to the precepts formulated by Theory and Philosophy, so that the design process can generate a Body of Architecture from the *genera*.

This shopping list was tested with the assistance of a number of offices. Some practices revealed ignorance of the Body of Knowledge concept; while others confessed that they were content “to leave questions of theory and philosophy to others”. Indeed, there was a strong preference expressed for jumping in at stage 3, Design Method, with one practice

declaring:

“We don’t mess with all that philosophy stuff, but when it comes to actual design we have one hell of a method.”

I asked Sir Norman’s partners how their own work might relate to this shopping list, and where, if at all, it fitted into my suggested stages of the design framework.

**MQ:** David, does that make any sense to you, that some offices would completely ignore the Body of Knowledge and the Theory and Philosophy components, taking Design Method as their starting point in design enquiry and development?

**David Nelson:** Well, yes, I can understand that. But that’s not always the case in the Foster studio.

**MQ:** Could you explain that?

**DN:** Well, perhaps it’s something like this. You see, we have always believed in working closely together. It’s a spirit of collaboration that goes back over 30 years, and it involves all stages and all aspects of design, from concept to detailing. That in turn involves sharing—sharing knowledge, problems, ideas, technical innovations, all manner of things. I suppose that’s our body of knowledge, since it is a deep well of experience on which we have been drawing continuously for three decades. It pre-exists somehow in the practice memory, in our daily reference, our constant recall of... how shall I put it?

**MQ:** The Body of Practice, perhaps?

**DN:** That’s it. Body of Practice. That describes it exactly. You see, we probably don’t have a concept of the Body of Knowledge in the normal sense, because it already pre-exists within our Body of Practice as a whole, that is within each one of us as part of the Practice family. It brings into play all our collective knowledge and research. And you might say that it *embodies* our theory and philosophy, too. Because for us, the design process is the way we do things. It isn’t just one stage along the way. It’s the whole thing.

**MQ:** Perhaps we could look for a moment at what underlies the whole teamwork approach in the practice—what I would still call “the Foster philosophy”. Can you shed any light on that for me?

**DN:** What is more important than just working together as a team is the idea of sharing a common aim. The overall goal must be more important than the interests of individual team members.

**MQ:** In other words, architecture is a collective rather than an individual art?

**DN:** If the design intention is to get the best possible project from all viewpoints—best ideas, best design concept, best price and realization—then the goal can become clear to everybody, and everybody contributes to that intent. As long as that collective spirit is sustained, it doesn’t really matter who has the original ideas. It’s a wonderful feeling when you put an idea forward to the others and they latch onto it, push it and very rapidly develop it through three or four stages. Also, you have a responsibility to the team when others put ideas forward. Unless it’s completely ridiculous, you have to be open-minded enough to say: “Well, that’s not what I might have thought of, but let’s

try it". It's this attitude that, more often than not, helps to unlock a design. But you can't create that spirit overnight. It takes a lot of effort by everyone for individuals to feel comfortable with each other and completely open to one another.



Joslyn Art Museum, Omaha, Nebraska, 1930



New addition to the Museum, 1994

**MQ:** And trusting?

**DN:** Oh, absolutely.

**MQ:** Is there a special, a particular way in which that trust is built up?

**DN:** A central ingredient of the process is the establishment of project teams as *total* project teams, rather than being merely work-stage related. That provides the continuity and, therefore, the consistency.

**MQ:** And how does that work, exactly?

**DN:** In the early stages of a project, a wide range of people in the practice may become involved, although the core team itself might be quite small. Gradually, as the project becomes more real, the team becomes more focused. A core team emerges that could have anything from two to six or even ten people, depending on the scale of the project. That team then continues right through the project to completion. Naturally, it can't always work that way. But, as far as possible,



Riverside Three, Foster and Partners Studio, 1996

the group that started out at the beginning sees the whole thing through to the end. There are tremendous advantages in this. And here we have the Body of Practice again. Because, in overall terms, it allows us to do projects with fewer people: it's a consequence of the way that information and knowledge are retained in the practice.

**MQ:** Could you explain how these information and knowledge banks are built up, and just how they influence patterns of expertise within the teams?

**DN:** Well, in the first place, in order to have a concept for a building you must know how to build it and how to detail it. Going through the whole process, from start to finish, is very important—especially for young architects. This is one of the reasons why the studio likes to take on projects with a wide range of scales at the same time. The

smaller ones are much harder to make work financially, but for architects entering the practice they are invaluable in providing a method for learning our particular Foster ways. The range of scale is absolutely central to the philosophy of the practice.

**MQ:** In which way do you mean that, exactly?

**DN:** Many architects, throughout the world, do their best work at certain scales—some do predominantly large-scale work, while others do much smaller-scale jobs. It's always been the Foster ambition to keep the range of project scales within the practice at any one time as varied as possible—master planning and urban design at one extreme, and product design at the other, with all the graduated scales of architecture in between. This ambition guides us in the way that we select projects.

**MQ:** So the art of building in the Foster practice has no limits, either of dimension or of scope? By your admission almost nothing is too large or too small. Perhaps this too connects with my vision of the Foster studio as continuing the heritage of Renaissance masters, and the great British and French constructors of the late nineteenth century?

**DN:** This question of construction arises out of the way the office evolved such projects as Willis Faber & Dumas and the Sainsbury Centre, where the concept of developing components was very much part of our thinking. This approach was influenced a lot by Norman and his education in the USA. For example, projects like the California Schools by Ezra Ehrenkrantz were known to all of us. That ethos was very prevalent in the practice at the time.

**MQ:** And that must have provided the basis, too, for the strong Foster interest in materials, and the materiality of architecture?

**DN:** Oh yes, the whole aspect of materials research was to the fore, and people spent huge amounts of time researching materials. I can remember that I talked to some forty companies about the floor for the Hongkong and Shanghai Bank. The Hongkong Bank really changed everything for everybody. It was one of those projects where the development of building elements gave us tremendous opportunities. The Bank was large enough to warrant new kinds of tooling that were not feasible for smaller buildings. Also, our client was anxious to have the best products, and if these weren't available we were encouraged to develop them.

**MQ:** It must have been very exciting to have had such demands made upon the practice, demands that allowed originality to be generated by teamwork.

**DN:** Like I said, the Hongkong Bank gave us design opportunities that hadn't existed in the practice before. In terms of the architect-client relationship, it was what we had always dreamed of. The client wanted better products for the Bank—the very best—and we were thrust out there on the limits of technology and quality to find these products or invent them. Quite apart from the fact that the Bank was being constructed at the very heart of the Orient's financial world, it was just architecturally exciting.

**MQ:** And have things changed over the years?

**Ken Shuttleworth:** During the last ten years, since the Hongkong Bank, there has been a revolution in the studio's working methods, and a hotbed of ideas—constantly questioning and moving on. Our skill is always being able to move forwards, never backwards. People outside copy us, but by the time they do we have moved on to the next idea.



Sainsbury Centre for Visual Arts, UEA, Norwich, 1974–8: interchangeable roof panels



Televisa Headquarters, Mexico City, 1989: pre-cast concrete structure

The way the practice works is that it really is a team of people—one team. It is not divided up into distinct groups. It has evolved as a team of like-minded people who continually search for excellence. There is a constant determination to ensure that we don't repeat experiences and produce the same scheme twice.

**MQ:** Can you say something about the way the practice has evolved?

**KS:** It is fascinating the way this studio has developed. Twenty years ago Norman was totally immersed in every design decision and all the projects, but then we had only three or four jobs at any one time.

When David and I came back from Hong Kong we had supreme confidence in our abilities, and we felt we could do anything. We didn't realize that we knew absolutely nothing about the front end of projects or how to design buildings. We had much still to learn, and what for me was wonderful is that Norman was prepared to spend time teaching us how to evolve schemes.

This was effectively carried out on the Mexico project, Katharine Hamnett store and Statue Square. It was on Statue Square that I learnt that Norman was truly a master architect. The way his pencil flowed with his ideas, and his design abilities, were just amazing.

**MQ:** Spencer, may I turn to you again? Perhaps you could describe how the structure and operation of the practice make this performance possible?

**Spencer de Grey:** Central to the organization of the practice is the strong sense of trust that exists between Norman, the partners and a number of other key members of the practice. This is crucial, especially when we have such an extraordinarily diverse range of projects, spread as they are across the world. Having worked together, each of us for over twenty years, there is an understanding within this relatively small team that enables us as individuals to operate from a position of great strength. Thus the design in the practice is centred around Norman, Ken, David and myself. We all work here in London in a single studio so that communication is excellent throughout.

Communication takes place both informally and formally. The chance discussion, the instant design comment or informal design review create a highly charged, creative atmosphere. More formally, there are regular meetings of the directors, thirteen at the moment, to review key issues, progress on projects and general financial matters.

Every project is run by a job captain, who is responsible to a director—the hierarchy is therefore very broad-based with quick communications to directors, partners and Norman himself. As a practice, we have always encouraged younger members of it to take responsibility. This leads to an extraordinary motivation and dedication from everybody. We also believe in continuity of key members on a project team, from inception to completion of that project. Again, this is good for motivation and good for client relationships. Modelmaking plays a central part in the evolution of our designs. There are then other disciplines, like CAD, publicity, graphics, programming, contracts, accounts and secretarial, that support the various project teams—everybody working together to ensure that we achieve the best possible without too much hierarchy, too much formality.

**MQ:** How about you, Graham? Can you share some insights into that experience?

**Graham Phillips:** It took me many years to understand what I now know, and this is that the one constant about Norman is his complete unpredictability. For example, just

recently we had a briefing from a top Australian lawyer, who described to us the extreme consequences that might come from a particular contractual situation. Not unnaturally, we were all rather apprehensive, as we awaited Norman's reaction to such bad news. But, in typical Foster style, he shocked everyone by concluding, after hearing the Australian's ominous statements, that the lawyer had got it quite wrong. In fact, Norman told us, the situation was far worse! And he went on to give us his own remarkably lucid assessment of the problem.

**MQ:** But surely, having collaborated with Norman on a number of projects, you must have been able to second-guess his response—to anticipate his reaction to a situation?

**GP:** Not really. It was almost impossible—and probably still is—to predict how Norman would assess a design situation. Often the staff would assume that they knew what Norman wanted, repeating a vocabulary of details developed for another Foster project. But once Norman became involved in the design, the whole direction of the scheme went into reverse. I am convinced that the Hongkong and Shanghai Bank would have developed quite differently, and would be much simpler, if Norman had decided to live in Hong Kong during the detail design stage.

**MQ:** It has been suggested that, with the considerable increase in the size of the practice since the early 1980s, it's no longer possible for Norman to exercise control on design decisions the way he did at the beginning. But Norman doesn't see the situation that way, and I know you too have a different viewpoint.

**GP:** Of course, one often hears the view that these days it must be impossible for Norman to continue exercising total influence. But I am constantly astonished by the degree to which Norman is able to control the design direction of many projects, and I personally believe that his involvement in the practice now is greater than it ever has been.

**MQ:** You don't think a sense of quasi-independence has come into being within the team structure?

**GP:** Not at all. Some people may think that, but it's not true. Naturally, some of my colleagues think there's so much going on that Norman can't possibly be involved any more. But that's not true either. Of course, with all the partners having to travel so frequently, it isn't possible for all of us to meet with Norman all the time. But Spencer has the closest contact with him. He knows what's really going on throughout the practice and in Norman's mind. Spencer makes sure all the lines of communication with Norman are kept open. And our real secret, of course, is our emphasis on the design review. We still retain this totally open process as the core of design philosophy in the practice.

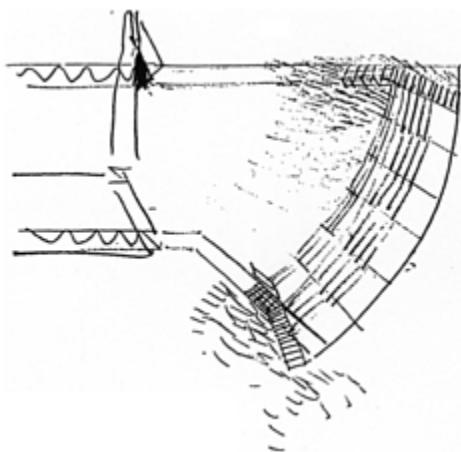
**MQ:** Perhaps you could explain how the design review works in the Foster context?

**GP:** Well, I recall that, back in 1987, some of us had a meeting with Norman at his studio in the country. He and Wendy had a house at Compton Bassett in Wiltshire. At that time I was in charge of the Sainsbury Centre Crescent Wing, and this particular meeting was at the conceptual design stage. We met with Norman, Wendy, Ken and other team members to review the Crescent Wing and some other projects. It was an incredibly productive meeting. The result was that the Crescent Wing and the other jobs all took a giant leap forward. I remember one observation in particular from that meeting. It was Wendy who said: "The speed of progress on a project is directly





Crescent Wing, Sainsbury Centre for Visual Arts, 1987–9: Norman Foster showing scale model to Lady Sainsbury



Crescent Wing: concept sketch by Norman Foster



Hong Kong International Airport, 1992–8: aerial view (above) and departures concourse (below)

proportional to the frequency of design reviews”. At the time this didn’t mean a great deal to me, but I’ve thought about it a lot since. Now I believe firmly that her observation really sums up how we work.

**MQ:** But design reviews are not a unique process, of course. Many offices have them today. So what would you say is the “real secret” of the design review as structured in the Foster studio?

**GP:** Well, for a start, the way work is brought together for a review is crucial. When the collection of material is truly comprehensive, and it’s put up on the wall, it’s amazing what can be achieved in a relatively short meeting. The secret, I believe, is having Norman there, together with some other incisive people.

**MQ:** Nevertheless, Norman is extremely busy and involved in a lot of overseas travel to visit sites and clients. So there must be times when he is simply so preoccupied that he cannot make himself available in the studio or on the site.

**GP:** In the first place, you have to understand that Norman’s main interest is in designing. It’s the thing that gives him greatest pleasure. For Norman, a design review takes priority over everything else. You only have to look at all his sketches to understand his emphasis on design. There are thousands of them, and they catalogue the progress of design in the practice. As I’ve said, a lot of the designing goes on in the design reviews. These reviews take place at all stages of a project—not just in the initial concept phase. They continue through to Norman’s regular visits to the site to see buildings under construction, and more often than not they result in detail design sessions being held on site. Naturally, Norman is presented with many distractions, but in my 20 years in the practice I have never known an occasion when he declined to participate in a design review because of some other commitment.

**MQ:** In observing the studio here at Riverside Three rather closely over these past three years, I must say that Norman’s attention to detail and capacity to monitor a wide range of projects seems rather impressive.

**GP:** As I’ve said, we have our process—the comprehensive design review—and we have Norman. I believe our own design review process is quite unique. Of course, Norman himself is unique. You just have to look at the

extraordinary variety of Foster designs and buildings. From that point of view, it’s interesting to compare him with other modern masters of the twentieth century.

Gropius talked about teamwork, but Norman’s relationship with his partners has made it a reality. Then you have Norman’s sketches. On one level they’re a catalogue of what we’ve done: on another level—through their diagnostic, conceptual and instructional logic—they demonstrate just how Norman permeates the practice design thinking and keeps his hand on the controls of the Foster “starship”.

**MQ:** Meanwhile, since we spoke two weeks ago, you have returned here to Hong Kong once again. Can you relate this present visit to the design process?

**GP:** Norman is here at the moment on a brief visit, before he goes to Shanghai. It’s only a few weeks since he was last here, but because all the projects in the Hong Kong office are currently at various stages on site, this visit has been primarily taken up with touring these sites. When we returned to the Lockhart Road office for design reviews, we found only two new issues to discuss since Norman’s last visit. One involved meetings and design interaction on the “theming” of retail areas within the commercial zones of the Hong Kong International Airport Terminal building. The other, seemingly more mundane, was the addition of a pedestrian walkway to the KCRC Railway Terminal building. Like the airport, the station is well under construction on site.

Only recently the client extended our brief by asking for an elevated walkway to link the forecourt of that station to the presently underdeveloped adjacent site. The project architect had prepared a scheme for this forecourt area. Clearly, he had a comprehensive knowledge of all the design parameters, having worked closely with the engineers and traffic consultants on the team. I believe most architects who were introduced to the complex issues—pedestrian movement, car and taxi drop-off areas, the need for weather protection, et cetera—would have accepted the project architect's design solution as a creative response to the problem. Most designers would not have dared to challenge the elaborate forms of the proposal out of deference to the knowledge of those who clearly understood all traffic engineering and other technical issues involved.

**MQ:** But then Norman is not your average architect. So, we should not expect him to simply stand by and accept the status quo. What happened then?

**GP:** This was not the first time I have seen Norman effect a design transformation of course, but what followed was a complete revelation to me. Systematically, Norman worked through all the traffic queuing, weaving lanes, and drop-offs, from first principles. He drew on the wall as he went along. Where the proposed design involved pedestrians crossing over traffic lanes, he reorganized things so that most passengers would be able to alight at the kerbside of the building within a few steps of the generous overhang canopy. "Ask any taxi driver," Norman said; "he'll soon tell you what he'd prefer. You don't need the Government Highways Department input. It's common sense!"

Norman had completely redesigned the scheme, eliminating all the serpentine roads. At a stroke, he had developed an entirely linear arrangement, which was nearer to the building, allowed safer manoeuvring, gave more car spaces while taking up less space, and simultaneously removed most of the low-level "bus-shelter"-type canopies required in the previous scheme. Then Norman moved on to tackle the pedestrian walkway, which had been conceived as an intermediate level—a transition between the station and the future podium of the adjoining development—and was lined with "potted palms". He simply cut it out, turning the expanded ground-level area into a park full of trees through which one can walk between sites, and generating a green lung in the congested jungle of the Hung Hom district. The whole process took just a few minutes, yet nobody present could suggest any essential requirements that had not been fulfilled by Norman's revisions.

**MQ:** And you would cite this, would you, as just another example of Norman's involvement in design decisions, his day-to-day influence or even control in the giant international practice that Fosters now is?

**GP:** Certainly, because while this was an example of a specific issue that occupied just a matter of minutes, it is also quite typical of the process that takes place with Norman for either an entire building or some small detail like a door handle. Only usually there would be a wider, more representative group present and, perhaps, even the client. Although Norman says that he doesn't like designing in committee, we regularly have evidence of great results achieved when he is interacting with all the experts around him, and he is able to synthesize the many technical and other issues involved. But it works best of all when all the basic materials—statistics, plans, sections, and simple

three-dimensional models—are available.

**MQ:** Ken, we have addressed the issues of management, organization and client relations; of design method, coordination and control; and now, in an attempt to summarize, I should like you to tell us just how all that adds up to the central passion in *Fosterwerk*—the translation from an initial sketch, through to the refinement of details, and on to the construction process and the finished building.

**Ken Shuttleworth:** It is quite fundamental to the whole practice approach that we all work together in one space as one team. The entire practice is a single force, not split up into groups and factions. We literally formulate project teams as contained units to tackle particular tasks, and in this way we can draw on the resources of the whole practice. Similarly, we also produce what is basically just one kind of architecture. We are not like other large practices where, depending upon the partner-in-charge, you get totally different approaches to various projects. Here we have just one approach, because we are all thinking along the same lines.

At the same time, we have a passion for constantly questioning everything and for a tireless search to attain the unattainable. Through our creative efforts we attempt to ensure that each scheme is better than the last one, and we try never to simply repeat an experience. Life's too short for that! But this passion comes from the partners and the body of experience we have built up through working together for more than 20 years.

**MQ:** What then is the Foster approach to *techne*, and how is the office orchestrated to ensure that all its different “instruments” are coordinated to produce the right sound?

**KS:** I believe absolutely in beginning the design process by getting the “right diagram” for a project at the very start. Our diagrams of initial concepts are tightly controlled by a small group of us. Our creativity in design is really facilitated by our financial partner, Barry Cooke, and brought to the boil by Norman, Spencer, David, Graham and myself.

When we have arrived at what I'd call “an absolutely earth-shattering diagram” for a project, then a team—a mixture of experienced and young architects—is formed within the studio and “gathered around” that diagram. They become attached to the idea and develop a shared enthusiasm for it. That team then stays with the project until the end. It gets added to, of course, as the workload expands. But the core team remains together until the building is finished and handed over...and even afterwards.

The practice also works on the principle of interaction between architects, computer specialists and modelmakers. Everyone can communicate to everyone else: there are no closed doors. There are, literally, no doors in our studio.

**MQ:** But what is it, in the analysis, that carries Foster design philosophy and attitudes forward into the finished product?

**KS:** The actual translation of that original “diagram” or “sketch” into the sort of reality that allows us to achieve the quality we're after, can only be described as “magic”. It may be second nature to me, yet I can't really describe how we do it. It's partly osmosis, of course, plus an amazing amount of hard work and dedication, and the desire to produce only the very best. This is the desire that emanates from the very top of the practice structure, from Norman himself, and then permeates down to the guy running the warehouse. And the only word I can use to describe that percolating, that trickling down, is “magic”.

**MQ:** Graham, it's been most stimulating talking to you again, over extended periods during the past two years, making connections back to those debates we used to engage in more than 20 years ago at Liverpool. And you've given me some good insights into the atmosphere of the studio, but I would still like to know more about your actual approach to design. In other words, what is your design process?

**Graham Phillips:** Well, to start with, you have to "listen" to the client and "understand" the brief. You see, it's the quality of "listening" and "understanding" that determines the whole direction of the subsequent design process. Very often it's the communication of the brief from the client, the actual way the requirements have been couched, that implies...or even determines... the physical response. That's not surprising, really, since it's quite difficult to describe functional needs in isolation, in the abstract, and inevitably clients often come to us with preconceptions. In some cases that isn't even a problem, and it doesn't always compromise the design options. However, on many occasions, I have seen the practice re-examine a brief, delving much deeper into the problem, resulting in a complete liberation of the design. Although this may sometimes be a sensitive area with the client, when real breakthroughs are achieved it can be a source of pure joy.

**MQ:** Spencer, in the light of Graham's observations about the importance of the role played by the client, how does Fosters facilitate client participation in the design team?

**Spencer de Grey:** The way in which we work with our clients has always been a key ingredient of all our projects. The completed building is a direct reflection of this working relationship. Thus, from the first day of a new commission, we work closely with the client to achieve a detailed understanding of their needs and expectations. In some instances the outcome of this detailed briefing and analysis can be quite different from the client's original preconceptions. We believe that there should be no surprises, and that the client should be fully involved in the design process. Having agreed the brief, as the design develops, we use various techniques to explain the design—diagrams, three-dimensional drawings, CAD models and more traditional 3-D models with their attendant photographic montages. Later in the project, before contracts are let, these can develop into full-size mock-ups and/or pre-production prototypes. In this way, the users are made aware, at increasing levels of cost and detail, of the nature of their new building. The working relationship is therefore one of trust, mixed with challenge, to ensure that all avenues have been properly explored, leading to the best possible solution.

**MQ:** Wasn't it Roger Fry who said: "In art it's not the idea that counts, but the consistency of effort that brings to the final product the quality of the original thought"?

**SdG:** Exactly. It's our aim that each building should transcend the norm and uplift the spirit, offering the client and the public something that is quite out of the ordinary. Without these qualities a building does not become architecture in the true sense.

**MQ:** Without *Baukunst*—"the art of building"?

**SdG:** Precisely! We believe that if we don't take your breath away, then we have failed as designers. And this spirit of endeavour permeates the whole office. Everybody is restless in the pursuit of perfection—that is the reason why I am not tempted to look elsewhere for my fulfilment in architecture.



Norman Foster preparing presentation for the New German Parliament in the Reichstag



Team meeting around a model

**MQ:** Perhaps we could return to the significance of the design review, Graham. In your view, is this still the critical element in the design process at Fosters?

**Graham Phillips:** Yes. The interactive design review process is the most crucial stage of design development. But the process of creative contribution during such interactive reviews with Norman must involve crucial creative leaps from the others including, importantly, the engineers present. However, while the process and the comprehensive way in which the design is moved forward can be described, the actual quality of the design output itself is determined not by the process alone but through the quality of individual contributions, and the ability of individual participants to make creative leaps of the highest calibre. No matter how well you understand the process, the creative leap is not something that can just be manufactured to order.

**MQ:** And just how are the foundations for such alchemy laid in the Foster studio?

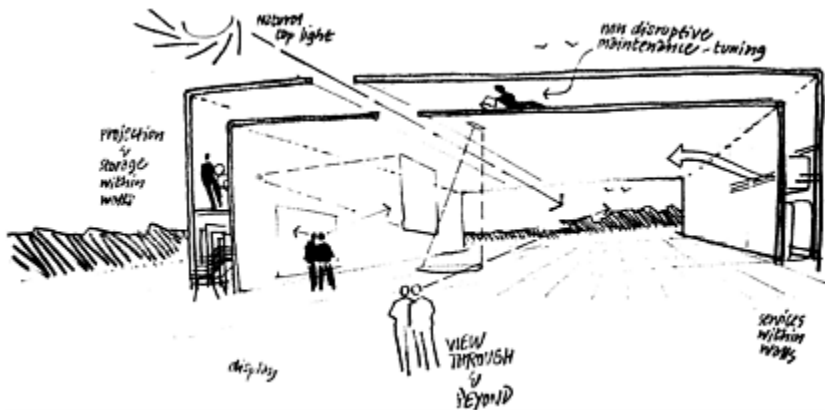
**GP:** Well, my view is that the studio has developed such a high standard of excellence in design consistency and diversity of approach because of Norman's own creativity. But linked with this is Norman's other great talent, which is his ability to attract and gather together a remarkable team of sympathetically minded and talented individuals—and this includes those key specialists outside the practice upon whom we depend and with whom we enjoy the joint creation of our works.

**MQ:** Perhaps we could now turn to the way in which the practice is perceived from the inside and the outside?

**Norman Foster:** What interests me here is the difference of perception between the designer and the critic.

**MQ:** How do you mean?

**NF:** Having read some of the draft critiques of our projects which form the body of your proposed book, I am reminded of the analogies that you make when you discuss our work. For example, you talk about the

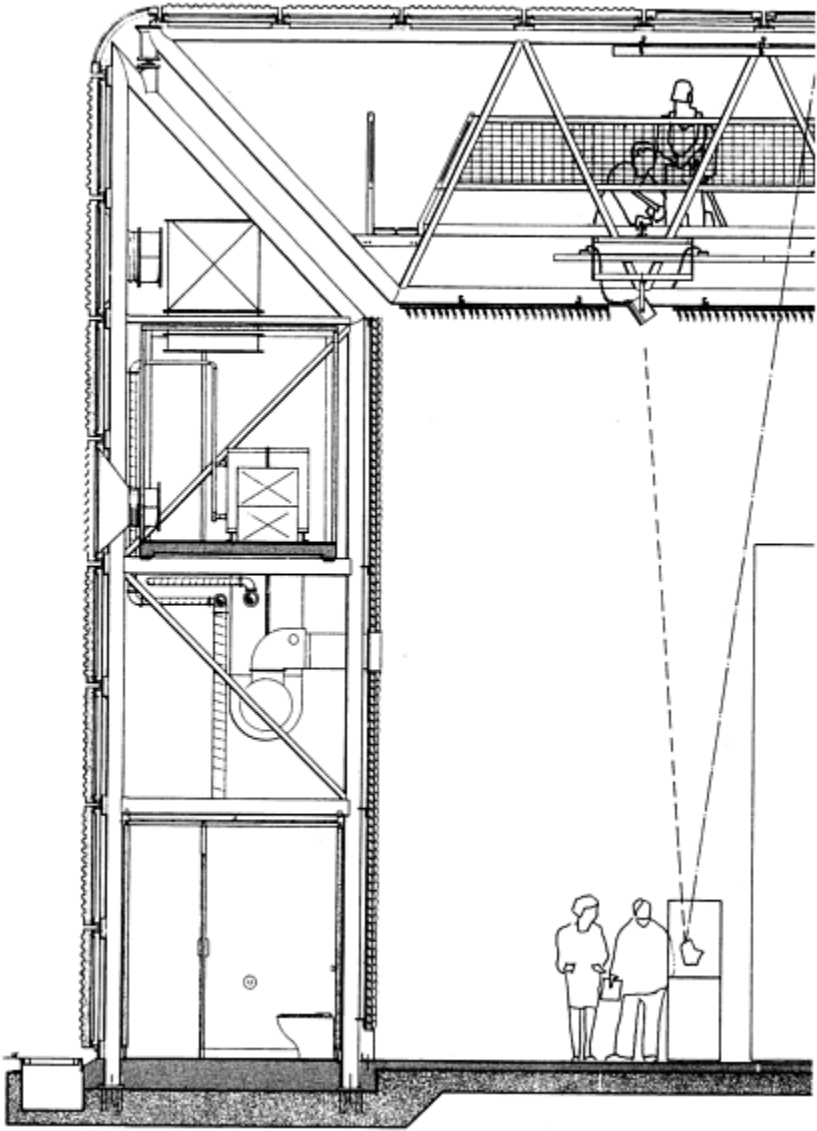


Sainsbury Centre for Visual Arts 1974–8: original concept sketch by Norman Foster

preoccupation with hangars in the context of the Sainsbury Centre. But nothing could have been so far removed from the reality at the time when it was being designed.

**MQ:** Can you explain that?





Sainsbury Centre for Visual Arts: cross-section through external wall and roof structure

**NF:** Well, all the parties involved—the Sainsburys—Sir Robert and Lady Sainsbury, who were donating their collection to the University and the funds for a building to house it—as well as the university—all assumed that we would propose a complex of buildings. One for the permanent collection—one for temporary exhibitions—a separate one for the School of Fine Art and another one for the Senior Common Room, perhaps combined with a café that would be open to the public—at least three or four

individual structures.

**MQ:** Why was it not built that way?

**NF:** Well, at the outset there was no brief in the traditional sense of the word—few preconceptions. There was a great deal of discussion and the shared experience of visiting other galleries and museums together. We travelled across Europe with the Sainsburys to see the Louisiana Museum in Denmark, the Mies van der Rohe National Gallery in Berlin, the last museum by Alvar Aalto in Jutland—even the hotels we stayed in, such as the one by Arne Jacobsen in Copenhagen, were talking points. We also exchanged reactions to other projects that we looked at separately, particularly in the USA. This led to questioning a lot of conventional wisdom. We had by then already agreed that the site for the new centre would not be next to the other arts building on the campus but would be at the opposite end, next to the sciences complex. There were a number of reasons for this, but one was concern with the importance of cross-fertilization between different disciplines.

**MQ:** And this moved you towards a kind of umbrella approach?

**NF:** Yes, because in that spirit we concluded that there would be social gains by grouping all the diverse activities—public and private—teaching and viewing—all under a single roof. For example, the idea that a gallery would, in the morning, be a teaching resource and, in the afternoon, a public space, was revolutionary. Can you imagine the culture shock of teaching an appreciation of art with real masterpieces instead of slides and books?

Also, once you have a restaurant and café with a public and university catchment then the centre has the potential to be much more of a community focus. Such ideas took root almost immediately. The centre has since become one of the most popular venues for wedding receptions in the Norwich area—it also regularly hosts private views combined with formal and informal dinners. More recently there was an outcry from the academics when it was thought that the later incorporation of a small lecture room might threaten the established tradition of using the galleries as teaching spaces.

**MQ:** But how did you proceed to solve this problem?

**NF:** The first attempts to group all these activities under the umbrella of a single roof—clear-spanned for maximum flexibility—was compromised by small-scale support spaces, such as toilets and plant-rooms. This was finally resolved by a structural form with sufficient depth in the wall zone to absorb them and the same depth in the span for overhead access to the lighting. In this way we dispensed with the traditional need to erect maintenance equipment every time you have to light an exhibition or refocus a lamp.

**MQ:** And what exactly were the precedents for this approach?

**NF:** The idea of grouping a diversity of activities under a single roof was also in a tradition of earlier projects such as the Newport School and the Pilot Head Office for IBM. What I have described is a process of design evolution—a sequence of decisions based on research—as much concerned with the heart as with the mind—in which social, technical and aesthetic considerations all merge together. What, then, for heaven's sake does all this have to do with hangars?! When I read your critical appraisal of this building it sounds as if I had a love affair with hangars and decided that was the answer! But seriously, do you not think this is a rather dismissive and

trivial approach by you as a serious critic?!

**MQ:** I believe it is important to understand in this context that I am a Norfolkman, and I was born just 5 miles from the Sainsbury Centre site. It would be much more tedious if we always concurred about design matters. And you will recall that my purpose is to free you from the high-tech pigeon-hole. I am too much in awe of what you do to ever take a trivial or dismissive approach to your work. But to put it in context, let me say that if Dutert can make a hangar for machines in 1889, and we accept that Hagia Sophia is basically a hangar for the Holy Spirit, then I believe the Sainsbury Centre can rejoice in being a hangar for art.

**NF:** The Sainsbury Centre is not an isolated example of what I have in mind. Let's take the Royal Academy. This was about peeling away the layers of history—continuing the tradition of each age making its own mark on the historic fabric—of value judgements to determine what was worthless and could therefore be removed, as well as what was precious and part of a heritage that must be preserved. The new enhanced the sense of awareness and appreciation of the past—and vice versa. In that sense it was like the city in microcosm. Now obviously we did cut away and remove some of the flesh of the old building. But don't you think that your extended analogies of surgical procedures rather miss the point of what we were doing as designers?

**MQ:** Not at all. You agree that it was necessary to “cut away and remove some flesh of the old building”, and my surgical analogy points out the delicacy and precision with which that was done. Once again, as with the hangar, my purpose was absolutely positive and complimentary. Naturally, in attempting to take an unconventional viewpoint I must run the risk of being misunderstood. The advantage is that I have a better chance of revealing *Fosterwerk* than if I adopted a polite and conventional attitude. After all, the problem is not so much that I am trying to mislead the reader, but that the reader has been previously misled by other critics.

**NF:** I think it is more a matter of emphasis. Several consistent themes run through almost all our projects: for example, the importance of the social context. Willis Faber is a very good example of a project that strives to achieve the democratic workplace. Standards increased as you ascended escalators through palm trees and sunlight to the two working floors, which were sandwiched between swimming-pool and café on the ground floor and roof garden and restaurant above. All the bright colours were used—lime green carpets, silver ceilings and yellow walls. Inwardly social and outwardly contextual—a deep low-rise building that respected the skyline of its market town setting—with a continuous facade that hugged the irregularities of its site and recreated the old medieval street patterns. Although most of the published photographs showed it in wide-angle panorama, the urban realities were of surprise glimpses as you rounded a corner from adjoining streets.

In energy terms it was equally radical—nobody was talking about issues of ecological importance in the early 1970s, yet it pioneered low-energy concepts as well as introducing revolutionary concepts of flexible office planning that are still not commonplace—such as wide-span structures and full-access floors. As a company, Willis Faber now boast, more than 20 years later, that their ability to cope with change has enabled them to prosper, because unlike their rivals they did not have to create a new building to accommodate the electronic revolution.

**MQ:** All of your remarks here give full support to my approach. Of course, the critic's task is to provoke by his criticism. And if I had not taken the attitude I have, perhaps your valuable observations would not have surfaced. If in viewing Willis Faber & Dumas as an "object" in the lineage of Modernism I have managed to provoke the response that this object is also a socially sensitive barometer, then I have succeeded in making this dialogue work.



Willis Faber & Dumas offices, 1971–5: swimming pool

# Chapter Three: Construct, context and subtext

A critical reading of selected works and projects



The Carré d'Art, Nîmes: concept sketch by Norman Foster, 1985



Old Baptistery, Church of San Lorenzo, Florence, Italy, c.1421; Brunelleschi



Church of Santa Maria, Trastevere, Rome, Italy



Cathedral of Santa Maria del Fiore, Florence, Italy, 1420–36; dome by Brunelleschi

In 1994, when Sir Norman Foster received the Gold Medal of the American Institute of Architects, it was clear that a dramatic shift had taken place in professional and critical appreciation of Foster's work in the USA. By 1994, Foster Associates, as they were known for more than 25 years, and their continuation under the banner of Foster and Partners, had been in practice for three decades. Those 30 years have been extremely productive and successful. They include the design and construction of such notable buildings as: the Willis Faber & Dumas office headquarters, Ipswich, England (1975); the Sainsbury Centre for Visual Arts, Norwich, England (1978); the Hongkong and Shanghai Bank, Hong Kong (1986); London's third airport at Stansted, England (1991); Century Tower, Tokyo, Japan (1991); Telecommunications Tower, Barcelona, Spain (1992); and the Carré d'Art et Médiathèque, Nîmes, France (1993). In addition, there were a number of innovative planning and urban design projects, of which three for London are of particular note: the new Radio Centre for the British Broadcasting Corporation at Langham Place (1983); the competition for the redevelopment of King's Cross (1987); and the Great Court Project for the British Museum (1995). The great diversity of this

work has brought the Foster studio many honours and other forms of professional and cultural recognition. In spite of all this international acclaim and prestige, however, Foster's work has only recently attracted substantial recognition from colleagues in the USA.

This study has its origins, in part, in a number of proposals made between 1991 and 1993 to arrange for an exhibition of Foster work at a major museum in the USA. A variety of reasons were advanced for the lack of interest in that project. Among these were: "We're not doing any more bio-shows right now";<sup>1</sup> and "High-tech might provide a possible theme for a show that could include Foster, but frankly there's no real interest in that sort of thing any more". Within two years of its avowed lack of interest in bio-shows, however, the Museum of Modern Art in New York (MOMA) staged just such an exhibition of the work of Bernard Tschumi, a Swiss architect who is also Dean of the Graduate School of Architecture and Urban Planning at Columbia University in New York City.

Aspects of such dissimulation by American museum pundits offer the framework of a cultural puzzle. For example, the Foster studio is commonly characterized as a high-tech practice, but that does not constitute a true assessment of its actual output and performance. The question of cultural politics in the marketplace of fashion comes into play here, the outcome of which is to deny the Foster studio certain critical exposures of its work. Clearly, the underlying structures of cultural fashions do not depend entirely upon professional skills and demonstrations, but rather upon affiliations and agendas of particular groups of tastemakers. These sorts of consideration predicate "rules of play" by which an architectural work is assessed in terms of political correctness or incorrectness.

Although it is possible for the rules and principles of aesthetic order and conformity in architecture to be precise, they have not proved to be very exacting outside the classical discipline. De Stijl had its ground rules, as did the architecture of Le Corbusier, but these are essentially *aides-mémoires* when compared with the *taxis* underlying a Mies van der Rohe building, depending as it does upon strict classical rigour. Certainly, by the time we reach the 1980s and the permissive vagaries of Deconstruction, there was scant evidence of rules or discipline in use. Perhaps one of the essential difficulties of categorizing Foster buildings and ideas lies not only in their diversity, but in the fact that they reintegrate the structure and appearance components that were separated out by Brunelleschi and Alberti.<sup>2</sup> It is not that Foster buildings put the architectural entity back together just as it was before the Renaissance. On the contrary, in a Foster building the skeleton of structure and skin of appearance are assembled with a new dynamic and aesthetic. Rather than modulating the facade, the skin becomes a mirror or a *vanishing* through transparency. The bone and flesh of architecture in a Foster building review the revolutionary anatomies of Brunelleschi and Alberti, but they also quote from Joseph Paxton, Charles Dutert and Gustave Eiffel. Nor is the enclosure itself, the sacred box of architecture—and certainly *not* high-tech architecture—sacrosanct to Foster, for this can be made to disappear, too, for the benefit of the space that is enclosed. There is a suggestion, perhaps, of turning the body of architecture inside out, of reversing architectural priorities, of a *mystery* in fact. And although all that might be *haute-technique*, it is not high-tech in the conventional sense that has been applied to Foster.<sup>3</sup>

Part of the problem in trying to categorize Foster work is the fact that it has been

conventionally positioned by its detractors as occupying a sort of no-man's land between Modernism and Constructivism. Neither of these two territories has any enduring attachment to structure or construction, however. High-tech, on the other hand, literally invokes technology—the technology of construction—as one of its underpinnings. The



Interior, Church of San Lorenzo, Florence, Italy, c.1421; Brunelleschi



Medici-Riccardi Palace, Florence, Italy, 1444–59; Michelozzo di Bartolommeo

questions posed here will therefore centre upon the constructional versus the compositional preoccupations in architecture. To undertake this exploration, it is necessary to distinguish between the material nature of a building, its intended “being”, and its perceived “effect”. In order to understand these elements of architectural existence, and the related “mystery” that links substance and appearance, we must go back a few hundred years, at least as far as the early fifteenth century in Florence, when Brunelleschi and Alberti effectively invented the creative interventions of architectural practice.<sup>4</sup>





Church of San Miniato al Monte, Florence, Italy, 11th century; Rolando and Piero Fusi

There is something quite dramatic about Brunelleschi's representation of architecture as a new and discrete formal being. His delineation of the surfaces, junctions and volumes of the Sagrestia Vecchia at San Lorenzo (1420–29) depicts an organizational clarity that removes the work from the constructional realm into one of pure order. Brunelleschi's delineation is quite different from that used by Benedikt Ried in the Castle at Hradcany, Prague (1502) or in the church of St Barbara, Kutna Hora (1512), where the vaulting ribs follow underlying structural patterns. In a similar way, Brunelleschi's design for the interior of San Lorenzo, Florence (begun 1421), although based upon a system of arcades for both the nave and aisles, removes architecture from the realm of material substance to that of pure order and delineation.

The sheer weight and deliberation of such early Christian churches as the fourth-century Santa Maria in Trastevere, and San Paolo Fuori le Mura, Rome, to which Brunelleschi's designs for his Florentine churches are indebted, are dissolved in San Lorenzo by the architect's use of light, and his ingenious employment of the abacus block between the capitals and the arches in order to stilt the arcade above its supporting columns. Thus, at the very beginning of the Italian Renaissance, when the rules for interpreting Classical architecture were not yet worked out, Brunelleschi still had that freedom to improvise that imparted a freshness to his design. Yet, at the same time, the cortile of Michelozzi's Palazzo Medici-Riccardi demonstrates uncertainty in the treatment of the corners of the arcade, which practically disappear at the critical structural junctures because insufficient space has been allowed to accommodate the intersecting archivolts.

Brunelleschi's delineation of the enclosing surfaces and framing elements of space and form defined the distinction between a work of masonry construction on the one hand, and on the other hand a construct of formal relationships in which the architectural idea is *drawn*, in opposition to a material composition or mass, of which the eleventh-century San Miniato al Monte, Florence by Roland and Piero Fusi is a pre-Renaissance example. A similar transformation took place between the world of medieval painting and its Renaissance successor, wherein the detached iconic objective depiction of hagiographic

material within rigid and static frameworks gave way to a freer narrative composition in which the religious solemnity was relaxed to accommodate a broader social context. Between these two extremes, we have the interesting experiments of the Sieneese school, with its intervention of the architectural interior as a mechanism for replacing one system of spatial ordering with another. In both painting and architecture at the beginning of the fifteenth century the uncertainty in breaking out of an established set of rules did not promote new rules to replace them. Together with the imperfections of early Renaissance architecture go the refreshing quirks of faulty experimentation. As with early Modernism, the boundaries between subject and composition were somewhat like the clothes-designer's seams, formed between intention and construction.

Brunelleschi had paralleled his work at San Lorenzo with an entirely different architectural exercise, the design of a dome to span the vast crossing of Santa Maria del Fiore, the cathedral of Florence. Expansion of the original plan to create the largest church interior in Tuscany had left an opening at the crossing that was seemingly beyond the means of contemporary builders. Brunelleschi's dome was originally designed in 1418 and constructed 1420–36. Importantly, the technology of Brunelleschi's brilliant solution was all borrowed. He took the idea of building the dome without any centring from the cantilevered horizontal courses of the Pantheon in Rome. Then he used the system of the double-shell dome, which already existed in the Florence and Pisa baptisteries. And, finally, he employed the medieval pointed arch form to contain the dome's forces, and stretched the double skins over 24 ribs for added stability. His solution, then, was not in any one of these individual pieces but literally in the stitching of them together into a new fabric.<sup>5</sup>

As work proceeded, more or less simultaneously, on the cathedral dome and at San Lorenzo, Brunelleschi straddled two significantly different epochs in Italian cultural history—the end of the Middle Ages, and the beginning of the *rinascimento* or Modern World. The values built into the cathedral and the completion of its dome were of a strictly material and technical nature. To design a dome that would span the gigantic



Pantheon, Rome, Italy, AD 118–128



Cappella dei Pazzi, Florence, Italy, 1442; Brunelleschi

crossing of Santa Maria del Fiore was not simply an intellectual exercise; nor was it an act of faith. It involved rather a profound knowledge of the materials and techniques of construction. Even when all the necessary constructional facts were harnessed, there was still a further stage before Brunelleschi could bridge from purely technical knowledge to a workable design solution that could be built. A basic understanding of the problem was not enough. What was required was an idea—a concept that would allow seemingly unrelated bits of information to interact. Brunelleschi’s contribution, then, was to create a dialogue of constructional parts: literally an interplay of texts that would allow their amalgamation in a new *context*. The unifying thread of his “plot” was a constructional device or re-invention—“the dome”—which was assigned the “role” of piecing and stitching together all the separate, individual contributions from preexisting techniques in order that they might function as an architectural whole.<sup>6</sup>

Brunelleschi’s parallel work on San Lorenzo, and later in the Capella Pazzi (begun c.1430), was of a different order precisely because its constructional idea is mitigated by the architectural *schema*. The exterior of the Florence cathedral dome reveals no indication of its inner strength. Unlike a system of vaulting, a dome is a mystical body of architecture, whose appearance gives few if any clues about its inner being. When we dissect a dome we can open up surgically its hidden anatomy. Imagine if, instead, we were to draw on the surface of the dome certain patterns indicative of a hidden internal structural skeleton. What would such a strategy suggest? It might offer clues about some invisible order, such is done by the coffering of the Pantheon dome in Rome, but these would only be false clues expressing an architectural construct rather than evidence of a structural or constructional presence.

In this sense, Brunelleschi left the constructor behind when he moved on from Santa Maria del Fiore to San Lorenzo and, subsequently, the Capella Pazzi, transforming himself from a builder of form into a delineator of surface and space. By the same process, the same intervention of linear logic, architecture was also abstracted from *techne* and technology and given over to a drawn analogy of itself. Those abacus blocks

atop the capitals of the nave arcade at San Lorenzo, for example, do not represent a continuation and extension of a constructional framework, but rather its interruption and transposition.

In a similar way, the panelled effect of the wall surfaces in San Lorenzo's Sagrestia Vecchia, created by the contrasting materials of wall finish and architectural features (pilasters, archivolts, etc.), dismantles the interior as a whole and focuses our attention instead on a series of separate but interrelated frames. This same treatment is even more abstractly applied in the Capella Pazzi, where the flatness of the bas-relief architectural system gives even greater emphasis toward a pictorial representation rather than a substantial material statement of built form. And herein lies the brilliant, disarmingly articulate nature of the profession of architecture as it emerges into the Italian Renaissance; for it is through sheer draughtsmanship that the fabric of monuments is drawn together after the invention of a propriety of pieces that can be butted, fitted, tailored and, finally, sewn together. In this context, the architecture seems no longer to reside in sheer substance and weight; rather it is subtended by the sinews, its forms and spaces delineated by the etched geometry of a draughtsman's contract.<sup>7</sup>

After Brunelleschi had separated out the art of design from the labour of construction, Alberti was left with the task of underpinning the experiments of San Lorenzo and the Capella Pazzi with an appropriate theoretical ground. In his *De re aedificatoria*, Alberti discusses what he termed the *lineaments* of building, proposing that:

“...the whole matter of building is composed of lineaments and structure...”

He further suggested that the purpose of lineaments:

“...lies in finding the correct, infallible way of joining and fitting together those lines and angles which define and enclose the surfaces of the building.”<sup>8</sup>

The separation between structure and appearance was a commonplace in the architecture of ancient Greece, and the Roman architects made it a norm. By the time the Colosseum was built, the distinction between the structural skeleton and a building's outer skin was clearly established. We speak here of a skin—or a mantle—that covers the bare body of construction, just as our own flesh and epidermis cloak the bony frame of the human anatomy. Nevertheless, this distinction between structure and the lineaments has remained a difficulty in the theory and practice of Western architecture. Brunelleschi may have demonstrated the distinction, and Alberti certainly provided it with a sound theoretical underpinning, yet the problem is still with us. We have the facts according to Brunelleschi and Alberti, and Alberti's explanation of the phenomenon, but some sort of mystery remains—a moral dilemma, perhaps, that obstructs full acceptance of the evidence. In any case, the fact is that the separation between structure and appearance, the distinction between construction and architecture, goes back to the very roots of civilization. Some 2000 years ago, the Roman architect Vitruvius wrote his treatise *De Architectura* and clearly defined this basic dichotomy of the architectural condition:



Palazzo Rucellai, Florence, Italy, c. 1446–70; Alberti



East facade, the Louvre Palace, Paris, France, 1667–74; Claude Perrault

“In all matters, but particularly in architecture, there are these two conditions: the thing signified, *and that which gives it significance*. That which is signified is the subject of which we may be speaking; and that which gives significance is its demonstration on scientific principles.”

Vitruvius’s proposition leads us to believe that, in the classical world, architecture existed as a defined discipline in its own right, possessing its own body of knowledge and a theoretical base (*taxis, genera and symmetria*). But the classical ordering of architectural elements and parts of a building did not describe the “joining and fitting together (of) those lines and angles which define and enclose the surfaces of the building” (Alberti). This theory of the outer fabric, skin, cloak or cover is Alberti’s own contribution, and its precise fit and application is demonstrated in the inscription of the architectural *schema* on the facade of the Palazzo Rucellai.

Now, this Albertian skin, or signifier, is not at all *Die Wand* of Gottfried Semper (1852).<sup>9</sup> Alberti’s outer skin is still a substantial wall, despite the precise draughtsmanship of its delineation and tailoring. The facade of the Palazzo Rucellai, for all its architectural graphics, is no mere “screen” in Semper’s sense. Nevertheless, a quite

significant blow for the freedom of the facade was struck by the Palazzo Rucellai.

The separation of structure and appearance, which the Roman architects had perfected, was forgotten when the Roman art of *pozzolana* was lost some time in the fifth century AD. The solid stone constructions of the Romanesque and Gothic periods restored architecture's monolithic essence, melding structure and appearance into one entity or condition: to a large extent, "what you saw was what you got". Through the transitions achieved by Brunelleschi's experiments, and the further transubstantiation promoted by Alberti's theories, the architect (who had been buried as a mere mason in his own medieval masonry) emerged to resume his classical role as architect, as the delineator of the lineaments.

*De re aedificatoria* also contains Alberti's celebrated definition of beauty (or perfection) that:

"...nothing can be added or taken away, except for the worse."

Alberti had, however, already distinguished between construction and appearance—between structure and lineaments. Thus a view of that from which nothing can be either added or subtracted is a view of that which is *visible*: that is, not the structure, which is normally concealed, but the appearance—the lineaments, which define, delineate and coordinate that appearance. Gevork Hartoonian is not correct, therefore, in suggesting that it was Claude Perrault who first questioned the authority of classical treatises, because Alberti had already done that convincingly in *De re aedificatoria*. Perrault's challenge, however, was to the classical inheritance as a whole, which, through the *lineamenti*, had given the post-Albertian architect the task of conceiving the overall geometric figure of the architectural work. This meant that, from the fifteenth to the seventeenth centuries, architecture had inherited a specific theory from antiquity, which depended upon an understanding of the framework of classical myth and philosophy that no longer obtained. Perrault began his search for the fallacies and misunderstanding he believed to originate with classical literature by re-examining Vitruvius's *De Architectura libri decem*. He followed this with his *Ordonnance* (1683), which was his attempt to reformulate the traditional problems of architecture in terms of a fully modern scientific theory. In advancing his "modern" theoretical position in the late seventeenth century, Perrault was confronted by such prevailing views of theory as "metaphysics". His principal opponent, François Blondel, held such views, and the majority of Perrault's successors continued to reflect them in the theories they formulated during the eighteenth century.<sup>10</sup>

Perrault believed that the underlying purpose of his modern, scientific method was to simplify its use in the practice of architecture, but Perez-Gomez argues that Perrault failed to really reformulate architectural problems in modern terms. However, after Jean Louis-Nicholas Durand revolutionized architectural theory in the early nineteenth century, Perez-Gomez believes that:

"...many of our prevalent misconceptions about 'classicism' and 'style', and even misunderstandings about



Crystal Palace, Great Exhibition, London, UK, 1851; Joseph Paxton



Galerie des Machines, World Fair, Paris, 1889; Contamin and Dutert



Glass office building, Friedrichstrasse, Berlin, Germany, 1921; Mies van der Rohe

the very essence of architecture as an historical phenomenon, may be clarified through a proper grasp of Perrault's theories."<sup>11</sup>

Perrault's proposal for the simplification of the Orders was based on his distinction between "customary" and "arbitrary" beauty. This distinction meant that the rationale for making architecture was literally dependent on the various techniques of construction. In

this way, the symbolic and analogical values of architecture were displaced by an emphasis on materials, craftsmanship in the details, and a building's form and order (*symmetria*). Architectural elements (*genera*)—the walls, columns, and arches etc.—lost their poetic role, as their meaning became abstracted.<sup>12</sup>

Durand conceived and classified architectural forms based on their function and economy of use. By separating architectural types from constructional means, Durand presented an abstract understanding of every element of architecture, placing each one in its empirical relationship with every other. His truly “scientific” analytical view stripped architecture of every mimetic effect, replacing these with the autonomy of architectural language. This opened the way to our theories of the twentieth century, allowing architectural meaning to be inherent in form itself, derived from its own syntactic role, having nothing to do with outside factors or references.

Twentieth-century theories have their beginning in the nineteenth century, when buildings such as Joseph Paxton's “Crystal Palace”, London (1851), and Charles Dutert's Galerie des Machines for the 1889 World Fair in Paris announced the transfer of glass architecture from the private world of the palm-house to the public realm. The future of this glass architecture was later prophesied by the “glass architect”, Bruno Taut, who wrote:

“In our profession, we cannot be creators today, but we are seekers and callers. *We shall not cease seeking for that which may later crystallize out,...* One day there will be a world view, and then there will also be its sign, *its crystal-architecture.*”<sup>13</sup>

In the first half of the twentieth century, glass architecture became the principal domain of a number of leading Modernist architects, including Erich Mendelsohn, Mart Stam, Walter Gropius, Hannes Meyer, J.A. Brinkman and L.C. van der Vlugt. It is Mies van der Rohe, however, who became the emblematic designer of glass buildings between the 1920s and the 1960s: beginning with his project for “A Glass Office Building in the Friedrichstrasse, Berlin” (1919–21); continuing with the German pavilion for the Barcelona World Fair of 1929; going on in the USA to the various buildings for the Illinois Institute of Technology campus in Chicago, including the Minerals and Metals Research Building (1942) and Crown Hall (1952–56); embracing two contrasting residential examples—the Farnsworth House at Plano, Illinois (1946–50) and the apartments at 880 Lake Shore Drive, Chicago (1948–50); and culminating in his Seagram Building (1958), designed together with Philip Johnson.

Working very precisely in the Miesian vein, Johnson designed a house for himself at New Canaan, Connecticut: a rectangular glass pavilion, transparent on all four sides, which was completed in 1949.<sup>14</sup> Its construction demonstrated that, in our post-Perrault, post-Durand world of glass architecture, when our aesthetic focus is on the external appearance of an architectural form—the *lineamenti* of the exterior surfaces of a building—then it is possible to reproduce the detailed character of that architectural entity very exactly. Indeed, as Henry-Russell Hitchcock observed not long after the completion of Johnson's Glass House: “It's really more Mies than Mies!”<sup>15</sup>

The emphasis on the exterior appearance of Johnson's New Canaan house in



measuring the success of this counterfeit is of great importance. When it is seen in the late afternoon, as a transparent rather than a reflecting box, its similarity to Mies's work is less apparent: instead one is merely looking through glass panes that are framed by black-painted steel. However, when the glass box reflects, and its constructional members double as *lineamenti*, then its transparency is not apparent. In most cases, glass architecture offers these two disparate readings: the one reflecting and the other transparent.

During the 1950s and 1960s, the glass pavilion became the emblem of Eero Saarinen and Skidmore, Owings and Merrill in succession to Gropius, Stam and Mies van der Rohe. Skidmore, Owings and Merrill in particular spawned many counterfeit Mies buildings in the 1960s and 1970s, not only in the USA but also in Europe, Canada, and Central America. The solidity of substance in urban architecture and character was superseded to a great extent by the erection of vast urban mirrors that replaced the urban chic of, say, Paris and London with a new urbanity—that of glitz and dazzle.



Farnsworth House, Piano, Illinois, USA, 1950; Mies van der Rohe



Seagram Building, New York, USA, 1958; Mies van der Rohe and Philip Johnson



Lever House, New York, USA, 1951–2; Skidmore, Owings and Merrill

The concept of transparency has, of course, not been the same since Colin Rowe and Robert Slutzky first published their article “Transparency: literal and phenomenal” in 1963. An early observation in that provocative piece reads:

“...at the beginning of any inquiry into transparency, a basic distinction must perhaps be established. Transparency may be an inherent quality of substance—as in a wire mesh or glass curtain wall, or it may be an inherent quality of organization—as both Kepes and, to a lesser degree, Moholy, suggest it to be; and one might for this reason, distinguish between a real or *literal* and a *phenomenal* or seeming transparency.”<sup>16</sup>

The Foster studio dates back to 1964, when Norman Foster began practice with Richard Rogers as Team 4 Architects. Even the early Team 4 mews houses in Camden Town, London, of 1964, although exhibiting determinedly non-transparent brick walls to the street, have full-width glass walls to the garden courts. In a similar way, another Team 4 design, Reliance Controls at Swindon, Wiltshire, of 1967, had three of the main walls *closed* by pressed metal cladding, while the other is entirely *opened* by full-height glazing. This pattern established a dominant glass element embraced within the architecture of Team 4, while Norman Foster went on to wrap the entire structure in reflecting glass when he designed an office/amenity complex for Fred Olsen Limited in Millwall Docks, London (1969). This makes the Olsen building an important transitional exercise in Foster’s emerging design strategy.

Returning to the distinction between *literal* and *phenomenal* transparency made by Rowe and Slutzky, it will be seen that the work of the Foster studio is, for the most part, determinedly literal. This characteristic certainly held sway in the first generation of glass architecture (c.1850–1914), and was extended through much of the second generation (c.1920–60). By the end of the 1960s and the beginning of the 1970s, this second generation of glass architecture had largely run its course. Thus, when Foster began to

occupy the ground of the third generation of glass architecture, he was able to penetrate into this territory almost unchallenged. This is not to suggest that the Foster studio has been continuously preoccupied with the realization of Bruno Taut's *Glasarchitektur*. Nevertheless, beginning with the Olsen Centre (1969) and continuing with the Willis Faber & Dumas office complex at Ipswich (1974), a case for equating Foster architecture with glass was already uncompromisingly made. With this categorization came the unavoidable label of "transparency", and by association there was also the assumption—or perhaps better to say the "presumption"—that because Foster's architecture was predominantly transparent, then it must follow that it was transparently obvious.

This in turn led to the notion that it is perfectly easy to *see through* (i.e. "understand") a Foster building because (in terms of barriers to comprehension) there is, architecturally, *virtually* nothing there.<sup>17</sup> The result was that when initial enthusiasm for the sheer novelty of Glass Architecture in the decades immediately following its "invention" gave way to a new negative critique, it was relegated to the camp of Minimalism. Mies van der Rohe is always credited with the design slogan: "Less is more". In fact it was coined by the English poet Robert Browning in his poem "Andrea del Sarto". In any case, Mies took his Minimalist concepts from Bruno Taut, who in his manifesto for the "Exhibition of Unknown Artists" broadsheet wrote:

"We call upon all those who believe in the future. *All strong longing for the future is architecture in the making. One day there will be a world-view, and then there will also be its sign, its Crystal Architecture.*"<sup>18</sup>

One principal difficulty with the "glass box" concept in architecture is that it provides for a direct facilitation of the Minimalist aesthetic. This was not intrinsically the case, however, in the beginnings of Glass Architecture, when both the Kew Gardens Palm House by Decimus Burton and Richard Turner (1844–48) and Paxton's Crystal Palace for the Great Exhibition (1849–51) incorporated extensive *lineamenti* in the frameworks of their designs. Even so, the essential transparency of these structures meant that, in Christopher Alexander's terms, they provided examples of "glass box" design method. In Brunelleschi's late-medieval dome for Santa Maria del Fiore, or the Palazzo Rucellai, what we see is only part of the whole story: the delineation of dome or facade by the *lineamenti* describes only the architectural *exteriority* of these monuments. Within the structure and construction of both, however, lies an element of mystery, which cannot be solved simply by reading the external signs. This mystery, which defies penetration on the basis of surface clues, creates by means of its hidden secrets something analogous to Alexander's alternative design paradigm, that of the "black box". When such a mystery exists, when there is an "inner sanctum" of hidden intentions that remains impenetrable, with these enigmatic qualities locked away between structure and appearance, then we can identify the operation of "black box theory" both in the design method and in its consequences in built form. Alexander did not label his "glass box theory" casually: it accurately describes certain design methods and their consequences.



Crown Hall, IIT, Chicago, Illinois, USA, 1956; Mies van der Rohe

The Modern Movement, in all its varying manifestations, unwittingly promoted the “glass box” approach to design methods and the production of architecture. For example, in their *Commentary on Manifesto V*, van Doesberg and van Eesteren reinforced the De Stijl philosophy:

“We have to realize that art and life are no longer separate domains. Therefore the idea of ‘art’ as illusion, unconnected with real life, has to disappear. The word ‘art’ no longer means anything to us.”<sup>19</sup>

At much the same time, Piet Mondrian suggested that:

“The life of contemporary, cultivated man is turning gradually away from nature; it becomes more and more an *a-b-s-t-r-a-c-t life*.”<sup>20</sup>

If the concept of art as illusion is removed, then the operational framework of architecture is also reduced. Removing illusion is the same as making reality more apparent, making for greater transparency, hence conforming to “glass box theory”. At the same time, the notion of increasing the abstractness of life might suggest it becomes less apparent or obvious, thereby implying the reintroduction of mystery, although perhaps of a different kind or degree. Thus we might have the possibility of a design situation that is both reductionist (i.e. transparent or glass box) and mysterious (i.e. opaque, cryptic, or black box).<sup>21</sup>

One obvious barrier against the acceptance of glass architecture from the Foster studio at the end of the 1960s and in the early 1970s was the fact that glass architecture had been in high fashion during both the 1940s and 1950s, as evidenced by Mies’s work at IIT, Eero Saarinen’s work for General Motors in Detroit, and such examples as Lever House and the Manufacturers’ Trust Company in New York City, both by Skidmore, Owings and Merrill. Whereas, in the 1920s, glass architecture had been truly avant-garde, two and three decades later it had become accepted as a cultural norm. Even allowing for the fact that a cultural lag distanced Britain in time from North America, by the end of the 1960s and the early 1970s, glass architecture was decidedly *déjà vu*.

Once again we should be alert to the problem of *transparent deception* in glass architecture, especially given our tendency to adopt an easy “see-through” attitude to its characteristics and appearance. Aside from Mies’ work, the glass architecture of the

1940s and 1950s was all influenced by Mies' examples, so that there was a basic set of rules: an understood aesthetic that governed the design of those glass structures and made them both acceptable and respectable. Glass architecture had been tested, at least culturally, by the 1940s and 1950s; it was no longer just some form of architectural perversity or a Communist outrage intended to displace the true fabric of society. As evidence that glass architecture had arrived in the 1940s and 1950s, we had a glass university in Illinois Institute of Technology, glass temples of industry such as the General Motors Research Centre, glass office buildings like Lever House (in homage both to Mies and Frank Lloyd Wright), and even glass banks like the Manufacturers' Trust Company. But, as we have observed, all these buildings conformed to what had become "classical" rules for the appearance of glass architecture. The industrial shed form that conceptually linked the Kew Garden Palm House, the Crystal Palace, and the 1889 Halles des Machines had been superseded through the example of Mies, Gropius and Stam by a refined pavilion that fused both temple and villa. Within the polished aesthetic of this New Glass Age of the 1940s and 1950s, part of the success that glass brought to building assembly, to the *lineamenti* of the architectural object, was in the refinement of putting the package back together.

If we can refer to the "classical" period of twentieth-century glass architecture—that of the 1940s and 1950s—its products therefore represented a looking-backward to the models already established by Mies, Stam *et al.* This gives evidence, in late-Modernism, of a desire to understand and replicate architecture of an earlier period—just as the Italian Renaissance looked back to the monuments of ancient Rome, and the early French Renaissance sought its inspiration from the Italian *quattrocento* and *cinquecento*. In the case of late-Modernism, however, this involved dipping into the immediate past. We have already observed Claude Perrault's efforts to reformulate traditional architectural problems in modern terms at the end of the seventeenth century. The principal reason that he failed may be put down to the fact that his theories were ahead of their time. But his rationale succeeded in reducing architecture to dependence on various techniques of construction. In this way, he opened up the supremely modern possibility that the symbolic and analogical values of architecture could be displaced by an emphasis on materials, craftsmanship (i.e. "refinement") in the details, and a building's natural form and order (*symmetria*). Perrault paved the way for the stripping of the poetic role from such architectural elements as walls, columns, and arches et cetera; instead, their meaning became abstracted. Perrault the anatomist would surely recognize the dissections made by Norman Foster into the architectural *corpus*. Cutting between the human *corpus* and the Body of Architecture, Perrault's anatomy is prescient of Mary Shelley's fictional science as well as foreshadowing Foster's "restitching" of Alberti's *lineamenti*. Thus Shelley's poorly sutured reconstruction offers a model for Foster's tailored *assemblage*.<sup>22</sup>

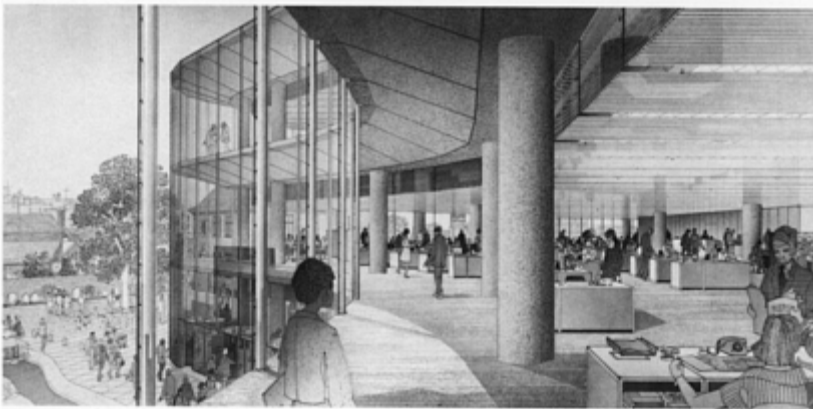
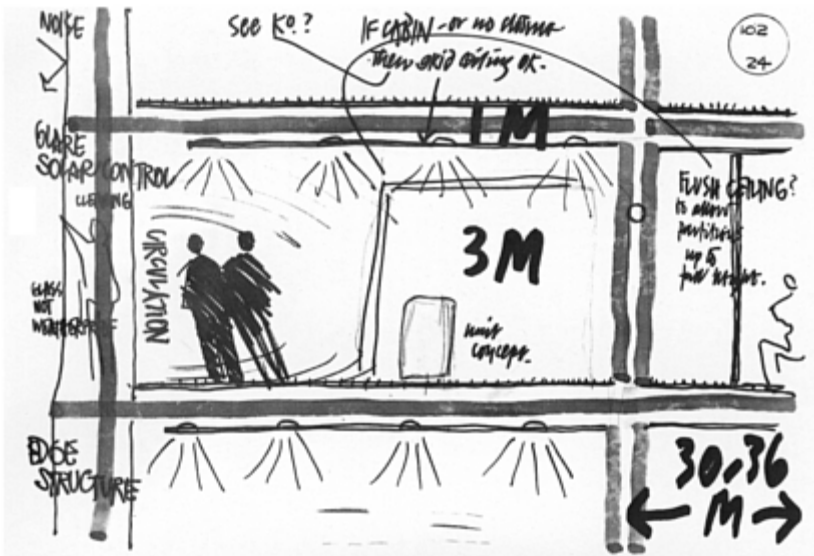


Willis Faber & Dumas Headquarters, 1971–5: night view

As we have noted, Perrault's "scientific" analytical view of architecture stripped it of every mimetic effect, replacing these with the autonomy of architectural language; opening up the way for twentieth-century theories. These allowed architectural meaning

to be inherent in form itself, derived from its own syntactic role, but substantially remote from external factors and references. This brings us up to date, to the 1970s and the sudden appearance of the Willis Faber & Dumas Headquarters in the very heart of the provincial city of Ipswich, Suffolk, in England's easternmost region, East Anglia.

I would now like to analyse some of the Foster projects in more detail, starting with Willis Faber & Dumas.



Concept sketch of edge detail by Norman Foster (above) and perspective by Helmut Jacoby (below)

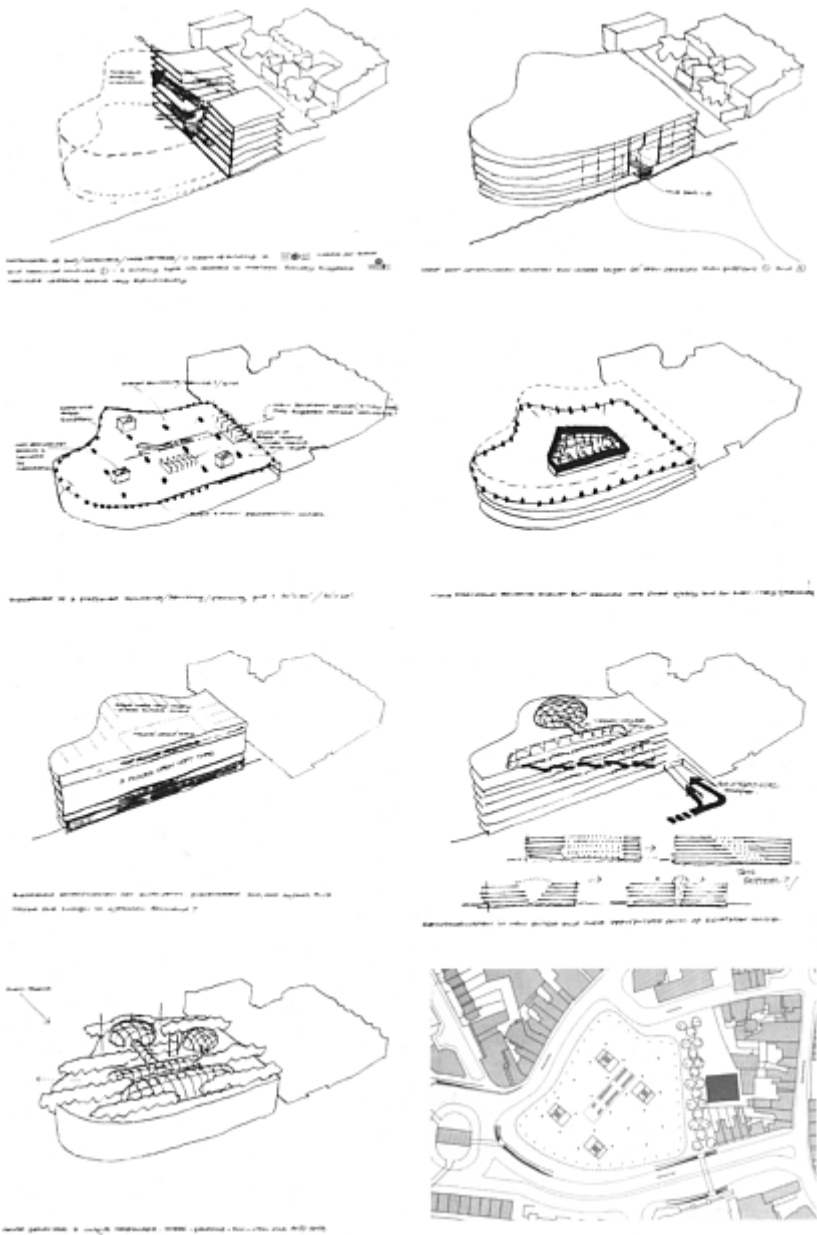
### Willis Faber & Dumas Headquarters, Ipswich, UK (1971–75)

The entire strategy for the realization of the Willis Faber & Dumas project was totally modern. Ipswich was a sleepy county town at the beginning of the 1970s. Its good fortune—or misfortune, depending upon one’s view—was that it is located on the main London-Norwich railway line, only 60 minutes from London’s Liverpool Street Station. The insurance brokers, Willis Faber & Dumas, had decided to move some of their operations from the City of London to the provinces. They were looking for a location on a railway line that had good, fast connections with London. The East Anglian rail route through Ipswich to Norwich seemed ideal. It took two hours to Norwich, which placed it too far from London. Ipswich, on the other hand, was only one hour away. The next problem was the acquisition of a suitable site in Ipswich.

Here the Willis Faber & Dumas real estate campaign anticipated that method later employed by the Walt Disney Corporation to acquire property for Disney World and the Epcot Center in Orlando, Florida. In order to buy the land they needed, in a relatively dense central urban area, Willis Faber & Dumas arranged to buy small separate, but adjacent lots, by using a number of different company names and aliases. This generated difficulties in packaging the overall site, and there were a number of changes in the area and perimeters of the Ipswich project during the preliminary design stages. The pattern of land acquisition is described here because it is directly reflected in the somewhat irregular shape of the site. What took place in Ipswich was a *displacement*: office workers were decanted from London to this provincial centre, while those who sold their houses in a brief property boom were removed to adjacent suburbs or else the nearby country-side. The short-term advantages in real estate dealing were quickly followed by the advent of a quite extraordinary building, the like of which the Ipswichians had never imagined, let alone seen. Described variously by locals with such colourful epithets as “the Black Blob”, “Tunnel of Love” and the “Masonic Ballroom”, Willis Faber & Dumas’ new provincial centre was greeted at first with considerable ambivalence by local Suffolk residents.

Ipswich had “suffered a direct hit from an unidentified flying object”, as one Suffolk wit put it. And, to make matters worse, not only was this UFO made of glass, it was black glass. It was not possible to see inside during daylight. “Heaven only knows what’s going on in there,” the locals wondered, “especially with all them Londoners! There’s no telling what they’re up to.” And at night, of course, when the building was left lit from within, and the black glass outer screen became transparent, there was nobody left inside. In their “Now you see it, now you don’t” black-box building, Foster Associates had created a profoundly mysterious piece of architecture. The mystery was compounded also by the building’s strange, irregular shape. Buildings ought not to be like that, especially not buildings in the middle of towns. For a while, therefore, it remained “the Black Blob” and “a visitor from another planet”—at least it was so for most local residents, for those “on the outside”. For those working inside the building, for the Willis Faber & Dumas employees, however, the perception of Foster Associates’ alien architectural object was entirely different.





Concept sketches by Norman Foster and site plan (bottom right)

The workforce, made up almost entirely of Londoners or those decanted from London, found themselves in a thoroughly Utopian environment, which some described as a “worker’s paradise”. After the cramped, ramshackle, poorly lit accommodation they had

occupied in London, with its inadequate toilet facilities, the new Ipswich centre was paradise indeed. For not only was the accommodation now spacious and well lit, with state-of-the-art toilets, the complex included such recreational amenities as a swimming-pool at ground-floor level, and a roof-garden spreading over much of the top of the building, where employees could sunbathe in privacy above the heart of the city below. Between the pool and the roof-garden are two well-lit, brightly decorated office floors, which are reached by the escalators thrusting through the atrium.



Entrance facade

The Willis Faber & Dumas building is not just simply a glass box, enclosing a parcel of workspace. Norman Foster is an unrepentant Modernist, and the Willis Faber & Dumas complex offers what is probably Foster Associates' most direct reference to Le Corbusier's "Five Points of the New Architecture". The *toit-jardin* is, of course the most obvious clue. For Le Corbusier the roof-garden was the main environmental thrust of his New Architecture in the aggressive urban environment. If we can no longer enjoy light

and air at ground level, then we must transfer our recreational pursuits to the roof. Since it is the advent of the automobile that sends us scurrying upstairs, Le Corbusier's treatment of the *rez de chaussée* in the Villa Savoye at Poissy presented a paradox, a "mystery to a solution",<sup>23</sup> as it were. For it is at Poissy that Le Corbusier gave fullest expression to his dictum that "La maison est une machine à habiter", by actually bringing the automobile within the boundary of the house plan, not simply as garage space but on a circulation track inside the entire perimeter. In the project as built, Foster

Associates were not able to open up the ground floor at Ipswich: the suspended, black glass envelope encloses all. Originally, however, provision was made for cars to enter the perimeter and pass through the corner of the site. There are no *pilotti* to provide the comfort of *déjà-vu*: "stripped of every mimetic effect" in Perrault's terms, it would seem that a Foster box is a box is a box. But not exactly, because at Ipswich, whereas there is no incursion of space and air beneath a colonnade—for there is no intrusion of either pedestrian or car within the building's boundary—the Corbusian principle is somehow turned inside out. For the swimming-pool, which would give load problems to the structure at roof level, is embedded within the working interior at ground level. This means that the office building is not simply *a machine for working in*. In Foster language, it is a machine for working in and recreating in as well, and Sir Norman has pointed out that provision was originally made for cars to approach the main entrance within the boundary of the building. What the local inhabitants imagined was "going on" inside the Foster black box was certainly not the whole story. People were not only working in there under ideal conditions, they were also actually enjoying themselves.

With Willis Faber & Dumas, Foster Associates reaped the harvest of the social equalizing management theory they had sown at Millwall Docks in collaboration with Fred Olsen Limited. At the heart of this theory was the concept that, just as the architect should sit on the same side of the table as the client, so also should blue-collar and white-collar workers go into the office or works through the same door. In this way, architecture becomes less of a grand cultural statement and more of a facilitator of socially balanced environments and a democratic *rendez-vous*. The idea of architecture as a pattern of *lineamenti* that describe the continuity of meeting-points and intersections within the surface of a building is, in this Foster design, substantially abandoned in favour of an alternative pattern of structure and Semper's *Die Wand*. This frees a building from fixed traditional formal references, and substitutes for these a set of alternative ordering strategies that, as it were, allow each building (released from the grip of pre-Perraultian mimetics) to "find its own way" in the world of architecture.

It was simply not possible to judge the works of Dutert, Eiffel, or early Perret by established and traditional rules, because they had broken through the authorized aesthetic of the *lineamenti* with a new constructional force and energy. The works of those early masters of Modernism asserted, by their scale and vigour, the undeniable existence of a new condition. There was no point in protesting that "they just don't fit in". It was precisely because they didn't fit in that they burst their way through to the leading edge of structural and formal ideas at the end of the nineteenth century. Because they too are finding their own way, Foster's buildings have to overcome difficult terrain, which is totally uncertain in topography and orientation, and frequently hostile. Because, in this uncharted territory of design, there is no preferred form or style to lean on, access along

the untrodden path of the “self-finding” building couples architecture’s uncertainty with the excitement of discovery and innovation. The Willis Faber & Dumas headquarters satisfied, by a fortuitous blend of adventurous management, design acuity, and a full-frontal attack on the previously untested aesthetic preferences of supposedly conservative East Anglians, both the conditions of the *unstated* and the *unconforming*.<sup>24</sup> Also, what at first appeared to be “a blot on the landscape” turned out to be a feature of civic pride. At the close of the first decade of the Foster studio, too, it represented an important watershed in the development of Foster’s design thinking.



The building at night

In addition to the highly experimental hung-glass cladding of the Willis Faber & Dumas perimeter, and the novel realization of Le Corbusier’s *toit-jardin* as a mini-park, the planning and arrangement of the interior of the building also reflect an *unstated* Corbusian principle. Again, this comes from the Villa Savoye at Poissy, where the vertical circulation from the first floor up is by means of a generous ramp. This is paralleled at Ipswich by the open-plan core, which has in effect a continuous ramp from the ground floor to the upper floors that takes the form of linked escalators. This also has the advantage of placing a spacious, well-lit atrium at the heart or *pneuma* of the building. The debt to Le Corbusier seems to be twofold: first, in the open-plan dissolve of conventional interior space (see not only the *toit-jardin* of the Villa Savoye, but also that of Les Terraces); and then in the *displacement* of the typical atrium, which is basically in itself a static space (although it may accommodate movement), by creating a totally kinetic experience through the thrust of the escalators. This kinetic experience exists only

notionally in the Villa Savoye, which accommodates movement through the *toit-jardin* without actually generating it. In addition to the possible reference to the Villa Savoye, the escalators in the Willis Faber & Dumas atrium recall the motion studies of Edward Muybridge and the kinetic patterns suggested by Futurist drawings. Willis Faber & Dumas, having moved from London, is still on the move “within itself”. In its open atrium we have echoes not only of Muybridge and Oskar Schlemmer, but also of Frank Lloyd Wright. The Wrightian source may seem more remote, but the Willis Faber & Dumas atrium captures the action of work (office work, at least) that connects us with Wright’s “Temple of Work”, that is, his Larkin Building of 1904. In the Larkin Building, however, the architecture both constricts and constrains the process of work: the space is regimented still, and from the galleries the workers may be overseen. In the Willis Faber & Dumas atrium all is free, all traces of supervision gone, and the workers pass through the building unshackled by its architecture. In fact, the architecture itself has been dissolved in light and air and space. And all that is left, floating in a limpid interior, are some vestiges of *lineamenti*, the last traces of a web of disentanglement.

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### **Sainsbury Centre for Visual Arts, Norwich, UK (1974–78)**

Just as in the 1940s, East Anglia, because of its renowned flatness, became the natural breeding-ground for American airbases,<sup>25</sup> so in the 1970s it became a preferred target for Foster’s unidentified flying objects. With the “Black Blob” of Willis Faber & Dumas securely settled into the heart of Ipswich, and even becoming an object of local affection, the University of East Anglia’s Centre for Visual Arts arrived in Norwich. It didn’t land in the centre of the city, however, because the university (UEA) campus is well outside Norwich on its southern side. Instead it came down in an open field, on the edge of the campus, but immediately adjacent to the university buildings by Sir Denys Lasdun, whose work was very much part of the perceived image of UEA before 1978.

Reference to the American airbases of the 1940s, and the context of the open field at UEA, provide possible clues for the provenance and form of Foster’s Visual Arts Centre. Importantly, the centre of Norwich was not the target for this architectural missile. Norwich is a city of Roman origins, containing 50 medieval churches, a cathedral begun by the Normans, a Norman castle, a fifteenth-century guildhall, and an extensive heritage of Georgian domestic architecture. Its urbanity and civility have been frequently shattered by the explosion of commercial activity since the 1950s—most recently by a grotesque mall, which parodies the famous turn-of-the-century Norwich shopping arcades. Norwich and Ipswich are very different places, and while we may speculate on what kind of Foster building might have been launched at Norwich itself, the fact is that it was aimed at a green field in the outer suburbs.

The impact of the architectural object depends very much on its accord with or contrast to its surroundings. Lasdun’s heroic concrete skeletons certainly had no connection with Norwich: nor did they suggest a healthy, well-ordered suburb such as Bedford Park. But if we turn our backs on Lasdun’s diagrammatic Modernism, and look out into the open countryside, we can envision, growing in a memorial field of poppies, the basic prototypes of an aircraft hangar. For Foster this memory from recent history appears to have as much relevance to contextualism as the Norman keep, the medieval nave, or the Georgian house. In Norwich, as it happens, the Norman keep, which in the Victorian

period was a regional gaol, has been a museum for most of the twentieth century, providing further evidence of Aldo Rossi's notion of the architectural *permanence*. Rossi's *permanence* is a building type whose structure and form are so basic as to become adaptable to a variety of uses over the ages. The hangar is, in Venturi's terms, but an "(un)decorated shed". The flexibility of its uninterrupted open space, made possible by a large-span structure, makes it ideal for exhibitions of all kinds. Foster's selection of the hangar as a (proto)type connects his approach at UEA with Dutert's design for the Galerie des Machines (1889).



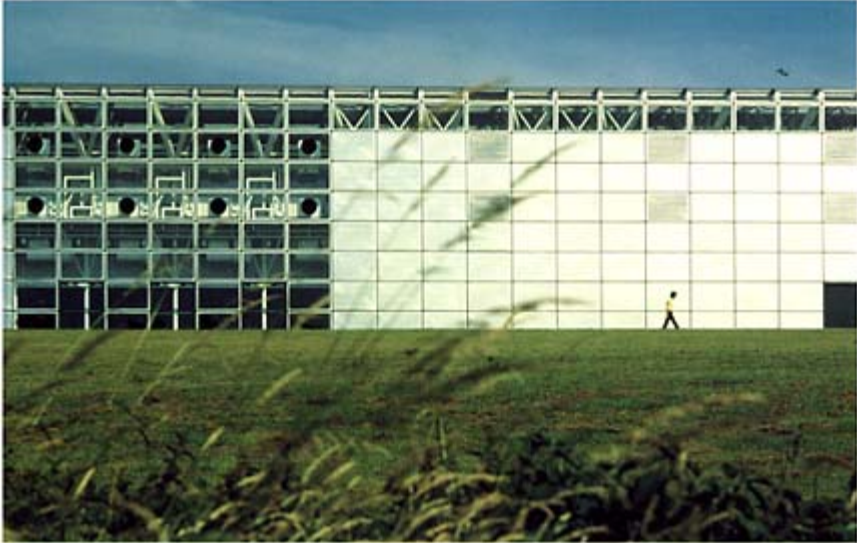
Main entrance atrium, with links to all floors

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There is a particular irony in the Sainsbury Centre Design. In one sense it is entirely pre-Corbusian in its reference to the Galerie des Machines from the viewpoint of



constructional callisthenics. If we make a link with Dutert, this is clearly pre-Corbusian. Yet Le Corbusier was careful to illustrate in *Vers une architecture* (1923) that the sources of modern architecture must include not only racing-cars and transatlantic liners, but also aircraft. Because of his somewhat simplistic approach to the transformational syntax of moving objects of power and speed into architecture, Le Corbusier might not have seen the connection between the moving object and its static resting place that becomes transformed into architecture.



Side view (above) and view from the wood (below)

A hangar is basically opaque, except when its ends are open. The Sainsbury Centre, for all its possible origins in the hangar, is not a transparent design; it is not a “glass box”

solution. Although Le Corbusier could cite the grain silo (a static type until the advent of space launchpads), he seems not to have had the clairvoyance to make connections to mere sheds. For one thing, he never had any hankering after wide-span construction. Whatever the intentions of his *cinq principes* for *L'Esprit Nouveau*, Le Corbusier was more the master of the well-ventilated box than he was of the well-tempered *machine*. Confronted by the alternatives of *construction légère* and *technique massive*, Le Corbusier took sides with the forces of weight almost every time. This is somewhat mystifying if we consider the inherent lightness and phenomenal transparency of his Purist paintings, and also take into account that the models for *l'Esprit Nouveau* were all vehicles of free movement and speed. While Les Terraces and the Villa Savoye may contain vestiges of nautical *esprit*, this is no longer present in the *pilotti* of the Pavilion Suisse or l'Unité d'Habitation. The vessel once buoyed up in the landscape has been displaced by a ponderous wreck of Atlantis.

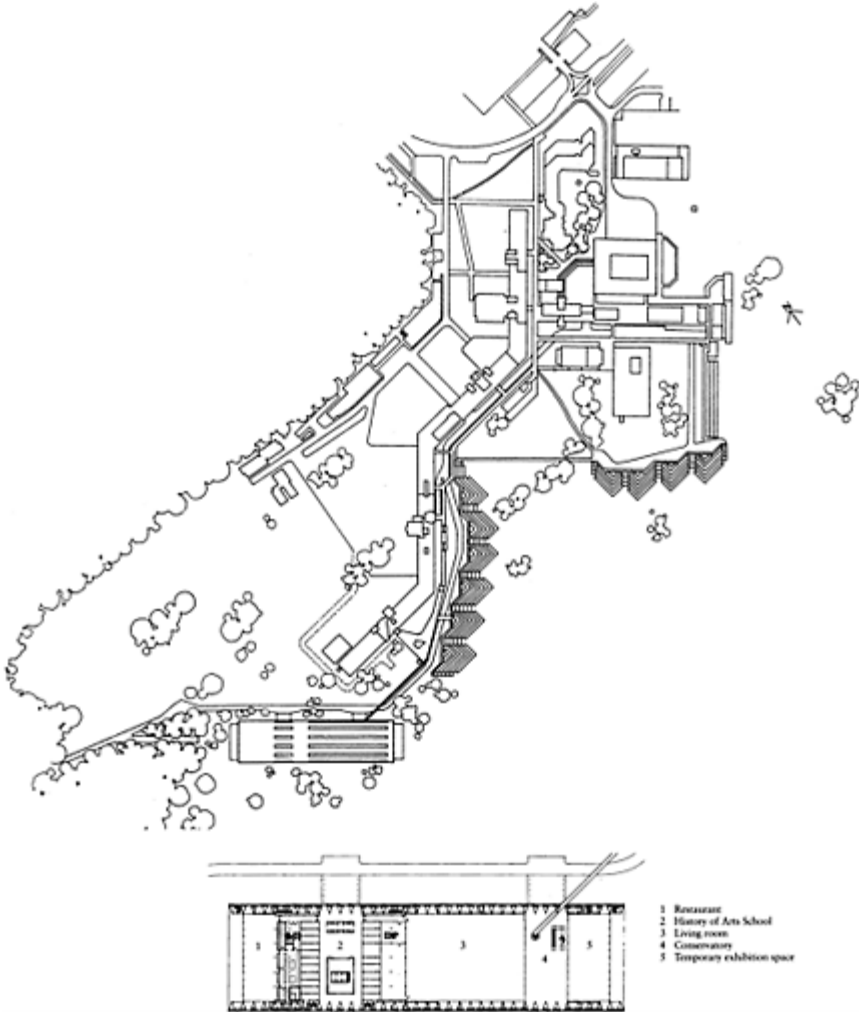
The Sainsbury Centre is not at all some reticent, camouflaged (and therefore self-effacing) statement about



Staircase linking to external elevated walkway



*shed*. On the contrary, it floats magnificently in its field of grass like some proud ship of the line. And therein lies the secret of the Foster touch, the magic of the late-Modern reinventions in architecture: for in their exploration of a building's self-wayfinding the more obvious transference of type is bypassed. Hangar and shed may be synonymous as storage "vessels", but in the storage accommodation of hangar and shed there is no element of display, such as we find here.



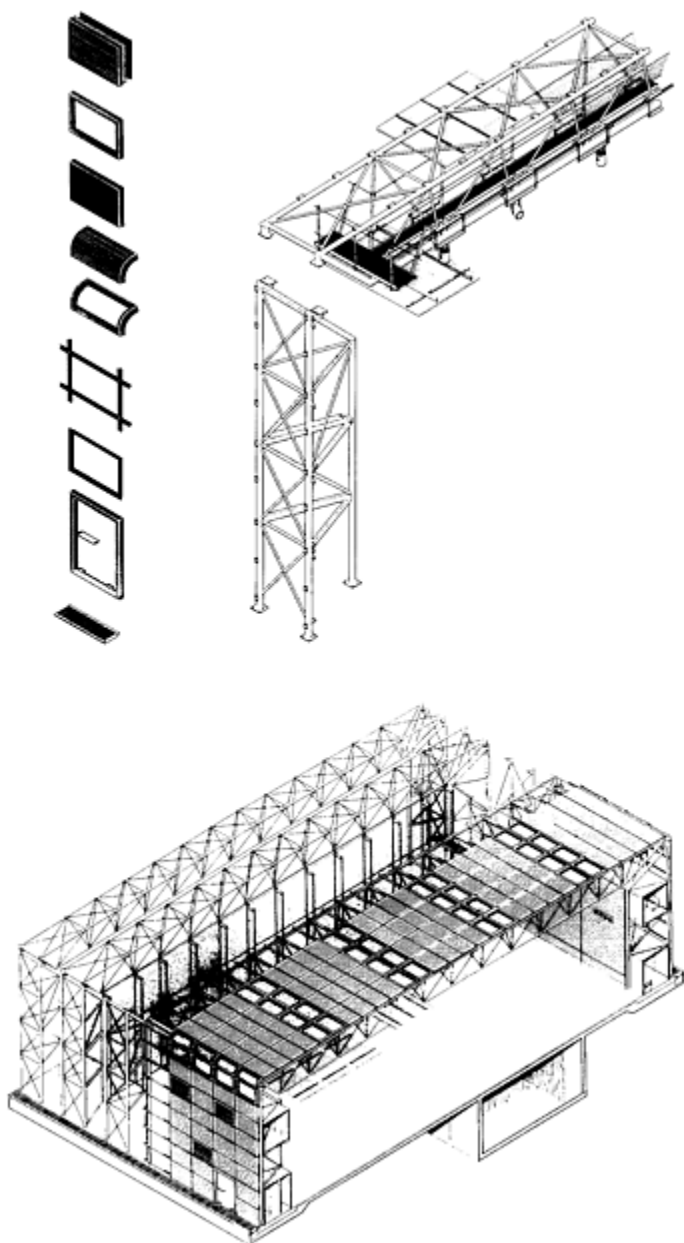
Site plan (above) and ground-floor plan (below)

Certainly the Sainsbury Centre has its conceptual, structural origins in Dutert's *Galerie des Machines*, which, interestingly, is known to us in the twentieth century only as *A Bride Stripped Bare by Her Bachelors*.<sup>26</sup> Those very machines that were the cause of the

Galerie des Machines effect have been erased from our received image of Dutert's masterpiece. Whatever the cause, however, it is not possible to give credence to Venturi's view of architecture. Venturi's slogan that "Architecture is either a *decorated shed* or a *duck*" dates from 1965: in other words from the time of popular uprisings, Pop Art and the Beatles. It is basically a Pop slogan, intent upon the provocative over-simplification of objects, institutions and information. For Norman Foster, or anyone else engaged in the serious pursuit of experiments to enable architecture to become "self-finding", Venturi and his "New Deal" of politically correct (but vacuous) slogans had no substance to offer. Venturi's "Pan-Doric Box", *Complexity and Contradiction in Architecture*, was opened in 1965, ironically by MOMA (New York's Museum of Modern Art). Ultimately, as many of its aficionados discovered too late, Venturi's intention was to effect a Perraultian reversal. As Modern architecture had already been stripped bare of all mimetic references—other than a few poorly observed trains, ships and silos—Venturi had vowed to "(re)deck the halls with matzo balls" and anything else that was lying handy.

Having selected the shed as the *type* for the Sainsbury Centre at UEA, it would seem natural for the Foster practice to ask certain questions about the nature of sheds, and how sheds and hangars relate to the Norfolk landscape. The wartime hangar was camouflaged to be self-effacing from above: to create a similar effect from ground level a skyscape could be painted on its sides. But such a pictorial approach belongs to Venturi's world. During time of war, hangars are denied identity. What identity would a self-finding existence express in peacetime? The answer is: that of the very object it was originally constructed to conceal—i.e. an aeroplane.

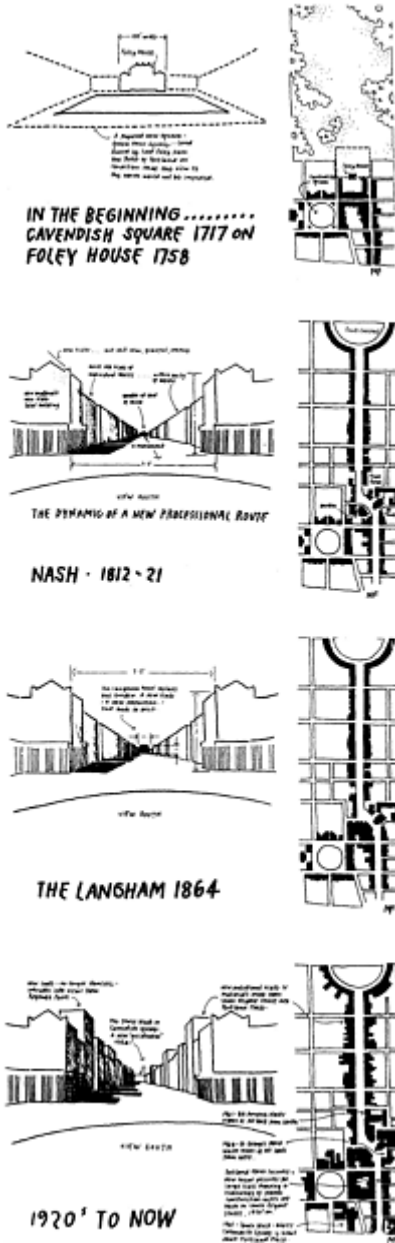
We therefore see at UEA the perfect integration of vehicle with vehicle: that is, the original vehicle, or aeroplane, and the sheltering vehicle or building. At its glazed ends, the Sainsbury Centre for Visual Arts expresses the form and structure of a hangar—an elegant hangar, perhaps, but a large-scale transportation shed nevertheless. The long sides of the Centre, however, with their ribbed aluminium panels, confirm the building's alternative image, that of a ship—an airship—lying at its mooring. The freedom and flexibility of the interior space, giving a great sense of continuity to the visitor, certainly echo the concerns of Sir Robert and Lady Sainsbury that works of art should be available as an enjoyable aesthetic experience. Indeed, inside the Centre the emphasis is so much upon the exhibit that the architecture seems virtually to disappear upon entry. This is yet another aspect of the Foster magic, that this team can direct the self-finding process of architecture with such harmony and balance that it often achieves an elegance that is so elegant it is barely perceptible. There is almost nothing to criticize. Perhaps it is the supreme irony that, having nothing in common with Venturi's cultural confusions, Foster can generate a design as provocative and satisfying as the Sainsbury Centre, in which the vehicle becomes the building and the building is the vehicle. If one is seeking evidence for Venturi's denial of either/or in favour of both/and, this is surely it.



Axonometric view of building showing structure and components



Main exhibition space



Norman Foster's analysis of the history of the Langham site

**BBC Radio Headquarters, London (1982–85)**

The commission to design the new Radio Centre for the British Broadcasting Corporation (BBC) in London (1983) provided Foster Associates with a unique architectural opportunity. The BBC site lay within the grand avenue design of 1812–21 by John Nash, embracing Regent Street, Oxford Circus and Langham Place, and confronting Nash's All Souls Church. It therefore contained considerable planning and urban design problems in an area held in great affection by most Londoners and many other British people. As a reflection of their appreciation of public sentiments and attachments to the Langham Place precinct, Foster Associates recommended that the 1930s BBC headquarters be retained to provide ancillary accommodation, developing instead the old Langham Hotel (1864) site. The former hotel was known to generations of composers, musicians, authors, poets, journalists, artists and other broadcasters as "the Langham" because it contained the "BBC Club", where boozy lunches were enjoyed, and after-hours drinking stretched well beyond dinner.<sup>27</sup> The hotel, which has now been revived for its original purpose, occupies what is basically a rectangular plot of land, the north-east corner of which was sliced off by Nash's route past All Soul's, Langham Place. Because of this cut across the Langham Hotel site, its additional fifth side faces directly onto Nash's church, although this relationship is more denied than underlined by the curiously symmetrical design of the Langham.

Langham Place itself, an address synonymous with the BBC, is the urban joint, where Broadcasting House and All Souls confront the Langham, but it is not at all like a piazza, or a place of respite from the urban turmoil; it is rather one of the busiest and noisiest corners in London. Behind the Langham is a short, quiet street, Chandos Place, and this leads into Cavendish Square to the south. Cavendish Square is also no haven for the pedestrian, with heavy traffic along its north side from Wigmore Street, and substantial vehicular movement from Margaret Street to the south. Architecturally, Cavendish Square is no longer in its original state, with its south side entirely taken up by post-1950s buildings, but the north side is occupied by the dignified classical facade of a Jesuit foundation, Heythrop College, while the east and west sides of the square are in good order. The square itself contains a semi-formal garden, which is open to the public, with one of London's first underground parking garages spiralling down beneath.

It is clear that the extended site, the full extent of the area that would be affected by the development, has a number of sensitive aspects. These include Nash's All Souls Church, with its famous cylindrical, columned portico and conical spire, the entrance to the original BBC building ("Langham Place" itself) and (as existing) the somewhat detached amenity of Cavendish Square. Nash's strategy in linking The Mall through Piccadilly Circus, Regent Street, Langham Place, and Portland Place to Regent's Park, has always been admired for its originality and boldness. What was needed in this context was a planning and urban design solution that would build upon and reinforce the strength of Nash's skeletal framework at Langham Place.



Model showing relationship between All Souls Church and the atrium



Site analysis sketch by Norman Foster

This is precisely where Foster's no-nonsense, self-finding approach to design puzzles comes into its own. Foster Associates' solution to this challenging problem was brilliant and uncompromising. It dared to cross swords with Nash on basic principles, because Nash had in mind that the main thrust of his scheme should be along the north-south axis, with Langham Place merely playing the role of a knuckle. The Foster strategy took a much firmer grip on Langham Place by effectively creating a crossover on the north-east/south-west axis passing between All Souls Church and Cavendish Square *through* the Langham Hotel site. In one intuitive stroke the Foster project cut across the restrictive urban bottleneck of Langham Place. At the same time, the stubborn cork in that bottleneck, the old Langham Hotel site, was sliced through to promote a free flow of pedestrians between Langham Place and Cavendish Square.





Model view of the central atrium looking towards All Souls Church

Quite apart from the restriction of circulation in Langham Place itself, there was a severely constricted pattern of movement within the old Langham Hotel. Although access existed from the front of the building, the diagonal main facade across from All Souls, there was no egress towards Cavendish Square, other than through the side door from the BBC Club, which discharged into Chandos Place opposite the London Society of Medicine. The circulation within the Langham was conditioned and confused by its pentagonal plan. The Foster strategy was to unravel all the Langham (Place and Hotel) knots with one skilled draughtsman's intervention. This was the diagonal axis drawn from All Souls to Cavendish Square, creating a covered pedestrian route from Langham Place to the corner at the intersection of Wigmore Street and Chandos Place. Significantly, perhaps, this *galleria* directly links the cylindrical portico of All Souls with the Cavendish Square Garden, which has been "a circle in a square" since the construction of its underground parking garage. Possibly even more significant is the echo of a salient feature of London's West End, which is located only a short



View from All Souls Church to atrium

distance from Nash's Royal Way: the celebrated Burlington and Prince's Arcades. The Foster *galleria*, an enlarged arcade form in the spirit of the Galleria Vittorio Emanuele in Milan, allowed for its full width on the north-east to embrace the whole vista of All Souls, and provided for a generous off-pavement social space at its intersection with Langham Place. It was proposed that the *galleria* should then diminish in stages until it reached a much smaller entrance at the junction of Wigmore Street and Chandos Place in Cavendish Square.

Regrettably, the project came to a halt in 1985, when the BBC decided to move its radio broadcasting operations to West London so they would be in close proximity to BBC Television Centre. For this reason the design was never fully developed by the architects. That is unfortunate for a number of reasons. First and foremost, of course, we have been deprived of an audacious Foster design in the very heart of London's West

End, a solution that promised to provide considerable stimulus to a precinct that is only five minutes' walk from London's principal shopping thoroughfare, Oxford Street. Of equal significance is the fact that, whereas the study model gives a clear indication of the proposed *galleria* and the basic massing of the building forms, with a low profile at the point of contact with Cavendish Square that increases in height to the towers at the north-east end of the site which stay beneath the commanding silhouette of All Souls' spire, this model gives only schematic information about the presence of the buildings in Regent Street, Wigmore Street and Chandos Place. Most particularly, it is these detailed elevations that would have given us more reliable information about the ability of the building to solve an extraordinarily difficult problem in urban design: the most critical point of all being, perhaps, the corner junction with Wigmore Street and Chandos Place at Cavendish Square, where the *galleria* is at its narrowest.

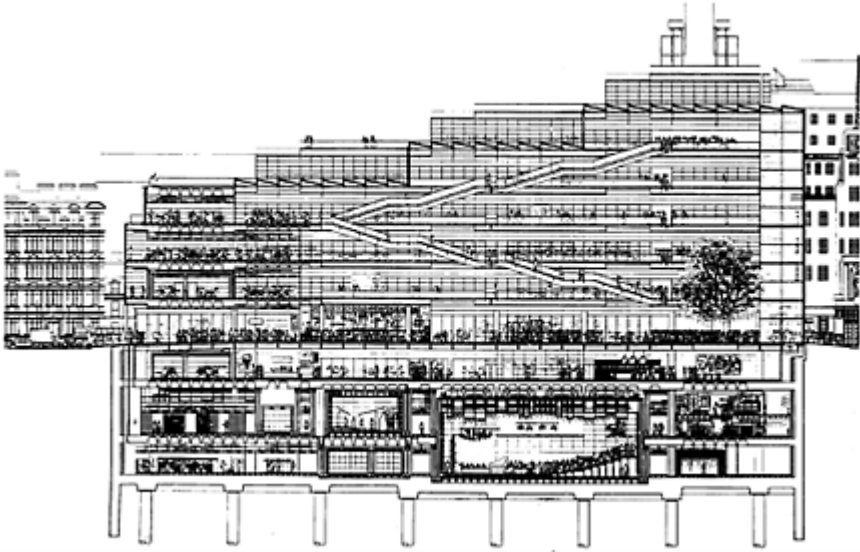
Corner entrances are notoriously hard to solve, especially where the corner is 90° or less and access is therefore restricted. On the evidence available, the BBC Radio Centre project seems to fall somewhere between a planning study and an effective urban design. Its contribution to grand urban strategy, in the tradition of Nash and Hausmann, is indisputable, and in those terms alone it would have provided a great improvement over the status quo. Some doubt remains, however, about the capacity of the design as it exists to provide a convincing cityscape to the adjoining streets and John Nash's All Souls. The exterior envelope for the proposed BBC Radio Centre as proposed seems too conventional for a Foster design, whereas its innards—centred on the thrust and bravura of the *galleria*—being consistent with Foster self-finding architecture, are not. It is therefore unfortunate that the design was not developed further.

In Foster's design for the Willis Faber & Dumas complex in provincial Ipswich, it was possible to ignore the threads and traces of context in favour of a subtext fashioned jointly by architect and client. As we shall see in the more recent Carré d'Art at Nîmes (France), it is feasible to subvert an historical context—even if that is founded in a first-century AD Roman temple—by a skilful deconstruction of both context and contra-text. For, however central to Nîmes the Maison Carrée is, Nîmes itself remains provincial: thus since the context has elements of *patois*, these also can be embodied in the contra-text or "response". But the options, or variations on the urban theme, that may be promoted and accommodated in the provincial *urbs* have no place in the metropolitan *Innerstadt*. Like Alvar Aalto, the Foster studio has little experience with the complexities and nuances of metropolitan city centres; and, intriguing and successful as the Ipswich and Nîmes solutions are, these alternative romances with the urban fabric do not appear to offer the confrontational engagement with the city that the West End of London demands.

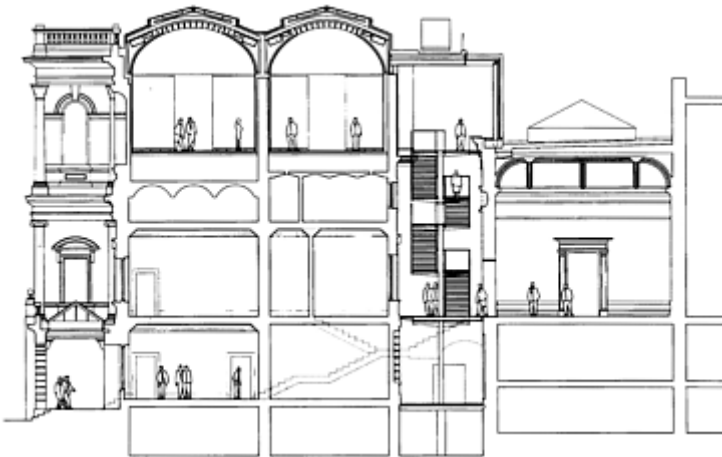
### **The Sackler Galleries at the Royal Academy, London (1985–91)**

Just half a mile south of Broadcasting House, between those famous Burlington and Prince's Arcades on Piccadilly, is located the once remote and detached, but now semi-affable and almost inviting, Royal Academy of Arts. Its Royal Academicians are mostly painters and sculptors, although its membership has always included a sprinkling of

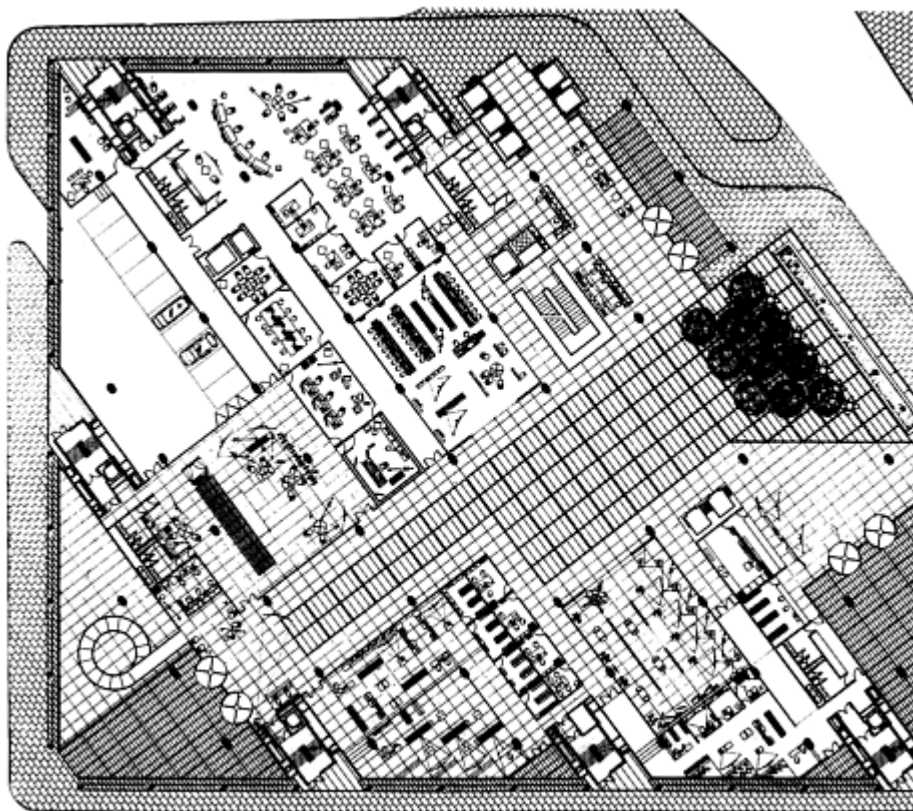
architects. And while architecture is still believed by some to be “the mother of the arts”, such a credo was of little consolation to architects while their profession was accorded Cinderella status within the Academy. Since the 1970s, however, this denial of architecture’s lofty standing has been somewhat redressed by the election of two architect-Presidents: Sir Hugh Casson (1976–84), and now Sir Phillip Dowson (1993–). Foster was admitted as an Academician at a rather early age in 1985.



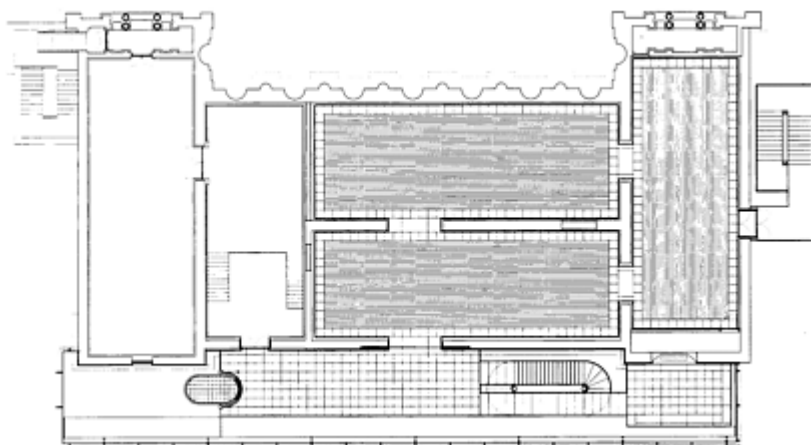
Long section through atrium



North-south cross-section with the new Sackler Galleries



Ground-floor plan



Second floor, new galleries and existing library





First floor lift lobby

The idea of making a surgical implant in the architectural body of the Royal Academy was clearly conceived as an unorthodox procedure. Founded in 1768, the Academy is the oldest institution in Britain devoted to the fine arts. It moved in the 1860s from its original location on the Strand, between the West End (City of Westminster) and the City of London, to what has become its permanent home further west on Piccadilly, at Burlington House. Considerable alterations and additions were made at the time of the move, when the main galleries were added at the rear of Burlington House, while a smaller suite of three rooms was built over the original house to exhibit the Academy's permanent collection of art, the Diploma Galleries. Substantial amendments were made to the Academy's fabric in 1860 and again at the turn of the century. There were further

modifications of a minor order after 1911. The Foster scheme for the new Sackler Galleries of 1985 generated a new master plan for the Royal Academy that was prepared by Fosters and Arup Associates in 1986, with the aim of coordinating a number of capital works that were essential to the modernization and improvement of the premises if the Royal Academy was to maintain its standing in the rapidly expanding and competitive international art world.

The Foster commission to insert the recently donated Sackler Galleries into the pattern of Academy accommodation required not only the design of these new galleries but also the organization of circulation patterns around the so-called “seam line” that separates the original Burlington House of the 1660s from the Academy’s new galleries of the 1860s.



Reception to the Sackler Galleries

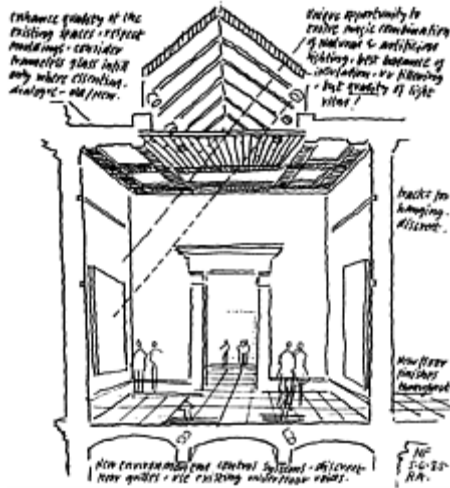


Interior views of the galleries

This involved a radical remodelling of the old Diploma Galleries, which had fallen into virtual disuse because of poor access to them and the consequent problems of servicing. Foster's design provided for the new galleries to be formed within the shell of the old ones, with natural top-lighting that is filtered through a sophisticated barrier of louvers to control light levels. This quality of lighting, combined with full air-conditioning, ensures that the new galleries are of a standard necessary to house prestigious loan exhibitions. In addition, the mainly side-lit "gap" between old Burlington House and the Victorian galleries became the fulcrum of this project because it now houses both a new staircase and a glass-walled passenger lift. These new elements of vertical circulation provide easy access between all floors of the Academy, while having the additional advantage of being invisible from the entrance lobby and main staircase. The design provides an effective system of movement around a rather complex building, thus making life easier and more



pleasant for an ever-increasing number of visitors; also, there is now greatly improved access for both the handicapped and the infirm.



Sketch of initial proposals by Norman Foster

What was before a lost and forgotten space, buried in a ravine between the two buildings, has been rediscovered, excavated and brought to life. Now, the new reception area sits above the original Victorian light-wells, while the parapet of the main galleries has become a plinth for the display of sculpture. Daylight penetrates to the spaces beneath through the glazed edge junctions of the new with the old. Also, the Academy's most precious possession, the Michelangelo "Tondo", has found a secure and permanent home on the wall of Burlington House at the new reception area level. On their way up to that level, visitors pass through long-neglected areas of the Academy, and the focus that now falls on the walls of Burlington House and the Victorian galleries has excavated a fragment of the building's once-hidden history.

Foster's intervention in the Royal Academy's architectural space can truly be described as emblematic of the *rinascimento* at that institution. Recalling Brunelleschi's inscriptions at San Lorenzo and Alberti's on Santa Maria Novella and the Palazzo Rucellai, we readily sense the incisiveness with which their *lineamenti* were drawn. Foster's treatment of the disused slot between Burlington House and the Victorian galleries has an essentially Renaissance quality to it. It is a rebirth in reuse; it is a recapturing of an escaped presence. The veils of absence have been stripped from these modest walls, leaving them to bathe, quite chaste, in Foster's limpid pools of light. We have a privileged anatomist's view inside the body of architecture. For what we find here is not simply a response to a categorization by Rossi. This is no permanence reborn out of some desecrated alley: it is a true resurrection of the body of architecture, because in its resurrected life it takes on a new form. Most importantly, any new veil drawn may not blur the new vision, a vision of a New Academy that comes from neither the Restoration nor the High Victorians, but is a transparency of purpose caught between two contrasting

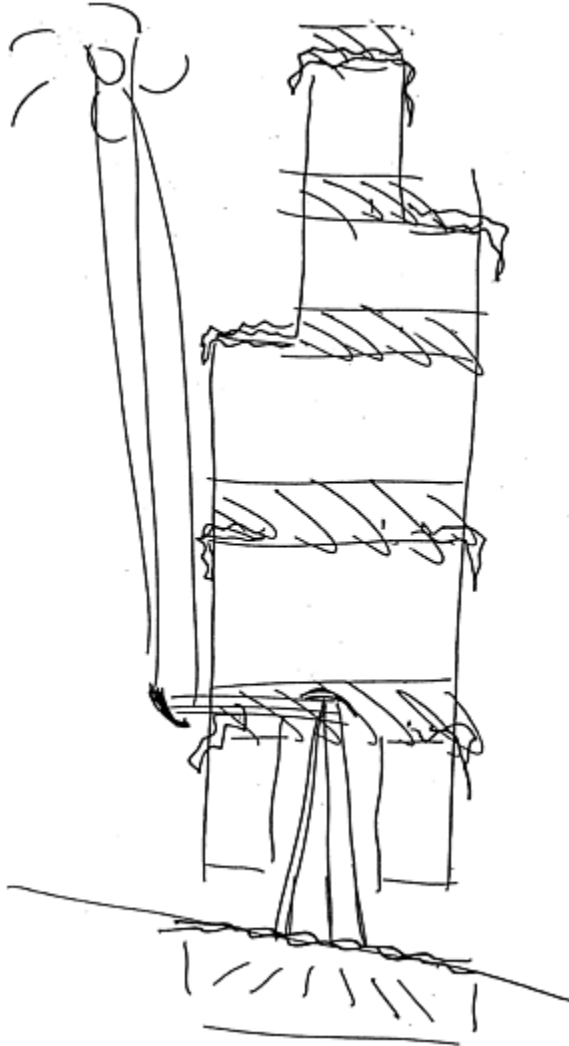
centuries in a web of finest draughtsmanship. What we discover here is a new invention, a variation on the *lineamenti* theme, wherein those organizing lines that are first put in place, then drawn and etched into spatial memory, must not be burdened with the definition of some shape or form, but are merely charged with an indication of their barest profile.



Detail of glass staircase

In this sense the design problem attending the installation of the Sackler Galleries at the Royal Academy concealed a spatial mystery that connected appearance with disappearance. What was invisible at the outset was a slot of space that had slipped down between Burlington House and the New Galleries and become lost from sight. Also invisible was the fact that this slot of space actually linked all the main spaces in the Academy—a fact that had remained a well-kept secret. On the surface, nothing appeared of these connections between various parts of the architectural body. It was only when

the architect-anatomist actually cut into that body that the organic connections between two sets of chambers and an embryonic main artery that could enliven them became apparent. What our skilled anatomist realized was that the secret—the mystery—of the concealed could be maintained, so that it was only visible when one was within it. Or perhaps even that visibility was unnecessary. In activating the life-giving artery it was necessary to dilate it with supporting, therapeutic constructional apparatus. At the same time, the surgical procedure would lay bare the artery walls. Anatomically, there was a conflict between the nature of the body as revealed, and the demonstration of the



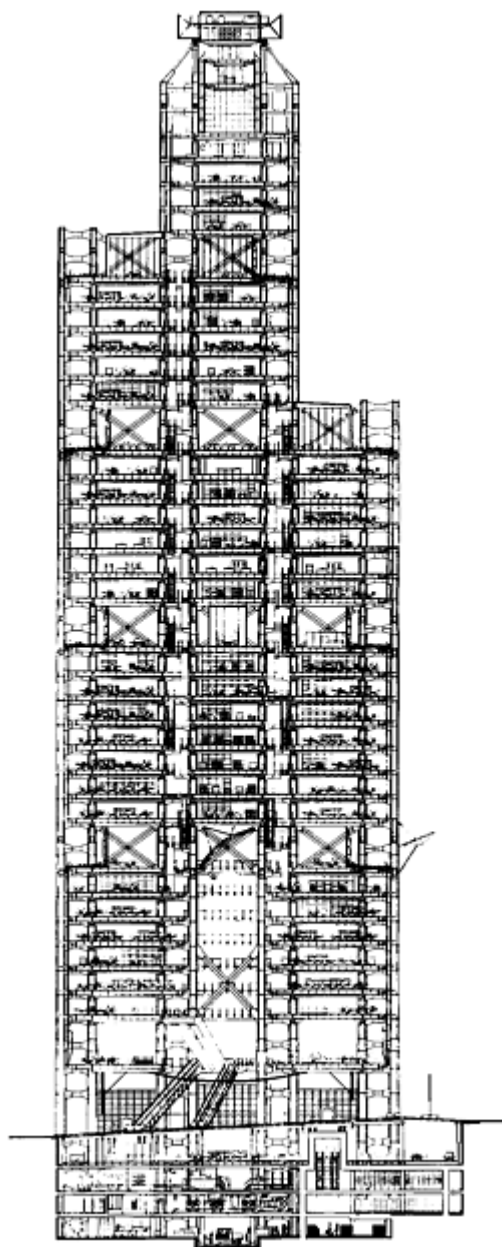
Concept sketch by Norman Foster

procedure for its revelation. The mystery of appearance and disappearance once again insinuated itself into the design.

Foster's solution was to bring the apparent conflict of appearance and disappearance into a harmony. To do so he invoked the principle of "less is more"; only in the Sackler project it had to mean "less of this" and "more of that". The intervention—the apparatus for dilating the circulation artery—was minimized to such an extent that, with the aid of lighting, emphasis on the display of sculpture and the use of glass, it practically disappears. Passing through this circulation artery, it is as though one were within the catheter itself but only aware of the details on the artery walls. By making one architectural framework, as it were, reappear, while inducing the other to disappear, the architect succeeds in introducing a virtually invisible intervention into this complex historical body of architecture. What Foster achieves here is a skilful combination of Albertian *lineamenti*, reinforced by a post-Enlightenment scientific attitude towards the body of architecture. Alberti was concerned with making the body of architecture visible; at the Royal Academy, Foster virtually succeeds in making it invisible. This is possibly Foster's most transparent design, yet for all that it is possibly also his most mysterious.



Night-time view



North-south cross-section

### The Hongkong and Shanghai Bank, Hong Kong (1979–86)

The new headquarters building for the Hongkong and Shanghai Banking Corporation in Hong Kong, completed in 1986, is arguably one of the most significant pieces of architecture to be built in the twentieth century. If we consider it in terms of structural boldness and clarity, with reference to its daring and the visual excitement this generates, or by examining the quality of its finish, on all counts it seems quite difficult to find an equal. The Hongkong Bank is indisputably a twentieth-century building; and what is more it reinvents the skyscraper with a confidence that links the structural innovations of the second half of the nineteenth century with the unfulfilled architectural agendas of the second half of the twentieth. This is no Miesian box, like the Seagram building, attempting to constrict the sky-scraper within a stylistic corset. The Hongkong and Shanghai Bank tower has the freedom of movement possessed by a troupe of acrobatic gymnasts. In terms of innovation, it does for the end of the twentieth century what the Eiffel Tower did for the end of the nineteenth. It is a thoroughly inspirational building, over-powering the viewer with its super-scale structure. Possibly this derives from an exotic Oriental site, but the Hongkong and Shanghai Bank has a scale and bravura that is missing from most other Foster works, although the Torre Collserola in Barcelona is a possible competitor. But the Hongkong Bank is a true urban monument. As a building, it has such a strong and persuasive form that it literally lifts itself up to a superior level on the skyline and maintains this aloof perfection. Also, it has a robustness missing from most commercial buildings since World War II. It is especially revealing to compare it with its neighbours in Hong Kong. Paul Rudolph's faceted glass tower only a block away still speaks an architectural language formulated in the 1950s and 1960s (Rudolph was one of Norman Foster's design teachers at Yale); while I.M. Pei's Bank of China has all the makings of the *lineamenti*, but there is no real structure beneath the surface to support them. Against the commonplace design manoeuvres of Rudolph and Pei, the clarity of Foster's self-finding architecture speaks a language that bursts out from within. Indeed, one has only to compare Pei's spurious *lineamenti* with the Foster solution, which simply displaces *lineamenti* and brings the structure itself out onto the surface in the spirit of Dutert and Eiffel.

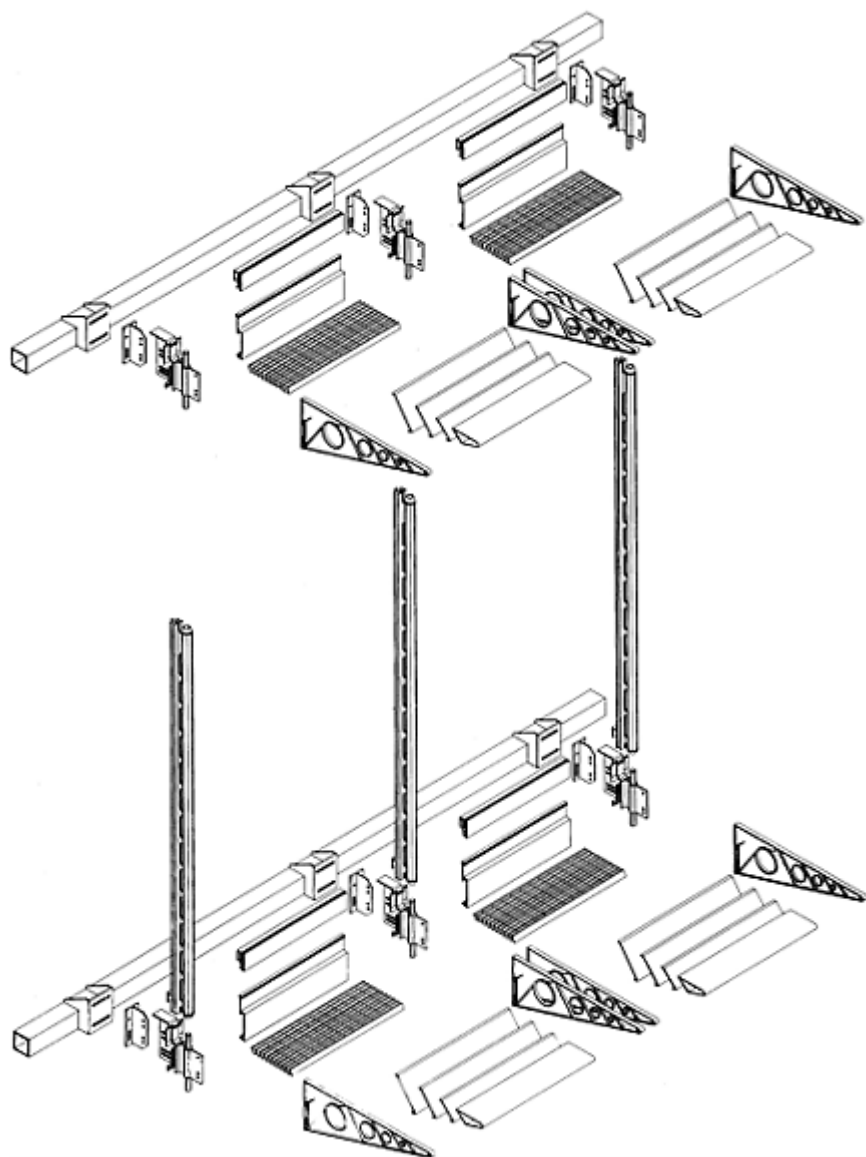
The giant coat-hangers that suspend the Hongkong Bank are referred to by Foster as "bridges", and the bridge concept for the bank's structure stems from the original site conditions of the project. When the Hongkong and Shanghai Banking Corporation decided to replace their Edwardian founders' building with a new headquarters that would reflect the rapid expansion of the bank's assets and interests, Foster's proposed in their competition report that the original banking hall be retained during the early stages of construction, in order that customers could go on using the old facility, and enabling them to grow gradually accustomed to the dynamic contrast of the new structure and banking hall. In order that the new building could "stride" over the old banking hall at street level, its notional design was therefore based on the premise of bridging over the historic remnant of the old bank. This decision established the form of the completed building, although the rationale for the bridge approach was eliminated at the advanced design stage. In logical, constructional terms, as Foster pointed out to the clients, the

rationale for the bridge model of structure became redundant through a radical change in the site conditions.

The basis for this paradigm shift,<sup>28</sup> in common with many similar cases of central urban development in large, crowded cities, was in the real estate numbers. Land is particularly scarce in Hong Kong with its restrictive island boundaries, especially land for pedestrian circulation and recreation. Redevelopment of the Hongkong and Shanghai Bank site offered a unique opportunity to influence the balance of pedestrian access in the city. The architects were able to interpret the legislation to create the social benefit of more valuable space at ground level and to raise the plot ratio from a previous maximum of 15:1 to an unprecedented 18:1—the equivalent of a bonus of 150,000 square feet of offices for the bank. The popularity of this space, especially at weekends when it is a favourite picnic place, is also testimony to its value.

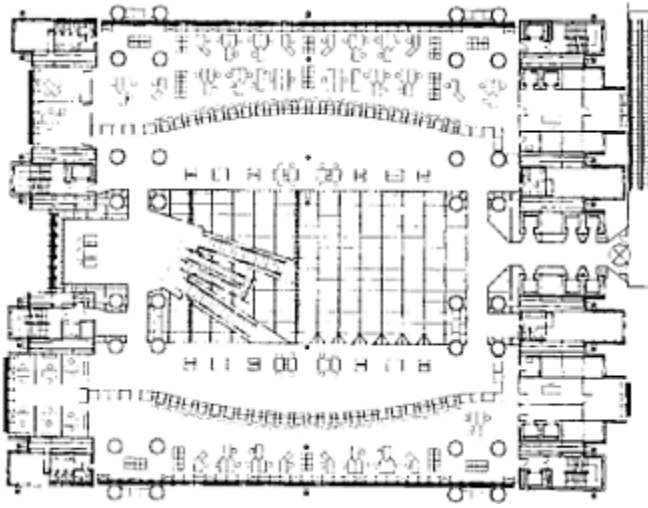
When Norman Foster suggested a redesign of the basic concept, however, the corporation's directors were not persuaded that the architects should head off in search of an alternative appearance. The bank was investing in a very expensive object: an extremely big piece of architecture, a very large bit of art by any standards. It is the impact and quality of the result that counts. If the inspiration has gone away, leaving only the work of art itself, this is simply history. Such gaps between cause and effect are the stuff of history, and especially the history of art. If the source of the content and expression in a work fades or disappears, it is still remembered in legend, narrative and literature. The mystery of the missing link always makes a good yarn, even one that bankers can dine out on. And architects are the servants of history, after all. It's certainly not their business to interfere with historical evolution. There's no need for them to go running off to seek another view of "form follows function". Banks are complex institutions. They don't look for simple explanations of their structures. And when future generations ask about the coat-hangers and the bridges, we shall be able to tell them: "Well, you see, once upon a time, when banking was carried on in marble boxes..." and so forth.

Having crossed into the banking precinct at street level, and penetrated underneath the tower, one can take the escalator up to the new banking hall above. Inside the tower itself the second dimension of this great twentieth-century monument becomes apparent. The hermetically sealed layers of space in the "club sandwich" menu of conventional modern office towers have been displaced by a vertical thrust of sheer void, across which there is a visual dynamic. Here, once again, are distinct echoes of Wright's Larkin Building, for the Hongkong and Shanghai Bank is also a temple. While the Larkin Building was simply a temple of work, however, the Hongkong Bank extends the boundaries of labour. In pre-World War I days, work was still synonymous with production, but since the 1960s the emphasis on production has been diluted by the displacement of work in the harnessing of manipulation. A bank might be cast as the supremely manipulative machine in late-twentieth-century culture, and this aspect of that machine is very evident in the great central space of the Hongkong Bank.

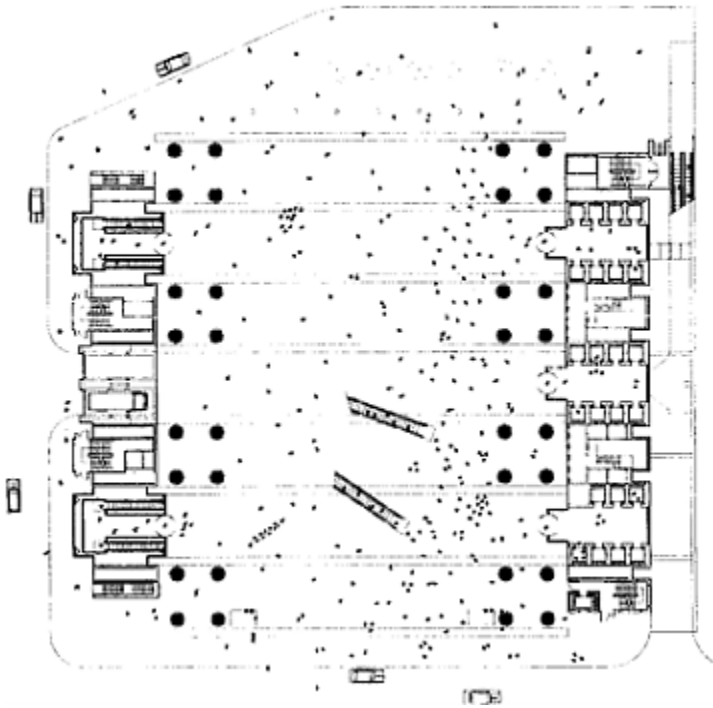


External wall components



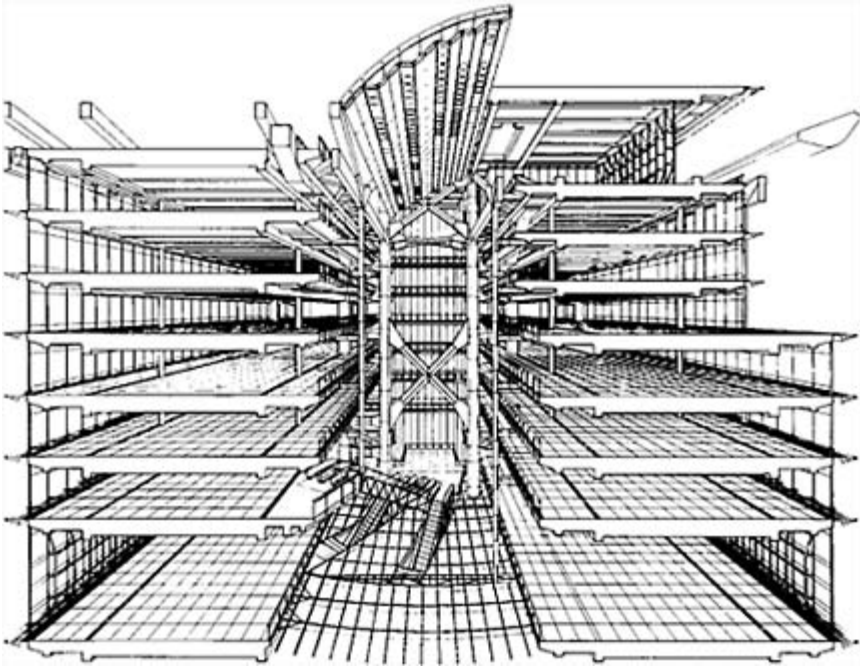


Banking hall at level 3



Public plaza at ground level

Normally, a visitor engaged in some aspect of everyday business with the bank will not look up at the vast space above. The giant symbol of ritual mystique—the great reflecting screen at the top of the building that scatters sunlight, as if by magic, throughout the building—may therefore remain invisible. But a general sense of the efficient and elegant mechanics of the building cannot be escaped, although visitors and customers have access to only relatively small and restricted areas of the building's interior. The employees, however, are caught in its total spell, massaged by its unique environment. Foster has updated Le Corbusier's notion of *une machine à habiter*. In its dramatic interweaving of structure, space and function, the Hongkong and Shanghai Bank has literally become the late-twentieth-century *machine à masser* for the financial and business world.



Sectional perspective through atrium



Exterior view

Not only has the street level been laid bare as a public concourse, but the interior of the tower has been opened up spatially, making it at least visually accessible, offering a regulated extension of downtown Hong Kong. By its very height and volume the bank displaces a large chunk of the central area; and it also gives back to the city, not only at street level but also within the seemingly limitless circulation of the interior. We may only judge the new bank as it has actually been built. The difficulties of retaining the old banking hall, with the consequent restriction of access to the rest of the site at ground level, can, however, be readily imagined. In the final analysis, then, the bank's directors appear to have made an enlightened decision about their investment. For it doesn't really matter that the bank's main structure no longer "bridges over" the old banking hall. Instead, these bridge-like structures represent the building's successful spanning from the

old bank to a new cosmos. Perhaps, too, these “bridges” span between the bold promises of modern architecture a century ago and their fulfilment in the Hongkong and Shanghai Bank.



Interior view of atrium

For those privileged to penetrate into the non-public interstices of its upper levels, the mechanical form and its operation of structure and movement instantly recall the experience of being drawn up into the Eiffel Tower. The structural ordering and dynamic of the bank's upper volume are truly overwhelming. In fact, this structural power and magic is more complex than the Eiffel's: there is something of Piranesi here, too, although without the threatening forms of his *carceri*. The sheer excitement of being in

this building clearly transfers to the employees, who seem to be buoyed up by a pride that is akin to that of the crew on a large ocean liner. But the bank is not a ship, of course, nor is it a giant viewing platform for a great exhibition. While not being a ship, however, the bank is indisputably *un vaisseau*—it contains, it protects, it transports. But unlike Le Corbusier’s proposal that we should expect to find the new architecture somewhere other than in architecture itself—in ships and trains and racing cars (invoking aspects of *Surrealisme* rather than *Purisme*)—the Foster practice manages to deliver the goods straight off the building production line. Once again, Foster’s self-finding approach to design shows the way in the Hongkong and Shanghai Bank.



Entrance to banking hall from public plaza

There were no preconceptions for the design of the bank. First there was the old banking hall, then came the bridges, and “*eureka*”. No “shoes and ships and sealing-wax” to precondition the bank’s appearance. Of course, had the old banking hall been preserved, a very substantial presence of “bank” would certainly have been retained at street level. In contrast, one of the supremely modern aspects of the Foster design is that the “idea of bank” is virtually invisible while one is passing beneath the building. This invisibility is not merely another aspect of transparency. For, after the cases of *literal* and *phenomenal*, we might here record what may be described as that condition beyond transparency, the architect’s *white hole*, or “no-see”. The difference between the space beneath a building lifted off the ground by Le Corbusier and one raised up by Foster is phenomenal. The *pilotti* under l’Unité d’Habitation at Marseilles seem determined to eat up as much space as possible, and since there is no teeming mass of pedestrians beneath it, they are unrestrained in this determination, leaving only a grey hole. There is little structural interruption of the space beneath the Hongkong and Shanghai Bank, however. Instead, a steady flow of people beneath its tower is permitted, extending transparency beyond the visible into a white hole where physical objects are seemingly “lost”, disappearing up and out of sight.





Banking hall at level 3

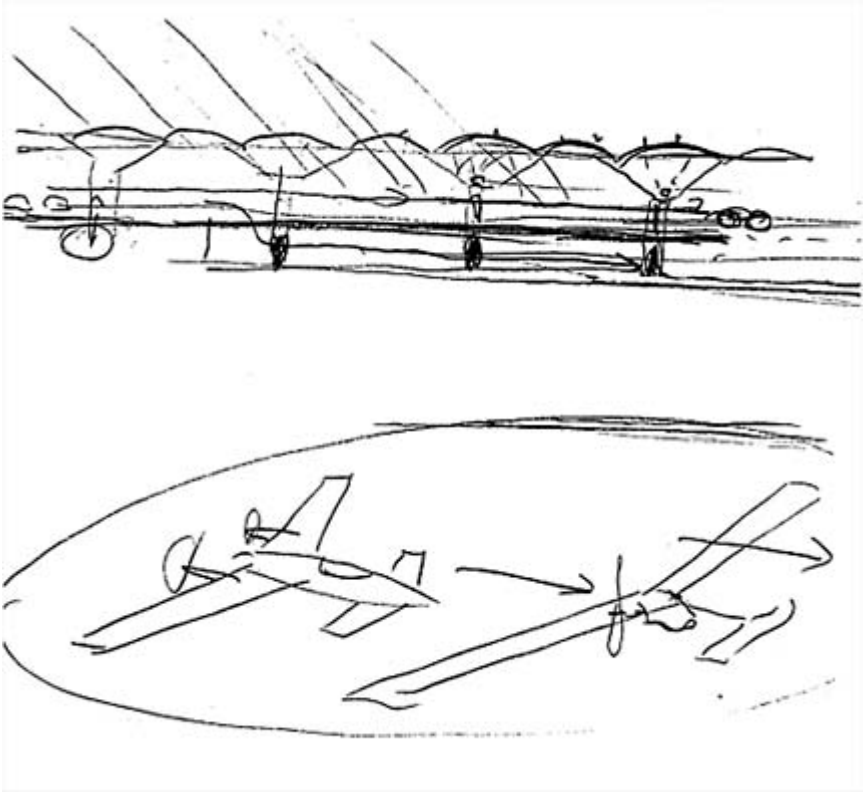
### **Stansted Airport, UK (1981–91)**

With London's second airport long established to the city's south-west at Gatwick, and already overloaded by the early 1980s, the selection of a site at Stansted, northeast of London in Essex, to accommodate London's third airport had been actively resisted by the local population for 20 years, but following the presentation of the Foster proposal for the Stansted terminal it was approved by the residents in minutes. Foster Associates were originally commissioned to undertake its design in 1981, but the brief for the master plan and terminal building was gradually expanded to include a British Rail station, stations

for the tracked transit system, two satellites and ancillary buildings. These were significant additions to the design programme, because modern air journeys neither begin nor end in terminal facilities. With all these additions, however, Fosters' Stansted terminal buildings remain one of the studio's most striking and articulate expressions of structure.

*Foster Associates, Recent Works (1992)*<sup>29</sup> shows the first hangar for the Atlanta Airport, Georgia (1925) to demonstrate the contrast between the simple beginnings of commercial air traffic and the sophisticated solution of its more complex problems at Stansted. Significantly, the Atlanta shed is shown set down in a field, an "airfield". Just as the World War II airbases were located on large expanses of flat, open countryside north-east of Stansted in East Anglia, early airports like Atlanta displaced local rural activities, mostly agricultural, and necessarily uprooted all trees that constituted an obstacle or danger. It is a fact of aeronautical life that trees and aeroplanes cannot exist in harmony. Displaced trees, whether at Atlanta, Georgia or at Stansted, Essex, therefore symbolize the departure of earth-based scratching and its replacement by evidence of the most revolutionary technique of the twentieth century—skyscraping. For Foster—a flyer, a man of the air, an architect for whom the source of modern design inspiration is not merely ships, trains and racing cars but aeroplanes—this project therefore brought particular significance.

The problem of the Stansted terminal building, however, was not simply related to the hangar/shed prototype, nor to the airship model invoked by the sleek *halle* that encloses and houses the Sainsbury Centre at Norwich. Air travel conjures up the romance of being "free as a bird", yet the passage from ground transportation through check-in and immigration control conventionally requires the traveller to negotiate a series of barriers to such freedom. Normally, too, there is very little transparency in air terminals, and the invisibility of form and structure that we have recorded beneath the Hongkong Bank tower is usually excluded by a complex and persistent pattern of opaque obstacles. Rather than letting one out of a cage to join the free-flying birds, the commonplace air terminal from Gatwick to Narita intensifies the sense of incarceration. Reima Pietilä discovered that long-term geriatric residents and patients feel most deprived of "a sense of verticality". Confined to wheelchairs, moving about on walking-frames, they are inclined to keep their eyes down, and "they never see any kind of horizon". Airline passengers, struggling with luggage-carts, repeatedly having to produce tickets and passports, trying to find the signs that will take them in the right direction—all these tasks create a myopic view when travelling by air. If only air passengers could look up, and have a sense of verticality already in the terminal building: if only they could see something other than the check-in desk that is immediately in front of them. Perhaps, then, it would actually be possible for the terminal building to create an indoor environment of space, air, and distance, rather than simulate some sort of detention centre. Birds rise up into the sky from the branches of trees, causing us to look up and follow their ascent. Trees are launching-pads for the birds' freedom of the air. The trees that have been displaced by airports had this capacity to launch an upward thrust of freedom-seeking flyers. If those displaced trees could be replaced by substitute trees—by symbolic, notional trees—perhaps this might re-establish the balance between development and destruction. But any symbolic, notional tree would have to be a constructive part in the form of a Foster



Concept sketch by Norman Foster (above), and (below) a sketch that he made when talking about parallels with innovation in the world of flying



Baggage reclaim hall



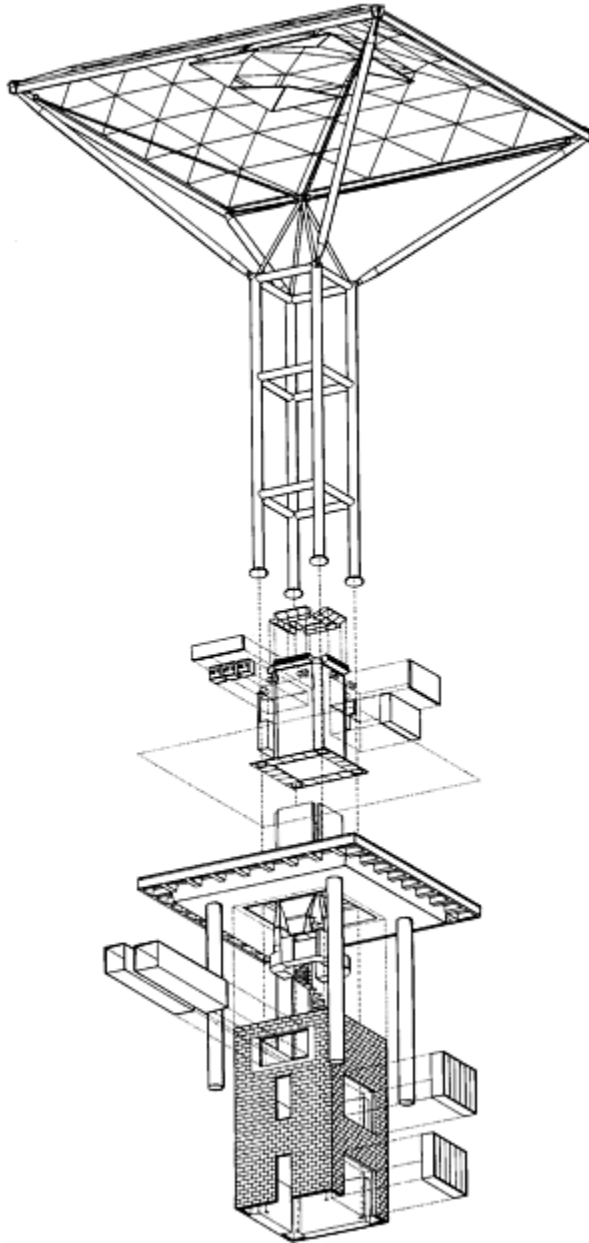
building: an abstract tree, like those of Mondrian, would not fill the Foster bill. Mere appearance would not be sufficient for the purpose. While a notional tree (like the notional bridges in the Hongkong Bank) might support the appearance of the building, this tree-like appearance would need to be firmly rooted in the building's structure.

Indeed, replacements for the displaced trees did provide the inspiration for the structure of the Stansted Airport terminal building. They are anything but abstract, although, at the same time, they are certainly only notional. And that is certainly appropriate, since the *notional* in the Foster vocabulary is consistent with the kind of abstraction that the studio practises. We would no more expect to find an identifiable oak or elm at Stansted than we would look for a "real" bridge in the Hongkong Bank. This kind of structural realism belonged to Gaudí and more recently, perhaps, to Michelucci. It is strongly present in the tree structures of

the later Stuttgart airport, whose architects closely followed progress on the Stansted site. But the tree-like form of the columns at Stansted achieves everything expected of it. First, it raises the roof so that we have a pronounced sense of the vertical in large interior spaces with extensive horizontal distances. Second, consistent with its "tree" role, it carries our attention upwards to an artificial sky over the *salle d'attente*. And finally, because the "trees" are widely spaced, and each one has an extensive span of "branches", there is a great sense of clarity and continuity across the entire terminal—quite the opposite of the crowded "forest" in Stuttgart airport.

For a Foster building to have such genuine and pervasive roots in nature may already seem extraordinary, but when we examine the structural "trees" with their square bases and relate this fact to the form and order of the plan, we discover an even more fascinating significance in this project. There are 36 trees in all, with 24 inside the concourse and the remaining 12 placed equally along the arrival and departure edges of the terminal (six on each side). The arrangement of the trees along the sides of the buildings effectively creates two porticoes, while the overall form of the terminal, including the porticoes, is a square. There never was a square temple, of course, but in this "temple to aviation" the patterns of values and rituals are also different. Within the enclosure of this modern temple even money-changers are welcome.

Another dimension relating to the role of the trees—both the displaced trees and their symbolic replacements—is of interest. Ernst Cassirer referred to the act of cutting a clearing in the forest, the removal of a sufficient number of trees to create a void:<sup>30</sup> the act of cutting a space for a building site, a place within the forest where the displaced trees can be replaced by a man-made structure. Cassirer defined this clearing, the open space among the enclosing trees, as a *templum*. A template is "a pattern or mould used as a guide in shaping". We get this term from the French *templet*, which is the diminutive for *temple*, and comes in turn from the Latin *templum*, which is "a small timber". This gives us the following interrelated patterns of human activity in the act and art of building:



Structural tree with integrated services pod

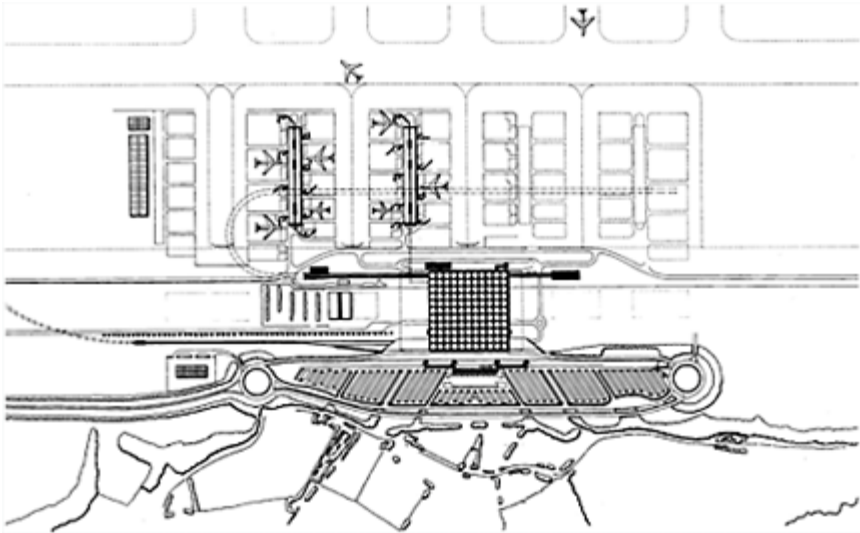
**Idea** (notion)—**Work** (action)—**Material** (resource)

which in turn generates the reverse order:

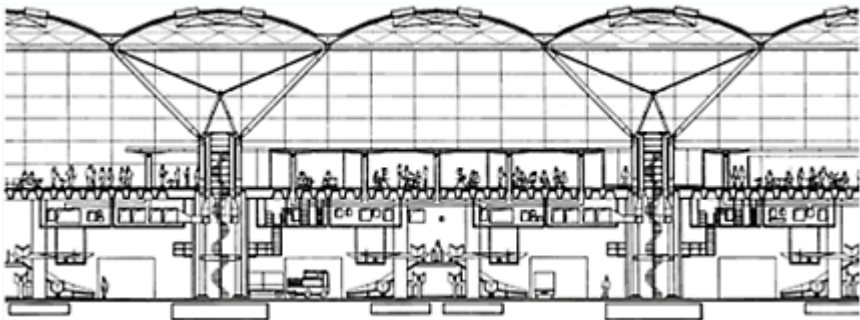
**Material** (resource)—**Work** (construction)—**Idea** (realization)

In other words, the construct of building requires:

- 1 an idea of what the building is about;
- 2 space in which to build it; and
- 3 material from which to build the idea.



Opening configuration in context of master plan



Detail of east-west section, showing cabins, services and baggage handling



Daylight diffuser below roof light

In the notional language described by Cassirer, the forest initially represents both obstacle and resource. The trees are in the way, *but* they occupy desirable land, and they can be displaced by Man's technology—the axe. When the trees have been cut down, they are no longer an obstacle; they become instead a resource. At least they become so when more technology is employed: when the trees are stripped and cut into usable scantlings. Then we have both the space to accommodate a building idea, and material to construct it (in Cassirer's pre-Classical paradigm, at least). All that remains is to inscribe the building idea on the site: that is, within the *templum*. And it is with the aid of the *templum* (small timber) that this circumscription is made. The *templum* facilitates the development of Cassirer's *templum*, because the cut timber of the one permits the spatial inscription of the other. Man cuts into the forest and clears it, then proceeds to remake the clearing in his own image.

In the case of Foster's design at Stansted, however, the replacement of the displaced trees by a figurative temple within the *templum* is not the end of the story. The trees themselves provide a further elaboration of this architectural theme—the construct between labour, material and spatial formulation—linking us back to Perrault and Durand. Perrault, as we have noted, paved the way for the stripping of the poetic role from such architectural elements as walls, columns and arches, so that their meaning would become purely abstracted. Durand followed Perrault's initiative by separating architectural types from constructional means, offering an abstract understanding of every element of architecture, placing each one in its empirical relationship with every other. In this way, by his scientific and analytical method, Durand succeeded in doing what had been, more than a century earlier, beyond Perrault's reach. He actually managed to strip architecture of every mimetic effect. Now, almost two centuries after Durand, after the principles of abstraction have been in control of both art and architecture for more than eight decades, we find Foster transecting theoretical evolution and once again transforming the source of formal expression into the architectural representation. With Stansted the outside reference once again enters the building, like “the Woods of Dunsinane”, and our post-Durand position of not allowing architectural meaning to be inherent in the form itself has presumably been bypassed.

Certainly, those trees have been on the march at Stansted, and they are clearly established there in both the porticoes and the concourse as a symbolic element of the terminal's structural design. But, and this is a significant caveat, if Foster chose to diverge from the straight line of Durand's path and take a walk through Cassirer's forest,

this route offered another view of Vitruvius's distinction between "the thing signified, and that which gives it significance". The tree is sacrificed for the *templum*. The *templum* in turn facilitates the projection of the building idea within the site (or *templum*). Without the *templum* the perimeter of the building cannot be inscribed and fixed: without the *templum* its concrete structure cannot be formed and raised. The tree is in the *templum*, and the *templum* is in the defining and making of the building. Because the tree returns "from the dead" to impress its memory upon the skeleton of the building, its presence in the form and content of the building, in its architectural representation, has simply to be surfaced.



Structural tree with integrated services and passenger information

At Stansted the tree-like columns remember the trees they have replaced, so that the tree-idea is kept alive within the landscape of the building, particularly in the terminal's

interior. These tree-like forms pronounce their origins, recalling that they had to be cut, sawn and planed to become *templum* of the site's *templum*. In this way, the hole cut into the forest is redefined by the members drawn from the trees that once occupied the hole. As the *templum* is placed within the *templum*, so is the building form inscribed within the site. This framing of Man's intervention, his outlining of an alternative existence, is inseparably linked with the resource of the trees, a resource that is both material and ideational. The trees themselves have been recycled by the *templum* within the template. Although the displaced trees cannot actually be replaced, they are remembered and represented within the idea of the building and its constructive form.

### ITN Headquarters, London (1988–90)

The Independent Television News (ITN) headquarters building in Gray's Inn Road, London, is a redevelopment of the former Times Newspapers location. Consequently, the site came with the monumental basements that had accommodated the newspaper-printing presses. The Foster design incorporates this feature within a full-height atrium that both plunges and soars. It is customary to quote this building as the great Foster success in meeting the time and budgetary constraints of a very competitive commercial developer—Stuart Lipton's Stanhope Properties. Indeed, its rapid, sure-fire construction contract of only 18 months, from June 1989 until December 1990, is certainly impressive. But it would give an incomplete account of its virtues if we were to write this building off simply as a Foster exercise in developers' bean-counting and efficient contract management. It is true that the directors of ITN were desperate to get into a new headquarters building and, with the aid of this remarkably punctual construction process, actually managed to begin live broadcasting within hours of the building's completion, but it was never suggested that ITN were interested in achieving anything less than an ideal and positive working environment that would be both relaxing and productive.

If Stansted has decided resonances of forest and temple, then Foster's ITN headquarters conjures up unmistakable memories of great European cathedrals. This association with those vast, soaring interiors of the medieval period in England and France is apparent immediately on entry. In the first place, the scale is overwhelmingly monumental, as the elongated columns soar up from those deep basements, practically vanishing into the brilliant daylight before they reach the roof. Of course, these columns are too long and thin to simulate medieval forms and proportions. What matters, however, is the symbolic scale and sense of space: it is this that makes the ITN atrium cathedral-like. The top-lighting is profoundly modern, helping to dissolve some of the persistent structure at the upper level. Whereas the topmost reaches of the medieval cathedral are normally lost in mysterious shadows, in Foster's ITN building the apex of the structure assumes virtual transparency against the sky's intrusion.

If we recall Wright's Larkin Building (1904) not primarily in Banham's terms as "a well-tempered environment" but rather as a "temple of work", and then look up at the tray-like office floors at the upper levels of the ITN building, what we see is a "cathedral of work". It seems that the puritanical work ethic embodied in a "temple of work" has been replaced at ITN by a gentler and more well-tempered environment.





Main entrance from Gray's Inn Road



Entrance floor plan



East-west cross-section



In the Larkin Building, everything was visible to the supervisory eye; while in the ITN building everything is indeed transparent, but the light, airiness and freedom of its atrium seem to represent personal responsibilities, self-discipline and trust.

In Wright's "temple of work" all the actual work was carried out in the atrium. But this is not the case in Foster's "cathedral of work" because, by using the deep well basement as a continuation of the circulation space and light/ventilation shaft, it was necessary to keep the atrium free from function and devote it to amenity. At ITN the employees work not in the atrium (or nave) but around its edges. The pattern of their activities constitutes an informal ritual around this vortex of space; the focus is on its very emptiness, a void that generates a centrifugal force of human energy.

We have noted that the site for this project inherited a great pit from *The Times'* printing-press hall. From this great depression in the earth, a form of pre-existing crypt, the columns and spatial thrust of a new cathedral arose. Around these totemic elements there is a daily celebration of life and purpose. Along the boundaries of this magical nave, television pundits, crews and support staff wander, gathering here and there in this great, open, media space, enjoying a heritage of the workplace environment that has its origins in the Ipswich experiment for Willis Faber & Dumas. The significant difference, however, is that whereas Willis Faber & Dumas represents a decanting of a London workforce to a provincial centre, ITN celebrates the possibilities and virtues of consolidating space and other essential requirements on a cramped and difficult site in central London. The ITN headquarters demonstrates how an inventive design strategy, combined with the use of sophisticated environmental control systems, can open up a constricted and unpromising site. By bringing a well-lit atrium into the building's interior, creating a very highquality working environment at all levels, the Foster ITN building reveals how a subtle architectural intervention in the urban context can illuminate and transform both the site use and development framework of a commonplace commercial project. Although the external form of this building is simple in concept, its bare-bones constructional statement is certainly of a higher standard than those of its neighbours. Closing out the outer world, the ITN building focuses upon its own interiority, its own internal workings: and in this it might be understood, appropriately, as a *media-thèque* (or *media-monastery*), where the television monitor has replaced the illuminated manuscript. In the genre of the speculative commercial building, the ITN headquarters was clearly a hard act to follow.



Central atrium linking all floors



Aerial view of the site



Masterplan model

### **Master plan for the King's Cross area, London (1987)**

Together with the projected BBC Radio Centre, the Carré d'Art at Nîmes and the Great Court Project for the British Museum, the King's Cross master plan must be one of the most significant and provocative designs to emerge from the Foster studio: significant because it is concerned with the future form and use of one of the last major industrial wastelands remaining in central London; provocative, and therefore controversial, because the developer, Stuart Lipton, predicated that on this important central London site some 70 per cent of the construction should be in the form of commercial office space. This had the effect of limiting the potential for private and rental housing to provisions far below those desired by present residents of the locality, while making no significant contribution to the requirements of London's expanding population as a whole.

The political component of this project certainly cannot be ignored; indeed, the proposal was almost approved by the planning authority of Camden Council. The emphasis here, however, is mainly on the contextual, formal aspects of the Foster plan, although within the historical framework of London's urban patterns, with particular regard to those patterns in the adjacent villages of Bloomsbury and Regent's Park, these formal aspects cannot be divorced from their political and economic origins. Indeed, this project may contain a warning of the difficulties inherent in borrowing from one tradition of values in order to pay for those of another, invoking what might be labelled the "Peter and Paul principle".

It was against this background that developer Stuart Lipton described the underlying objective of his London Regeneration Consortium as "the creation of a new urban quarter of London, a clear and powerful vision of places, spaces, a park and real urban grain". Lipton emphasized that to achieve these goals his company would commission "architectural excellence and a wide variety of other design skills to put some meat on the bone". And to give credence to these intentions, a number of visual artists were, quite uncharacteristically, actually involved in the conception of the project from the early planning stages.

The site stretches more or less due north from two of London's northernmost railway stations, St Pancras and King's Cross. It contains 54ha, and measures 1.6km on its longest axis. Apart from the two railway stations, it includes goods yards, a collection of listed gasometers, industrial and commercial premises, and residential accommodation. Its position as a hinge between the Euston Road, north London and the City of London means that it is currently subject to heavy peak-hour traffic. Among its architectural features and significant buildings are Cubitt's King's Cross Station facade, the Great Northern Hotel, St Pancras Hotel and the extensive, monumental train sheds behind them. In addition, the Regent's Canal, which threads through Regent's Park to the west, penetrates into the King's Cross site.



Space Syntax evaluation of the master plan showing the improved local infrastructure



Space Syntax site analysis showing the disjointed local infrastructure



The penetration of the Regent's Canal into the site generated the idea of a park or green space, which in the early Foster schemes took the form of a large oval that variously contained 9.7 to 10.5ha of urban parkland. This was presented by Norman Foster as being precisely within the tradition of London's unique grain as a city. He explained that, unlike the American grids of Chicago or New York, or the continental European patterns of Barcelona or Paris, London's fabric is dotted with parks, both pocket and large, as evidenced by a random catalogue of their names—Islington Green; Clapham Common; Hampstead Heath; Regent's Park; St James's Park; Hyde Park; and Shepherds Bush. They vary in size from the small Soho Square and Cavendish Square to the vast open spaces of Hyde Park and Hampstead Heath. In the revised submission of the master plan presented to Camden Council in 1989, the area of King's Cross Park was increased from 10.5 to 14ha, or more than a quarter of the total area of the site. To reinforce the virtues of this larger green space, Norman Foster pointed out that, although King's Cross Park would still be smaller than St James's Park, the longest dimension of the King's Cross green space, some 700m, compared favourably with the longest axis of the royal park at 800m.

Foster's aim was to realize a "clear and powerful vision of places, open spaces, a park and real urban grain". The Foster master plan certainly responds to that challenge in its proposal to marry the virtues of Bloomsbury's squares with the ingenuity of John Nash's grand Regent Street avenue, which terminates in Regent's Park and distinct echoes of John Wood's elegant essay in *The Crescent in Bath*. In their earlier projects for the BBC Radio Centre at Langham Place, the Foster studio had already come under the spell of Nash's talent for making bold incisions in the urban fabric, and had responded with an equally assertive geometry. The King's Cross project has a similar boldness, with strong formal memories of its eighteenth- and early-nineteenth-century precursors. Indeed, its conceptual strength lies in an ingenious combination of town and park, in a focus on square and crescent (transformed at King's Cross into an elliptical Circus, reminiscent of those vestiges of the Roman colosseum at Lucca) formed by enclosing a landscaped recreational space that suggests more affinity with Regent's Park and Primrose Hill than the sedate, fenced gardens of the Bloomsbury squares.

This level of ingenuity is extended by the creation (or rather conservation) of a well-known local industrial landscape and landmark, by reclustered the listed Victorian gasometer frames. These listed structures were a late classical plea for tranquillity against the approaching hordes of blight and desolation. According to the Foster plan they would be regrouped, like some rotating Graces, portraying a more Romantic memory of the first industrial age. The effect, at least the intended effect, in the King's Cross plan is to build a collective environmental memory of urbanity and industry, through which the paths of this new London village will thread, and around which its economic patterns will revolve. The intention of the Foster master plan is to effect a romantic marriage of town and country that is remembered by providing a parkland focus at the heart of the project, while the post-Blake industrial landscape, in which those mills are no longer dark or Satanic, is rendered by subtly regrouping the superscale sculptural forms of the gasometer frames.

The conversion of London's fields into the squares that became the civilized memory of those fields, and the construction of high-class residential enclaves to frame those

squares—these were the relatively simple investment and development strategies in the eighteenth and early nineteenth centuries. A proposal to create a new London village at the end of the twentieth century is not such a simple matter. It involves what we have come to call a “mixed development”. Yet we might well ask: “Are not most developments mixed in one way or another?” Certainly, those eighteenth-century developments were not all houses and squares, because room had to be made for churches: *vide* St George’s, Hanover Square. Indeed, what do we really mean by “mixed”? It is proposed to include restaurants and cafés around King’s Cross Park, so that the single, residential use of London’s traditional squares would not be followed. But would there be a church in or adjacent to the park—as there is at Primrose Hill—or a synagogue or mosque, perhaps? In any case it was the intention of the Foster plan to improve the overall environment by substituting daylight for darkness, and replacing the tensions of vehicular traffic with the calm of open, pedestrian spaces.

It was pointed out at the 1989 RIBA meeting that both Camden and Islington Councils had expressed reservations about the massing, height and sheer bulk of the development, with Camden requesting that the height of the original fourteen-storey and ten-storey blocks be reduced. Yet it was seen by the audience that the revised proposal, which included the requested height reductions, also showed the introduction of two point blocks, one of which was possibly 300m in height. These two towers had the effect of overshadowing the horizontal landscape emphasis of the original proposal, with its debt to the scale and character of St James’s Park and Primrose Hill.

Not everything that transpired at the 1989 RIBA meeting took on a negative aspect, however. David Kerr, for example, was able to effectively deflect the anxiety of Ms Kline (Railway Lands Group) that “the vastly increased flow of vehicular traffic that would be generated by the proposal would result in chaos”. He quickly disposed of her fears by sketching the map of public transportation on the site. He reminded the audience that no fewer than five London Underground train lines (Circle, District, Northern, Piccadilly and Victoria) run beneath the area of the master plan, while at surface level there are the British Rail lines that feed both St Pancras and King’s Cross stations. Studies based on these facts had led the government’s Department of Transport to agree that only some 6 per cent of arrivals to the new development would be by private vehicles. In addition to this, now that the Channel Tunnel Terminal would be at Waterloo rather than King’s Cross, there were new plans for the improvement of the entire road system in the area. With this background, Kerr confidently predicted that Ms Kline’s anxieties were ill-founded.

The 1989 RIBA presentation was sufficiently controversial to attract the attendance of one of the profession’s most colourful members, the Welsh architect Cedric Price. His contribution to the debate was to point out that King’s Cross Park, as described by Norman Foster, was in a way the exact opposite to the traditional London parks because it would have restaurants and cafés, and be open at night. He said, “It would not be like the normal park, it would be alive.” Mr Price seemed to be suggesting that, although the park form adopted at King’s Cross may be traditional, its facilities and pattern of use do not belong to that tradition. It was Mr Price’s view that this distinction could be emphasized to advantage.



Photomontage of proposed new international terminal between St Pancras and King's Cross stations (above)

The study and pursuit of London's unique urban grain, that peculiar English sensitivity to planning which embraces both the enclosed communal garden and the free-ranging park within the city's limits, will indisputably be nourished by the Foster master plan for King's Cross and its exploration. It will certainly remain a model of modern interpretation of this tradition. The underlying integrity of the Foster proposal to create a new central London village around its own extensive green space has a sound theoretical premise within the history and context of London's unique urban fabric. Even if, as Cedric Price seems to imply, Foster's park idea draws a little also on Copenhagen's Tivoli gardens, perhaps this only reflects London's long-established habit of cross-culturalism. After all, the Danish Church in London is not so far from the King's Cross site.

Whatever the practical or political outcome of present efforts to regain this central urban enclave from the realms of railway twilight and industrial decay, the Foster plan will stand as the first intelligent and comprehensive view of the area's problems and its potential as the new London village envisioned by a bold developer.





Aerial view of international terminal: model (below)



Aerial view of British Museum today



Photomontage showing the Great Court with its glazed roof

### **The Great Court Project at the British Museum, London (1995)**

By definition, a museum is a storehouse in which cultural artefacts are collected, studied and displayed. We mostly think of museums in terms of what we can see and read, of the visual information we receive from what is exhibited. In reality, the nature of a museum has evolved over two centuries into something more arcane than the sanctuary of an Orthodox church. The inner sanctum of the museum has become a secret place, hidden behind an *ikonostasis*, where a higher order of scholars pulls strings to manipulate a puppet theatre whose existence is hardly known and whose purpose is seldom revealed to the faithful public. To compensate for this awesome division between the high priests of culture and visiting neophytes, during the last quarter of the twentieth century many museums have begun to dismantle parts of the *ikonostasis*. Publicity drives have been made to promote various kinds of museum membership and to bring in much-needed financial support. In parallel, the increase in the number of gift shops has converted museums from cultural temples and repositories into centres of popular education and emporia of memorabilia.

In this mass conversion from high church to the television accessibility of popular religion, the British Museum, that paragon of European *Museumkultur*, has proved no exception. The "BM", as it is affectionately known, has been bursting at the seams for more than 50 years, since the end of World War II. It is more than 20 years since the museum's ethnological collections were exiled to the Museum of Mankind, behind the Royal Academy in Burlington Gardens. Now, more than ever, the British Museum is desperate for more space, improved facilities and better circulation for visitors.

It was in 1753 that the British Parliament agreed to hold a public lottery for the express purpose of creating a national museum. More than £95 000 was raised by this means, bringing the British Museum into being. The doors of its original home in Montague House were opened to the public in 1759, and the museum moved into Robert Smirke's original building, on the same site, between 1840 and its completion in 1852. During a history of almost 250 years, it has become the world's preeminent museum, containing collections of manuscripts, books and other artefacts that are quite unparalleled in scope and quality, setting the highest standards in the fields of scholarship and education. Naturally, a continual increase in material possessions and the attendant activities they generate has put ever-increasing strains upon the museum's space and other resources. By 1995 the British Museum had more than six million visitors annually, making it the most visited museum in Britain: it was also visited by more people than the Louvre, Paris and the Metropolitan Museum, New York. Clearly, as we approach the end of the century, the need to reorganize and expand the museum is now critical.



Photomontage view of Great Court

Because of historical and emotional attachments to its Bloomsbury site and the symbolic image of the British Museum created by Robert Smirke's buildings, it has always been thought desirable to accommodate the rehabilitation of the ethnological collections and other expansions of facilities within the framework of the existing complex. This would require that any project to expand the space and facilities must be accomplished within the perimeter of the existing building framework. Such an expansion and restructuring would not have been possible on the Bloomsbury site were it not for the fact that the British Library, formerly known as the British Museum Library, has moved to a new building adjacent to the King's Cross master plan site, alongside St Pancras Station.

The first British Museum Library, familiar to generations of scholars for its famous Round Reading Room beneath the dome of the rotunda, was constructed at the centre of Robert Smirke's original Great Court in the 1840s, while the corners of the courtyard



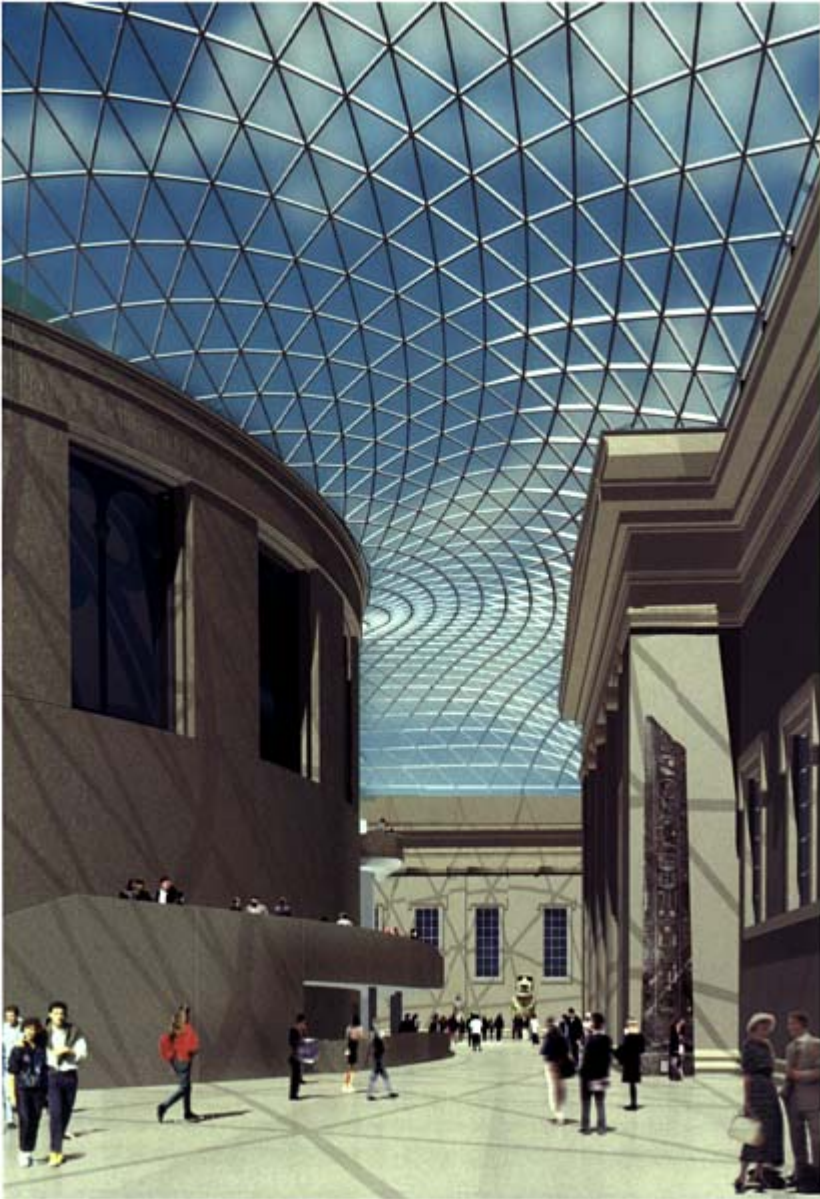
accommodated the bookstacks. This means that the form of Smirke's concept for the heart of the British Museum has not been seen for 150 years. Now, the removal of the library and its bookstacks to the new British Library building in St Pancras, designed by Colin St John Wilson, presents the possibility of re-examining the use of this large central space. Fittingly, therefore, it is the reconstruction of the Great Court that constitutes the centrepiece of the museum's major development plan, a project known as "The British Museum's Millennium Project". It seems appropriate, too, that the Foster studio, which has already proved itself adept in delicate architectural surgery and transplant techniques at the Royal Academy of Arts, has been appointed, after an international competition, by the British Museum to present its Great Court Project to the Millennium Commission.



Photomontage view of mezzanine restaurant

More than 60 years elapsed between the opening of the British Museum at Montague House in 1759 and the commissioning of Robert Smirke in 1823 to design a new museum on the Bloomsbury site. It took 25 years to build his design, which was not completed until 1852. At its heart Smirke had placed the Great Court, which was to be a major focus of the museum, acting as its vital breathing space and giving the public direct access to the galleries from a garden. Within a year of its completion, however, essential reading and book storage space was required for the library. The Round Reading Room, designed by Panizzi, together with Smirke's brother Sydney, was completed in 1857. It occupied the centre of the Great Court and, shortly after, the quadrant bookstacks were built into the remaining interstices of the Great Court. In this way the clarity of Smirke's original design was lost, and with it the quality of that magnificent central space also vanished.

The Foster design for the Museum's Millennium Project seeks to achieve four main objectives:



Photomontage view of Great Court from the north

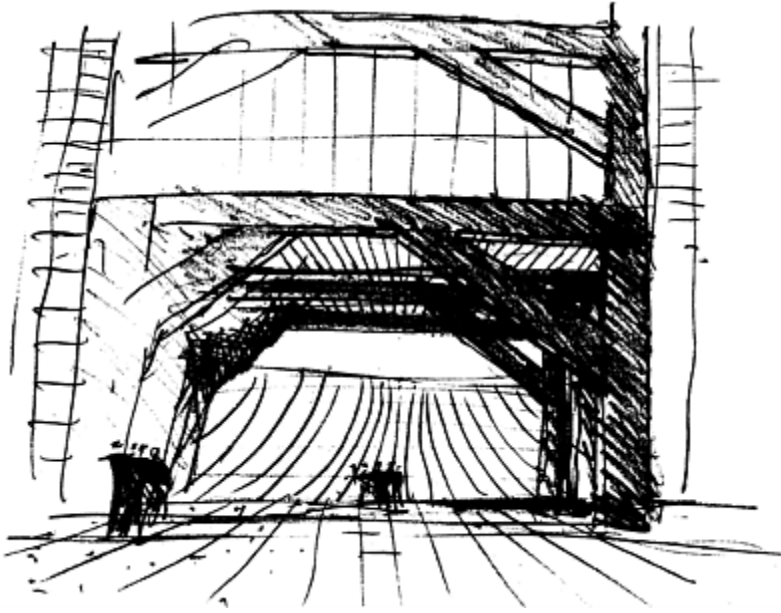
1 to retain the memory, the essential form and structure of the Round Reading Room by conserving its magnificent interior as a new information centre for the Museum, where the public will have free access to this formerly very private space, thus keeping the form but changing the character;

- 2 to construct around the external shell of the Round Reading Room a lightweight steel structure to carry a transparent roof, which will provide generous natural light while protecting the periphery of the Great Court from the elements;
- 3 to enter the Great Court directly from the principal entrance to the museum, by way of the rebuilt classical portico designed by Smirke, and also from the other three sides of the Great Court;
- 4 by these design strategies to restore the purpose of the Great Court as the focus of the entire museum, providing: (a) unimpeded access from the entrance to the very heart of the museum and its sophisticated information resources; (b) much-needed clarity of circulation on arrival at the museum and in dispersing to other centres of interest; (c) an expanded entrance area to allow space and time for orientation before moving on to specific exhibits.

Beyond these principal concerns for circulation, orientation and education, the Foster Great Court Project goes on to locate bookshops, restaurants and other services adjacent to the entrance/orientation areas but below decks on mezzanine levels. The clarity of this proposal depends on flushing out the Great Court and restoring some of its intended roles in terms of spaciousness, freedom of circulation, and the visual connection of things and spaces that have long since been barred from view.

Since the museum's original submission to the Millennium Commission, the design for the Great Court has been developed to produce a more dramatic and architecturally satisfying solution. These recent improvements have been developed in full consultation with English Heritage and the Royal Fine Art Commission:

- 1 In particular, a clear, uninterrupted space has been created as the visitor enters the Great Court. Access to the upper levels will be provided by means of a symmetrical double staircase revealing the full height of the drum of the reading room, and there is now a single link at the upper level, to the northern range of galleries.
- 2 The design of the roof has also been developed, using a radial geometry emanating from the reading room. The initial submission was based on the use of lightweight foil cladding for the roof—this was a totally workable solution. However, further structural and fire engineering studies have shown that it is now possible to consider glass as an alternative material.
- 3 A great deal of further thought has been given to how best to use the public spaces within the Great Court. The space offers the opportunity for a display of important pieces of large sculpture reflecting man's artistic achievements in the last five millennia. Objects like the Knidos lion, the cast of the throne-room relief from Persepolis, Hoa-haka-nana-ia from Easter Island, the Chinese Buddha and the Haida totem pole from Queen Charlotte Island, Canada, are a few examples from the museum's rich collection, which are being planned for display.



Concept sketch by Norman Foster

### **Century Tower, Tokyo (1987–91)**

Of Foster Associates' Century Tower in Tokyo (completed in 1991), the British journal *The Architectural Review* said:

“Century Tower in Tokyo brings the practice’s rigour and clarity to what is essentially a speculative office block, creating an example and a landmark.”<sup>31</sup>

Theory for Norman Foster cannot be divorced from the nature of materials, the problems of component production, and the art of construction and assembly. Consequently, the design process in the Foster studio requires a concentration and continuity of effort that “brings to the final product the quality of the original thought”. This constitutes the very heart of the Foster reputation: that, over the years, confidence has grown in Foster architecture precisely because of the persistent emergence of robust ideas that are then brought to perfection in detailed design development. The clarity of these ideas, and their resolution, has developed a consistent quality of architectural language—in many ways of a limited expression—but with the poetic economy of the Japanese *haiku*.

All this helps to explain how it was that an extremely fastidious Japanese client came to commission the Century Tower for his Obunsha Publishing Company from Foster Associates. Like Mies van der Rohe’s Seagram Building in New York, the Hongkong and Shanghai Bank has been its own best self-advertisement. The Japanese developer, Kazuo Akao, who has been the patron of such artists as Richard Long and Carl Andre,

got to know and admire the Hongkong and Shanghai Bank. He became a frequent visitor to Hong Kong, always staying next to the bank in the adjacent Mandarin Hotel, in order to study the Foster building in detail and become thoroughly familiar with its unique architecture. Akao then invited Foster to visit Tokyo in November 1986, and commissioned Foster Associates to provide an innovative solution of comparable boldness for his Obunsha Publishing Company. Century Tower is in no way a scaled-down version of the Hongkong Bank, however. It is quite another building, for a very different context: it has its own logic, and it must be judged entirely on its own terms.

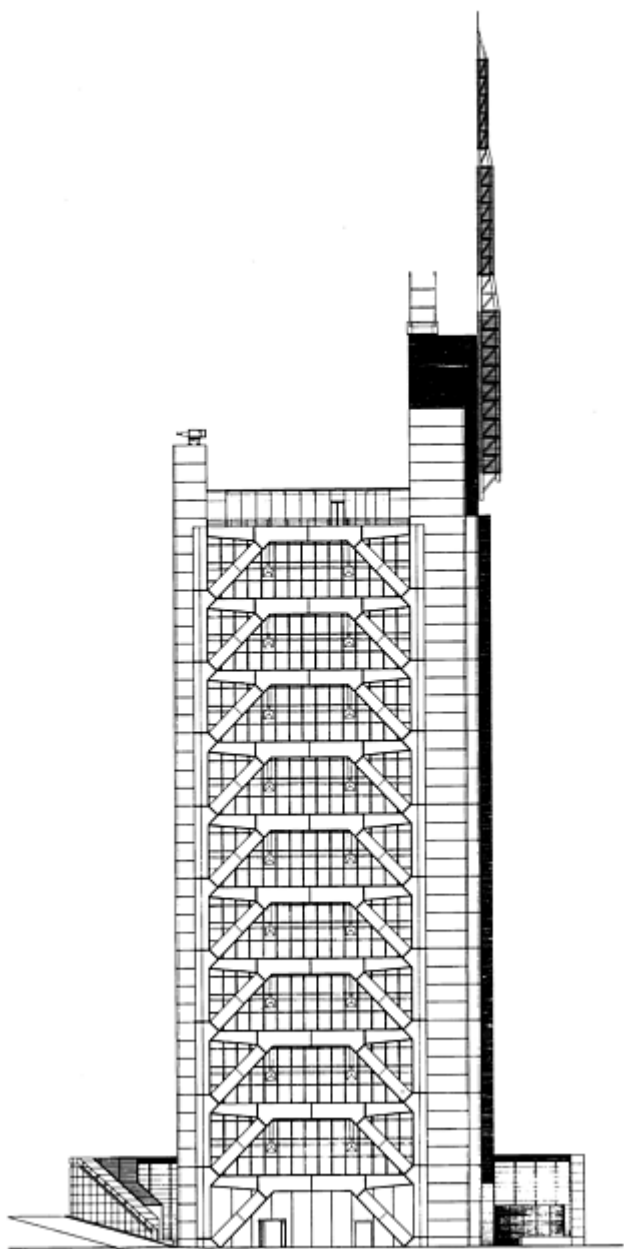
In the Hongkong and Shanghai Bank, Foster Associates reinvented the skyscraper, returning to its original Chicago intention that had been followed later by Mies van der Rohe, of giving prominence to a clear

expression of primary structure. The vitality of the Hongkong Bank's irregular massing is a direct response to the constraints of Hong Kong zoning codes—just as the expressionist staircase forms of Alvar Aalto's Baker Dormitory at MIT reflect the requirements of the local fire marshal. Similarly, the variation in the height of the two towers of the Century building in Tokyo's central Bunkyo-ku district derives from building regulations. The tower solution originated from codes that allow 21 storeys at the front (south) of the site, but only 10 at the rear (north), with an enclosed light-well linking the two parts up to the tenth floor. During the course of design development, revisions in the zoning regulations eventually allowed the north tower to rise to 19 storeys, while the south tower remained at 21. The upper floors of the south tower accommodate Mr Akao's own private offices and penthouse residence.

Consistent with most Foster designs, the outer form of Century Tower is deceptively simple: contained from north to south within the four eccentrically braced frames that define the two towers, with a continuous narrow atrium between, the building provides columnfree office space and basic seismic shock resistance. Main structural floors, known as stability floors, are double height, with mezzanines suspended between them on north-south hangers for all but one such floor (level 17 in the north tower, and level 19 in the south tower) in both towers above entry level. The towers are slung, like a series of stacked bridges, over a three-level basement. It is this bridging arrangement that has caused Century Tower to be compared with the Hongkong Bank, but the idea of relating to deep basements refers also to the ITN Headquarters and the Carré d'Art at Nîmes. There are surely conceptual links between the Hongkong Bank and Century Tower: the same kind of notional connections we have pointed out between other Foster buildings. But these conceptual (or structural) commonalities are not reflected in the finished product, in the actual appearance of the object.

The deep basement of Century Tower has parking at the lowest level, with a museum for Mr Akao's collection of Oriental antiquities at the second level. Public access to the museum is from the entry (street) level, in the central area between the towers and beneath the atrium to the office floors above. To both east and west the towers are enclosed by moment-resistant frames that define the boundaries between master (lettable) space and slave (service) elements. At levels 11 and 12 the towers are structurally linked across the ends of the atrium on the moment-resistant frame. Along the western edge





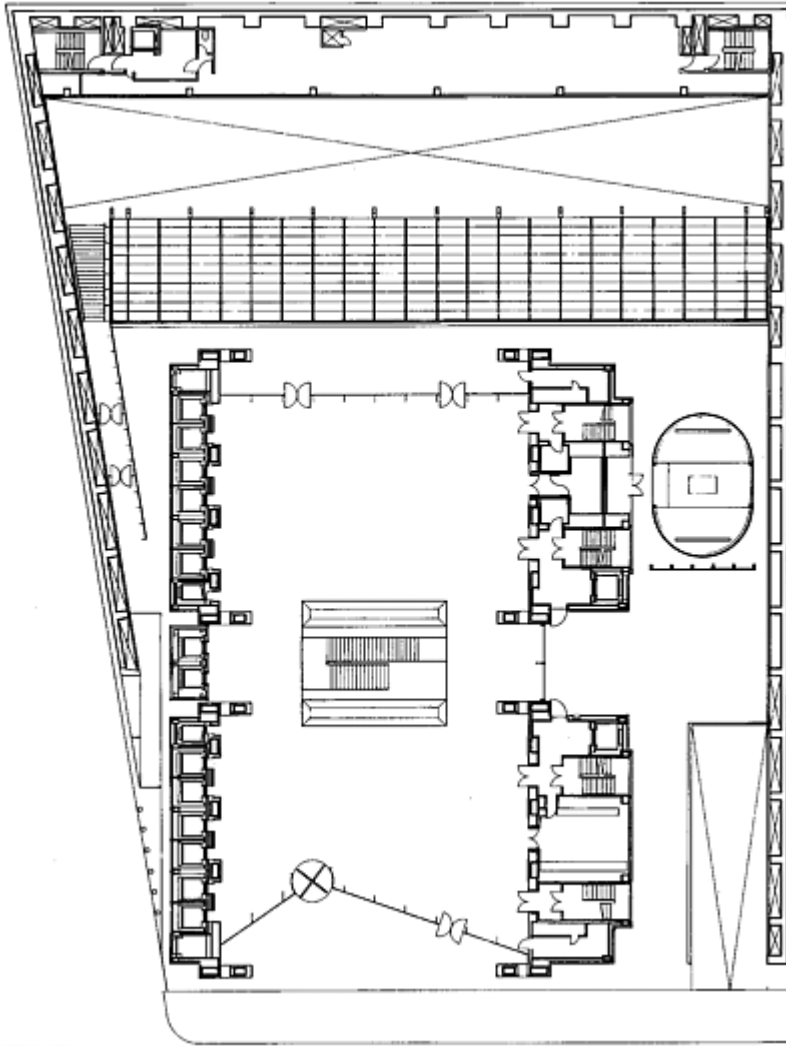
South elevation



Exterior view



Atrium interiors



Ground-level plan

these conventional beam-and-column frames give access to the main bank of 12 passenger lifts, all of which go to floor 9. From level 9 to level 19 six faster lifts serve the upper floors. These lifts on the western side are arranged behind an effectively continuous transparent glass wall, offering excellent views across Tokyo on the ascent.

The atrium, or what Norman Foster calls “the slot”, between the towers, which is essential to allow light to bounce through the building on both axes, is the most daring and innovative part of Century Tower in the context of Japanese office design. Before the design of this building it had not been permitted in Japan to combine an open central air shaft, or atrium, with adjacent open-access floor space. Previously, all Japanese atrium

buildings were required to have enclosed floors at all levels, with the additional provision of fire shutters. There are two components to the ingenious solution to this problem by Foster Associates. The first of these is the provision of smoke-activated shutters that descend from both the main and mezzanine floors a distance of 1.5m towards the continuous glass balustrades which occur at the floor edges. This will have the effect of accelerating the flow of air from the atrium into the smoke-affected floor. Fans located in



Night-time view of entrance



Water wall and staircase leading down to museum

the outer corners of the building would then draw the air across the floor diagonally, sucking the smoke out of the building away from the atrium, thus avoiding the migration of smoke into that central slot.



Century Tower is not only a building that “bridges” (like the Hongkong and Shanghai Bank) and which has a “deep basement” concept (as in the ITN Building and the Carré d’Art at Nîmes); it also incorporates moving mechanical parts (a feature of Pietilä’s competition project for the Monte Carlo Multi-Functional Centre in 1969). The effect of the smoke baffles descending from the upward-splayed soffit of the mezzanine ceilings recalls the brake-flaps on the trailing edge of aeroplane wings. By overcoming the problem of opaque barriers on either side of the atrium, Century Tower remains transparent on both axes. This means that the unique jumble and confusion of Tokyo’s central urban area is visible from almost every point of the building’s interior.

The south tower of Century Tower fronts directly onto a busy thoroughfare that runs along the edge of the canal adjacent to a major railway line, with the entire eccentrically braced frame forming the south facade. This frame provides the most forceful expression of the interlocked systems of logic that make up the concept of Century Tower. Its effect is best appreciated from the far side of the Kandagawa Canal, just prior to crossing the Ochanomizu Bridge and approaching the building. From close up, the legs of the eccentrically braced frame form a portico, or gateway, to the main entrance which is set back at a slight angle from the pavement line. The entrance lobby is revealed through the plate-glass screen that stretches beneath the eccentrically braced frame between the service bays that flank the transparent central volume to east and west. Entering through the single, four-blade revolving door, the lobby offers a choice of the first-stage lifts (to floor 9 and changeover) to the left, and the reception desk to the right. Ahead are the twin water tables, recalling the act of ritual purification, that frame the staircase down to the museum. These polished black Zimbabwe granite water tables were designed by Richard Chaix so that they overflow at their edges and feed the “waterfalls” that gently ripple down the enclosing walls of the staircase, descending into what Norman Foster has dubbed “the cave”.

Beyond the water tables and museum stairway, a public tea-house stretches back toward the rear wall. This tea-house looks onto the catenary roof above a restaurant and an exclusive health club, which are located in the basement on the northern boundary of the site. The diagonal, bracing legs of the eccentrically braced frame structure are the only interruptions to the clear spatial flow of the lobby from south to north. Beneath the dimmer-controlled illuminated ceiling, the sense of transparency and abundant natural light is immediately apparent, while the tranquillity of the lobby space is reinforced by the gentle gurgling of water flowing down the waterfalls, and by the soft grey surface of the flame-finished black Zimbabwe granite floor. In its muted way, this is quite a musical interior.

Approaching Century Tower along the canal from the south, we see both the eccentrically braced frame and the vertical thrust of the service banks to both towers. This composition reveals the basic components of the building’s constructional logic. The eccentrically braced frame displays the cross-site structure, while the service bays mask the posts and beams that make up the moment-resistant frame. Within this simple dichotomy of structural frames, the one virtually transparent and the other seemingly opaque, a complex interplay of technology and industrial design is worked out within the floors, ceilings and other interstices of the building. From a distance, the super-scale and brilliantly reflective frames of the eccentrically braced facade are contrasted with the

rugged slatting of the service banks and the skyward thrust of the red-and-white communications mast.



Museum interior

Century Tower offers a ritual refinement of structure in the eccentrically braced frames: at the same time, the muscularity of the supporting service “book-ends” is undisguised. Indeed, from the exterior, the structural dichotomy creates a vigorous marriage of high-tech rationale with the aesthetic of Expressionism. And this prompts one to observe that a Foster building is often characterized by a combination of refinement in detail with an almost raw freshness of the whole event—like silk and hessian. Such a contrast of textures is surely culturally correct in the case of Tokyo’s Century Tower.

Unlike the Hongkong Bank, Century Tower is not a corporate headquarters, but a private, speculative office venture, with special functions for the client and owner at the upper and lower extremities of the building. Within months of its completion in late May 1991 it had become prestige space on the Tokyo real-estate market, with such clients as the building’s main contractor, Obayashi, and Japan Airlines leasing accommodation. Although future cellularization of individual floors has been taken into account, the concept of Century Tower is rather one of universality of space and views. Privacy is not so much a visual concept in the corporate office of the late twentieth century, which is more connected with the actual work being done than with individual spatial status. With Century Tower, the feeling is one of being in the pounding heart of Tokyo, at the very centre of the modern world. Such an impression is not achievable in a conventionally planned office building. In Century Tower, the workers sense that they are suspended within the very centre of the modern city.



Century Tower is literally the city at work within itself. Once again, in the tradition of Frank Lloyd Wright's Larkin and Johnson Wax buildings, the status of work has been elevated to another plateau. The "trays" of Wright's "temple of work" as represented by his Larkin Building are replaced in Century Tower by a series of bridges that afford changing landscapes of light, of view, and of *being*. Although this building is certainly an efficient machine for working in, it is also much more. Its extra dimensions are immediately evident in the entrance lobby, and are confirmed on moving about the building. While the eccentrically braced frame establishes a formal, ritual language on the building's exterior, and this ritual sense is reinforced in the lobby by the water tables, the very essence of the building in use centres on informality, flexibility and comfort.

The distinctive form of the eccentrically braced frame—the frames seem reminiscent of temple gates with their diagonal thrust across the facade—combines with the stepped service shafts to create a vigorous new landmark on the Tokyo skyline. Inside the building the essential tension of the eccentrically braced frame structure partly dissolves within the pattern of main and mezzanine floors, but mostly in the continuity of light and space that permeates the entire interior. While Century Tower is outwardly a symbol of the new Tokyo, inwardly it represents another Japanese revolution, the triumph of design and technology in orchestrating an ideal working environment within revised building regulations.

Century Tower is not at all a case of "the Hongkong Bank having pupped". In spite of appearances—in this case deriving from the aluminium sandwich panels by Cupples of St Louis used on both buildings—the Hongkong Bank and Century Tower are not the same thing at different scales. The Hongkong Bank establishes itself, by its sheer force and bravura, as one of the great architectural works of the twentieth century. Century Tower is not only smaller, it is also more intellectual in its design. This fact is partially obscured by its mechanical charm. But in this combination, somewhere between its intelligence and the seductiveness of its mechanical rituals, Century Tower is very much its own thing. Of course, the Hongkong Bank has the *power* to assert its right to the *glory*. But Century Tower is not a monument as such: it is more a democratic, normal-sized building. And as such, it perhaps represents more than any other Foster work a true anatomy of architecture. Century Tower shows us the complete anatomical section (Da Vinci) in which both the chamber of conception (womb) and the object of conception (the actual embryo of architecture) are revealed. In the process, Alberti's structure is both drawn out to the surface to become the *lineamenti*, while those same *lineamenti* are withdrawn into the anatomy to overlay skeleton with sinew. Century Tower is another anatomist's triumph, reconstructing the body of architecture now from parts whose source is not only beyond mimetics, but largely unidentifiable. Perrault may be rejoicing in Paradise; Durand most certainly is.



Swimming pool and club

### The Carré d'Art, Nîmes (1984–93)

Perrault's celebrated eastern facade, the final touch with which he completed the Palais du Louvre in Paris, was finished in 1674–75. Twenty years later the southern French city of Nîmes, which had been an important Gallic centre of the Roman Empire, saw the birth of an extremely practical invention that has ensured the continuing nourishment of its reputation right through to the present day. For in 1695 a clothing fabric that is still popular with young and old alike, the ubiquitous denim, or as the worthy citizens of Nîmes would have it, *serge de Nîmes*,<sup>32</sup> first made its appearance on the city's looms. Nearly 300 years later, in 1984, Foster Associates arrived in Nîmes to begin work on another modern "invention"—the so-called *Médiathèque*—that was later to become known as Le Carré d'Art, and is now called Le Centre François Mitterand.

The site for this new architectural intervention in the renowned Roman centre is in the very heart of the city, on a plot of land that was previously occupied by a theatre and just 50m from one of the most celebrated Roman monuments in France, a first-century Roman temple known as the Maison Carrée. Fronting onto one of the principal avenues of Nîmes—the Boulevard Victor Hugo—the site looks directly across an open *place* that stretches between the boulevard and the first-century Roman temple. In a quiet, but emphatic and dignified way, the Maison Carrée appears to establish the ground rules that

set the urban style for this area of the city. Set upon a stylobate of some 2m, the Roman temple is quite aloof from the *place*, although its relationship to the public open space is certainly not imperious. In fact, the temple is denied a dominating architectural role in this central urban space because history, while not exactly conspiring to have the Maison Carrée turn its back on the *place* and avenue, has nevertheless succeeded in getting the temple to address both public space and thoroughfare with its flank. For this reason, the classical concepts of symmetry and axuality are missing from the ground rules for the site of this Foster design.

There is an additional contradiction in the disposition of the site and its relationship to both the boulevard and the *place* beyond: this derives from the fact that the avenue does not continue its straight course after it re-emerges from the *place*, deviating instead to the left. The result is that the negation of both symmetry and axuality between the Maison Carrée and the *place* is repeated by their elimination from the relationship of the Médiathèque site to both the boulevard and the *place*. In other words, the suggestion, floating on the surface of this *quartier*, that the Maison Carrée is affecting a classical presence not only upon the style of the public space but also upon the rules that govern the planning and layout of the entire area, is not a proposition that can be supported by the facts. Certainly there is a classical presence, but this is discreet and largely contained within a classical object. Although this might overflow a little from its exposed flanks, the classical presence of the Maison Carrée does not radiate to impact such outlying points as the Médiathèque frontage.

Following the opening of the Médiathèque or “Carré d’Art”, Norman Foster gave a lecture in March 1993 at the Louvre in Paris, in which he gave some valuable clues to his perceptions about the city of Nîmes, the site itself and the relationship of this project to the Maison Carrée. He began by emphasizing how on his first visit to Nîmes, before the competition of July 1984, he had made many sketches and had taken lots of photographs. One of the first things that struck him was the strong sense of contrast in the urban form of Nîmes, and in particular the opposition of light and shade that develops between patterns of open spaces and those connecting boulevards with the close intercolumniation of their tightly treed arcades. A prime example of just such a contrast of open space and boulevard is the elegant, thrusting Boulevard Victor Hugo and the *place* that contains the Maison Carrée. Norman Foster added:

“I was deeply impressed by the urban structure of Nîmes, with its strong simple routes and good spaces—particularly that space which is the setting for the Roman temple, the Maison Carrée. I felt that this space should not be changed—it seemed *familiar* and it worked well. Interestingly, our design in response to the international competition for this project was the only entry that did not try to change the nature of that space.

“I was impressed, also, by the Roman Arena and the nineteenth-century Jardins de la Fontaine. The new building became an opportunity to promote links between these two gems, with a main entrance on the corner adjoining the Boulevard Victor Hugo and a secondary entrance on its diagonal corner at the rue Gaston Boissier. This creates a diagonal route at the entrance level, which can become a public short cut, encouraging movement into the building and

through it.”

He admitted that he had also been influenced in his approach by the local architecture, particularly the courtyards of the traditional Nîmeoise houses, and the hill towns of



Aerial view of Maison Carrée and Carré d'Art

the region with their steps and terraces. He explained that these influences resulted in the Carré d'Art's being centred on an interior gallery court, which has generous cascading stairways that link all the public levels, culminating in the roof-terrace café that overlooks the Maison Carrée. He indicated that the portico of this Roman temple was another important source of design inspiration, referring to it as “generous, welcoming, urban and public”. In the Carré d'Art it was the idea, he said, to recreate the portico form but in today's terms, taking the inspiration for its details from contemporary materials and the

climate of the Midi.

Sir Norman concluded by recalling that when he first arrived in Nîmes he deplored the unsightly railings around the Maison Carrée, which at the time was marooned in a sea of parked cars. Over the intervening decade, however, it has been possible to implement a policy that gives traditional spaces back to the pedestrian. If he had to describe the single most significant achievement of the Carré d'Art, he said it would be that:

“Our project suggests ways in which the new can relate to the old, and can be respectful of the past while also speaking of its own age, achieved with integrity and without pastiche.”

Foster seemed to be aware of the discrepancy between a “discreet classical presence” and a “colonizing classical influence” from quite early days on this project. Norman Foster’s first conceptual sketches nevertheless paid homage to both the presence of the Maison Carrée and the significance of the Boulevard Victor Hugo, which separates the Médiathèque site from the public *place*. This obeisance was perfectly logical, and it provided a rational starting-point for the design exploration. Later, this tacit acceptance of a colonizing classical influence was abandoned. Instead, the design approach shifted to embrace the notion of a discreet classical presence and a correspondingly greater freedom in the ground rules. This shift once again demonstrates the Foster preference for the way of self-finding in architecture. Nevertheless, it is significant that Foster attempted to preserve the remaining columns of the facade from the nineteenth-century theatre that had occupied the site, although this decision was ultimately revoked.

These arguments have been rehearsed in order to discuss how the Carré d'Art at Nîmes does or does not provide architectural reinforcement for the Maison Carrée and its environs. This is not, of course, dependent upon one simple question: “Does it fit: yes or no?” During the design stage a number of substantially different solutions were devised, all of which responded to a classical presence in part, while none reflected the notion of a colonizing influence. From the exterior viewpoint, the designs prepared were for the most part not axial on the main facade to the *place*, nor did they exhibit any reference to, or simulation of, classical elements. Most critically, from the point of view of the persistent *presence* of the Maison Carrée, the various Foster designs did not address the question of the building’s edge condition in relation to the avenue and *place*, nor does the completed building tackle this question effectively.

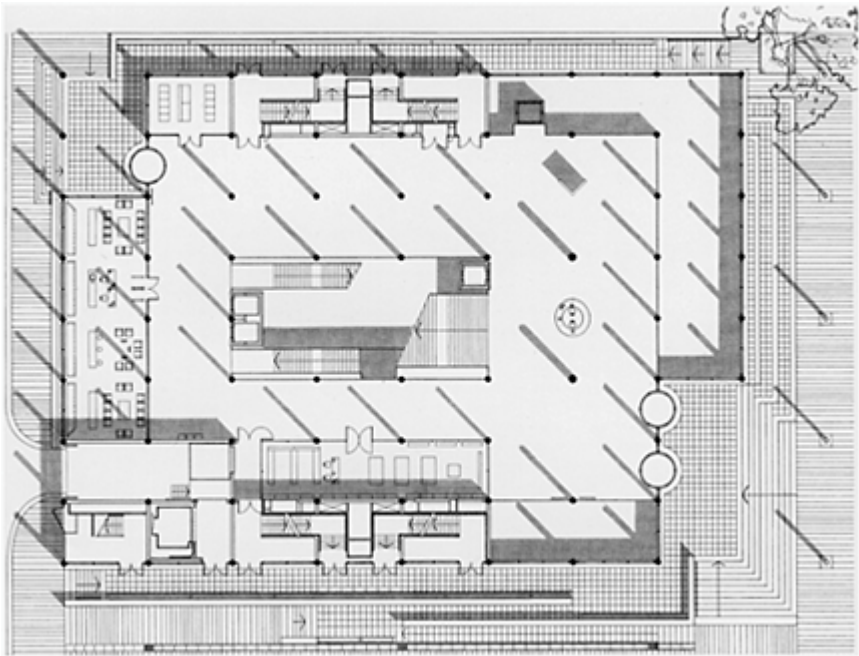
The vertical strut supports that hold up the roof canopy to the café terrace, although they offer a memory of the old theatre colonnade, are not columns in the classical sense, and they only minimally delineate the edge conditions between site and avenue and *place*. The clue to this problem of edge delineation is given by the Maison Carrée in its aloofness, in the distinguishing boundaries of its stylobate. By raising the pavement in a continuous, commanding platform, by creating a stylobate to raise the Médiathèque above the avenue and *place*, this strategic edge condition would have been unquestionably identified and pronounced. In the design as built there is, however, a gesture towards a stylobate. In response to my question: “Why is the edge of the site, the main frontage treated like that, with various classical references that are not really convincingly classical?”, Sir Norman replied, simply: “It was intentional”.<sup>33</sup>



The Médiathèque “stylobate” is compartmentalized, so that the portion extending out from under the main part of the building (to the right from the avenue) is continuous, while the part that gives access to the front entrance is set back. Also, the main section of this “stylobate” appears insufficiently high to make it a participatory element in the relationship between building and street. What is missing is a real platform that could be sat upon by the citizens as they kick their heels and look out over the *place*. This is precisely the form of stylobate possessed by the Maison Carrée, a characteristic that gives it both classical aloofness and its participatory role in the urban drama.



Section through Carré d'Art and the Place Maison Carrée



Ground-floor plan

The question concerning the role of classical columns and their simulation is of a different order. On the Carré d'Art frontage the thin, attenuated tubes that rise up from

the pavement to support the roof canopy of the café terrace bear only the sketchiest resemblance to classical columns—even those exaggeratedly slender examples from Nordic Classicism of the 1920s. The appearance of these supports is rather one of “struts”, such as those that characterized early aircraft design. Of course, Foster is well known for his mining of inspiration from the aircraft industry. But the classical presence—albeit discreet rather than colonizing—of the Maison Carrée, confronting the apparatus of the late Roman Empire with that of a distinctly post-Da Vincian provenance, is somewhat mysterious. The canopy support struts do, however, support the canopy: they actually hold it up in a curious, thoroughly Mannerist but, eventually, structural way. They are not part of a Gravesian decorative fancy, nor an Eisenmanic flirtation with technology. These canopy struts do not, however, support the notion of an edge condition. Yet, seeing that there is no adequate stylobate to fulfil this role, the definition and delineation of the edge condition between building and street might have become the secondary—even the primary—function of the canopy struts.

For those who view Foster’s work as transparent, “easily seen through”, and lacking in any aesthetic beyond technology, the Carré d’Art therefore poses a substantial puzzle. It seems to present an architectural mystery on quite a grand scale. The plot thickens and the mystery deepens if we consider Sir Norman’s consistent response to my proings that “It was intentional.” What kind of intention, we might ask, would fly in the face of conditioning factors on or near the site, particularly when Norman Foster himself had paid such respect to those factors in his earliest analytical sketches? If the original elevations for the proposed BBC Radio Centre did not exhibit a confident grasp of the urban issues in central London, we might have expected this result to improve with further study and refinement. In Nîmes, however, the urban framework is looser, and the Maison Carrée, although significant, does not have the impact on public space of Nash’s All Souls Church in Langham Place. The Nîmes project, however, was developed over a period of nine years. Perhaps, then, instead of looking for a solution to this mystery, we should seek a mystery to a solution. In other words, if we invert the patterns of classical activity in design—patterns directed towards “classical” solutions—we might then penetrate the mystery contained in the suggestion that “It was intentional.”

To pursue this course of enquiry, it is once again necessary to adopt the anatomist’s procedures and incisive interventions. On the Nîmes site we have:

- 1 a classical *corpus*—literally a corpse—lying in a public open space with its head pointing away from the action;
- 2 a public space that is rather bland in character, not very energized, in fact somewhat lacking life; and
- 3 a boulevard that might originally have fed life and energy into the *place* but, owing to the increasing pressures of automobile traffic, now actually drains the life-force away.

In this contextual puzzle, then, perhaps the object is not to mimic or match existing cultural factors or forces, but to invent and represent a new body and a new source of social energy? This would have the effect of turning the architectural puzzle, as we have so far considered it here, inside out. The nature and purpose of the architectural object would not be to reflect the surrounding framework, a mirroring of the architectural and urban context, because that context was dead. Now we can examine the Carré d’Art as a

post-mortem work: an architectural body that arises after death, as a resurrection in fact.

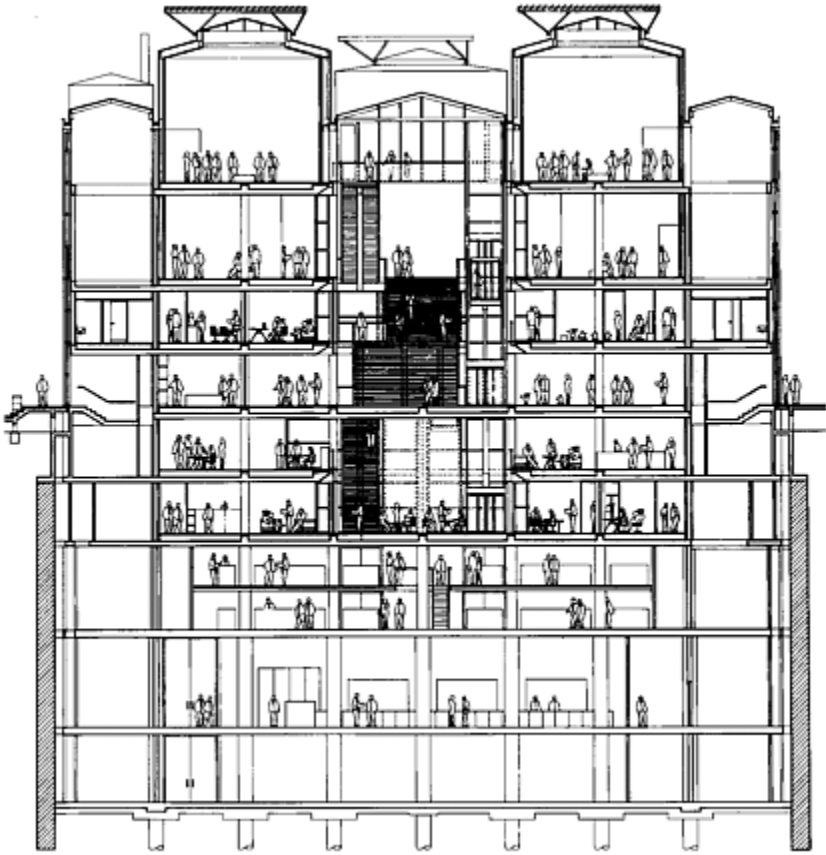
Seeking the self-finding, resurrected body for Nîmes, Foster dons the anatomist's gloves once again. Cutting the frontal epidermis, he inserts surgical struts to keep the interstitial tissues apart. Through this gaping invitation, which displaces the building's physiognomy (and all notion of facade), we have a view through, almost as far as the innards of the body—its very *guts*—the normally secret, working parts. But cutting is not enough to reveal the inner workings of this architectural body. We need physics as well. The removal of the frontal layer—skinning the edifice, as it were—is most instructive but, having taken us behind the epidermis, the anatomist hands us a giant *speculum* to enable us to penetrate into the very core of the body's anatomy and explore its most arcane chambers.

By these incisions, insertions and dilations, the anatomist affects the nature and representation of the body of architecture. For example, at one moment we are on the outside looking in, and the next we are inside, looking out. The difference is that there is no longer the distinction between *outside* and *inside*. Of course, the outside/inside dissolve goes back much further, at least as far as Mies's Barcelona Pavilion (1929) and, in Foster's direct experience, to Johnson's house at New Canaan (1949), or some decades before Venturi's *Complexity and Contradiction in Architecture* (1966) campaigned against cultural correctness. On his own terms, basic elements of the confusion between outside and inside are already manifest in Foster's early masterpiece, the Willis Faber & Dumas Headquarters (1974). The notion of opening up a building anatomically, by



Carré d'Art with the Maison Carrée in foreground





Cross-section with library below and galleries above

the metaphorical insertion of a *speculum*, by stripping off not merely mimetic effects but, to all intents and purposes, all traces of physical barriers and appearance, has its origins in the Sainsbury Centre for Visual Arts—not because of any prevailing transparency, but because of the truly minimum membrane between field and exhibition floor, between the agri-culture and the high-culture.

The self-finding way of architecture in the Carré d'Art virtually ignores the exterior appearance in one sense. With the minimum of impediment, it's up the shallow steps and through the glass entrance screen into an interior that definitely echoes the magic of Labrouste and Dutert. As in the Sainsbury Centre, there is no conventional sense of "art" or "museum" inside the Carré d'Art. One is reminded of departures, as in railway stations, and the journey continues. Turning, the front of the Carré d'Art is now apparent for the first time, not in the form of an obscure *Mauer*, but as a *trans*-parent screen that frames the Médiathèque's prize possession—a view across the *place* to the splendours of the Maison Carrée. Thus the front elevation is not revealed from outside, but held back within the structure to be enjoyed from the elevated aloofness of a true stylobate.



Library interior

In this way, any conventional memory or evocation of a row of columns, a colonnade, a truly classical facade, has been excised by Foster's masterful incision. A conventional response to an urban design context might match form with form and facade with facade,

the emphasis of that response being on solid and void. But Fosters are always seeking an alternative means of response, literally inverting convention, not by following some straightlaced rules of place but by trying to get beneath the surface, under the very skin of the problem. Both the original “giant umbrella” project for the Reichstag and the Carré d’Art are examples of this inversion. At Nîmes, the context and the provocation centres on the Maison Carrée; but it is both the stimulus to a response and a contraceptive device, both an invitation and a barrier: not so much an urban statement as a riddle, to which the answer is itself. It will settle neither for felicitous mimicry nor a pallid reflection. Sir Norman’s economical and incisive sketches have an almost permissive quality in this respect. Certainly, they record and delineate the anatomy of the *corpus*, but in indicating the surface topography they also begin to reveal the anatomist’s view beneath the epidermis, inviting scrutiny not only of what is visible, the taut skin of appearance, but also of the subcutaneous field of hidden tissue.

Conventionally, architecture is condemned to imprisonment within a decorated shed. Our perception of architecture is therefore normally one from the outside in. At Nîmes, precisely because they could not compete with the Maison Carrée, Foster Associates reversed this process, building upon a variety of outside/inside experiments in Willis Faber & Dumas, the Sainsbury Centre, and Century Tower, to realize the architectural presence of the Carré d’Art from its inside out. And there, from the inside, from the floor of the entrance lobby, the seemingly naïve, barely existent, almost imperceptible elevation to the *place* reveals itself as being a mirror-image of the Maison Carrée across the way.

Up the shimmering stairs, ascending the glass *Treppenhau*s to Paradise, and we come first to the main exhibition floor, then on to the café and terrace—echoes of Willis Faber & Dumas here. This staircase is magical again: both delicate and authoritarian, it combines the best of Bruno Taut and Marcel Duchamp. Here is just the sort of place to come across a “Nude Descending...”. But on arrival at the terrace level we discover that the French bar is equal to any on a fashionable boulevard. With the skilled anatomist as our guide, we have already travelled from the world of apparent architectural uncertainty to that of classical antiquity, then on through the narratives of Duchamp (or could it be Claude Perrault’s brother, Charles?), followed by a return to the bourgeois comforts of a boulevard bar; and finally, out there beyond the terrace guard-rail, lies the Maison Carrée, stretching out into the *place* below. But the first-century temple is no longer the abandoned corpse that presented itself to the Foster studio when the Nîmes project began. Now, looking down from the bar terrace to her discreet presence, there is a sense of new life having been breathed into the stone anatomy of this ancient architectural body; and what we witness is a vibrant, syncopated articulation of the old lady. And she is not alone in receiving this new energy, for a direct consequence of building the Carré d’Art is an increase of pedestrian traffic, not only within the building, but also in the *place* itself. This increase in the flow of people across the front of the site has stimulated the establishment of three new cafés on the opposite side of the *place* from the temple. Is this not yet another example of the inverted architectural anatomy of the Carré d’Art, whereby the interior of the body succeeds in “fleshing out” the exterior environment?

Understanding Foster architecture is, then, no more simple or straightforward than the process of unravelling Le Corbusier or any other major contributor to Modernism. We

find that in many cases the simplicity of effect conceals a compound causal mystery. Yet one of the battle cries of the post-Modernists has been that the Modernists had nothing to conceal, and that they revealed everything in utter boredom.

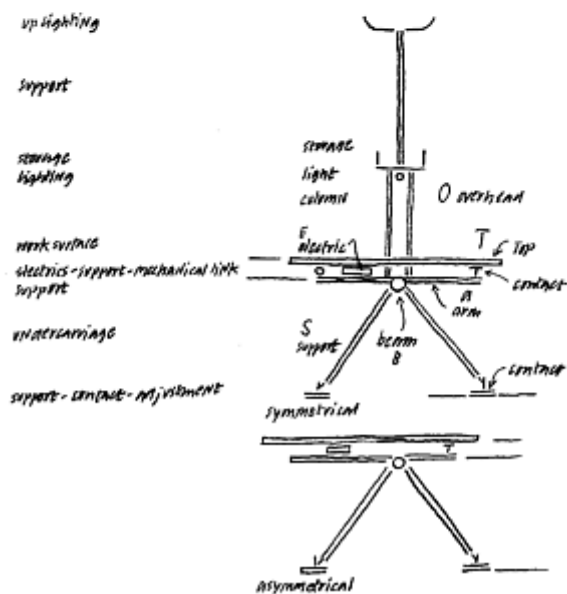
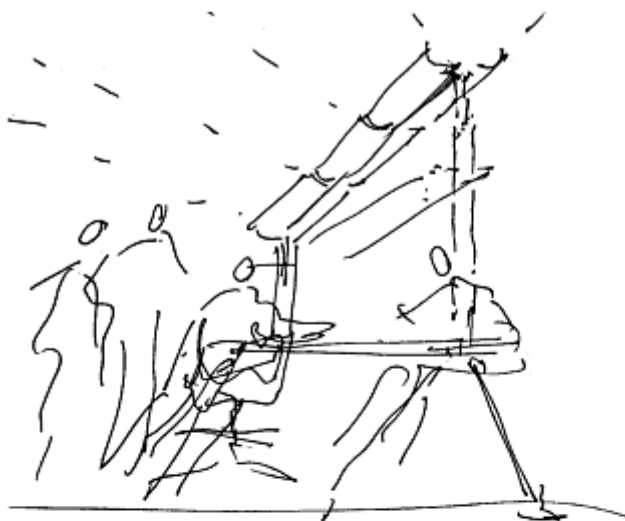
Throughout three decades, the work of the Foster studio has given the lie to such an over-simplification of both its design approach and effect. Our examination of these selected major works reveals quite remarkable consistency—not a consistency of mere design strategy, which could hardly have been more diverse and varied—but in a rigorous resolution of each problem. Foster rigour embraces a sort of logic, but Foster logic is not just based upon rationalization: for this reason it is not easy to grasp or to unravel.

In order to solve a design problem, or explore an architectural mystery, the Foster studio frequently resorts to turning the whole thing on its head—as we have seen in the case of the Carré d'Art at Nîmes. Such “consistency through diversity”, to quote Norman Foster, is not an easy subject, nor is it simple to expound. But once we have passed the see-through zone or “transparency barrier”, we are free to examine the true body beyond.



Roof terrace café overlooking the Place Maison Carrée

In the final analysis, it is a challenge to comprehend a Foster design, or “to know what he is up to”, at first glance. There is most often the need to see far more “than meets the eye”. This difficulty, almost an *obscuring*, the sense of only “seeing through a glass darkly”, certainly generates a mystery about the Foster opus. Why is it, we might ask, that just when everything seems to be so limpid and transparent, we can somehow only manage to see through that particular window “darkly”? The answer has surely been



Sketch by Norman Foster, 1985 (above) and drawings by Norman Foster showing the design concept (below)



providing built-in task-specific background lighting. Nomos provides freedom within rules—rules that are based on the ergonomics of the human frame in both the standing and sitting positions.

The system is so flexible that it can provide a table with a range of surface positions from vertical and high to horizontal and low. By using different leg configurations, the height can be adjusted. The system can expand both horizontally and vertically. It can also accommodate a variety of surface finishes—glass, wood, marble, metal and plastic. Most of the changes currently taking place in workstations are generated by varying requirements of developing communications technology. Nomos is designed to cope with these demands: it has a vertebrae-like conduit to carry cabling from desk terminals, and storage is accommodated above the desk to keep the floor space clear.

### Notes and references

- 1 The Director, Architecture and Design Department, Museum of Modern Art, New York, in telephone conversation with the author, January 1992.
- 2 See Gevork Hartoonian, *The Ontology of Construction: on Nihilism of Technology in Theories of Modern Architecture*, Cambridge, England, 1994, Chapter 1, “Montage; recording the tectonic”: under section entitled “Techne: the Poetics of Classical Wisdom”, pp. 7–8.
- 3 *Ibid.*, pp. 6–9
- 4 *Ibid.*, pp. 10–16. I am grateful to Dr Hartoonian for his insightful explorations of some of that anatomy, to which aspects of this chapter refer.
- 5 See Kenneth Frampton, “Rappel à l’ordre: the case for the tectonic in architecture”, in *Constancy and Change in Architecture* (eds Quantrill and Webb), Texas A&M Press, 1991, pp. 3–22.
- 6 *Ibid.*
- 7 See Foreword by Kenneth Frampton to Gevork Hartoonian’s *The Ontology of Construction*, *op cit.*, pp. xii–xiii.
- 8 Leon Battista Alberti, *On the Art of Building in the Ten Books*, trans. Susan Edria Bassnett, New York, 1969, p. 7; quoted by Hartoonian in *The Ontology of Construction*.
- 9 See Frampton, “Rappel à l’ordre: the case for the tectonic in architecture”, in *Constancy and Change in Architecture*, *op cit.*, pp. 10–12.
- 10 See the author’s review of *Ordonnance for the Five Kinds of Columns after the Method of the Ancients*, Claude Perrault (Paris, 1683), ed. and Intro. by Alberto Perez-Gomez, trans. by Indra Kagis McEwen (Santa Monica, 1993) in *Seventeenth Century News*, 1994, 52 (3/4).
- 11 See Introduction to *Ordonnance of the Five Kinds of Columns after the Method of the Ancients* by Claude Perrault (1993) by Alberto Perez-Gomez.
- 12 See my review of *Ordonnance for the Five Kinds of Columns after the Method of the Ancients* by Claude Perrault (1683) in *Seventeenth Century News*, 1994, 52 (3/4), 74–75.
- 13 From Taut’s contribution to the four-page leaflet published in connection with the

- Exhibition for Unknown Artists organized by the Arbeitsrat für Kunst in Berlin, April 1919. The other contributors were Walter Gropius (recently appointed Director of the former Vereinigten Grossherzoglichen Schulen für Bildende Kunst und Kunstgewerbe in Weimar, which Gropius had renamed as “Staatliches Bauhaus”); and Adolf Behne (1895–1948), Secretary of the Arbeitsrat.
- 14 Norman Foster was very impressed by the Johnson house when he visited it in 1962. It remains an emblematic design for him, and its purity is influential in his work.
- 15 A remark made to the author while visiting Philip Johnson at New Canaan, Spring 1955.
- 16 See Colin Rowe and Robert Slutsky, *The Mathematics of the Ideal Villa and Other Essays*, Cambridge, MA, 1976, pp. 159–186.
- 17 See Joel Barna, *The See-Through Years*, Houston, 1993.
- 18 See Bruno Taut, *op cit*.
- 19 See van Doesburg and van Eesteren, *Towards Collective Building* (1923), a commentary on the De Stijl *Manifesto V* (1923) by van Eesteren, Theo van Doesburg and Gerrit Rietveld; in Ulrich Conrads, *Programs and Manifestos on 20th Century Architecture*, Cambridge, MA, 1975.
- 20 See opening paragraph of the first issue of the magazine *De Stijl* (1923), quoted by Peter Banham in *Theory and Design in the First Machine Age*, London, 1950, p. 150.
- 21 See Bruno Latour, *Science in Action: How to Follow Scientists and Engineers through Society*, Cambridge, MA, 1987, who first coined the term “black box” in that work. With regard to Foster Associates’ Willis Faber & Dumas headquarters in Ipswich, my doctoral student, Steven Moore, has observed:
- “Science as a social activity (as opposed to Science as an accumulated body of quantifiable knowledge) conceals the political manner of its construction by hiding within the *black box* of cooperative agreement. It seems that the Willis Faber & Dumas project is the literal construction of the black box of deal-making, in the same sense that Latour intends with regards to Science. It is the privacy of discourse that blocks out the light of day.” (In private correspondence, April 1995)
- 22 Kenneth Branagh’s astonishing film, *Mary Shelley’s Frankenstein*, was put on general release early in 1995. A comparison between Dr Frankenstein’s reconstruction of the human body and Foster’s reconstruction of the Body of Architecture was immediate and persuasive.
- 23 See John T. Irwin, *The Mystery to a Solution: Poe, Borges and the Analytic Detective Story*, Baltimore, 1993, pp. 3–55, for an inversion of the conventionally logical progression in attempts at problem solving.
- 24 See Elias Canetti, *Earwitness: Fifty Characters*, New York, 1975; which includes among other portraits that of “The Misspeaker”, pp. 33–34.
- 25 The County of Norfolk, for example, has a topography so lacking in vertical contrast that its highest locality, rising some 76m above sea level, has been officially



labelled “Little Switzerland”.

26 *A Bride Stripped Bare by Her Bachelors*, a painting by the French artist Marcel Duchamp (1911), in which the traditional human habitation of the canvas is displaced by a quasi-mechanical conspiracy of abstract “beings”.

27 The author was a freelance writer for the British Broadcasting Corporation (BBC) during the period 1963–1980, and spent many convivial evenings in the BBC Club (“The Langham”) during informal negotiation for commissions with the Corporation.

28 See Thomas Kuhn, *The Structure of Scientific Revolutions*, Chicago, 1970.

29 *Foster Associates: Recent Works*, Academy Editions Architectural Monograph No. 20, London, 1992, p. 33.

30 See Ernst Cassirer, *Symbol, Myth and Culture*, New Haven, 1979.

31 From the editorial commentary on my article “Century Symbol”, a critique of the Century Tower office building in Tokyo, Japan, which appeared in *The Architectural Review*, **CLXXXIX** (1137), November 1991, 27–37.

32 *Serge de Nîmes* was a practical, commercial invention that facilitated, through its constructive social fabric, a bridge across barriers. In the Carré d’Art for Nîmes the Foster studio addressed the inner weave of the city’s urban fabric. From the completion of this project in 1993, the expression “*de Nîmes*” (denims!) has taken on another, culturally differentiated significance.

33 Here I am including part of my dialogues with Sir Norman’s partner, Ken Shuttleworth, as it seems to illuminate this discussion.

#### Malcolm Quantrill

Ken, I must say that I was somewhat confused when I saw various quite different projects for Nîmes in the archives. One of the schemes had two arms, shaped like wedges of cheese, opening out to the *place*. When I asked Norman about that idea, he said: “It was intentional, so that the public space actually comes into the building rather than making a definition, a line between the building and the square.”

Also, I have been thinking about the decision to have five columns on the frontage at Nîmes. On one of the projects I noticed that there were only two columns. Then I realized that only two columns were necessary to support that canopy. But I understood that the whole reason for having five columns instead of two was to create a colonnade, a spatial definition. Norman talked about breaking down spatial barriers, and bringing the outside into the building: result—no defining line between building and *place*. But in the completed building, we have a colonnade that creates a clear line of demarcation between the Carré d’Art and public space. I found this conflict of intentions and result quite confusing.

#### Ken Shuttleworth

You have to appreciate that Nîmes is quite different from everything else we’ve ever done. And this is principally because it’s what I’d call a “conversion job”. It was designed 50 times over in a nine-year period. Originally, it was basically designed as a concrete frame, with a column in the middle. But there was a big delay in the contract, which resulted in the basement’s being flooded with 25 000 tonnes of water. We had

another crack at it, and we realized that the only way of stopping the cars and water from going into the basement was to lift the whole thing up. This was a real conversion job, because the columns were already in place, and we had to modify the building around the existing structure. There was a lot to be done to ensure that it all worked, and that it really tied into the townscape.

MQ

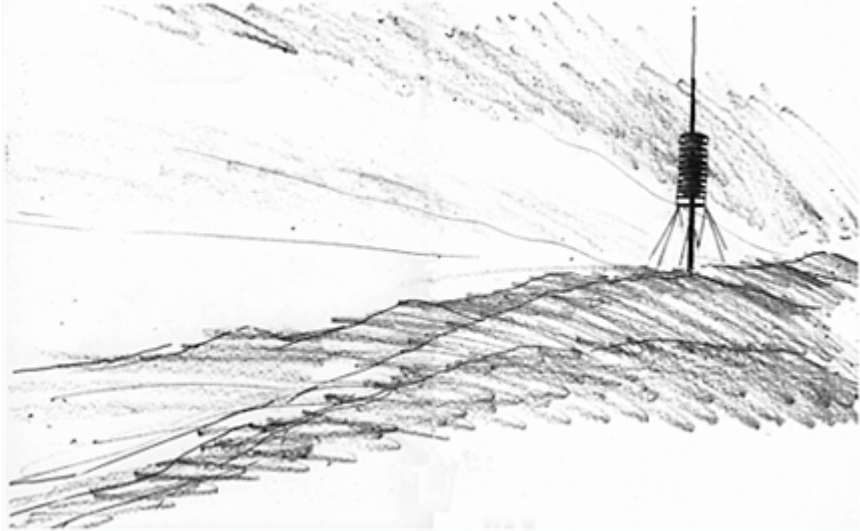
So what we see at Nîmes is not one single design concept, but an overlay of two or more rescue operations?

KS

Well, that's what happened, but it's not what you see. First of all, I mentioned that Nîmes took nine years altogether. Well, because of this time lag the completed building didn't just feed on experience from one project. It was responding to feedback from other new projects as it developed. Because it took so long, Nîmes was picking up ideas and philosophical approaches from different people as it went along. There is, however, a basic philosophy behind Nîmes, because it came out of the BBC Centre era, and that's very important. The BBC and Nîmes were being done at much the same time as the Hongkong Bank. Nîmes really is the built product of the thinking of the practice about the urban context during the first half of the 1980s, and much of what we were trying to do on the BBC Radio Centre rubbed off onto Nîmes.

## Chapter Four: The body of architecture

An exploration with the partners of some recent projects



Torre de Collserola, Barcelona, Spain, 1989–92: concept sketch by Norman Foster

### **Business Promotion Centre, Duisburg, Germany (1988–93)**

Aware of the fact that the partnership attaches particular significance to the Duisburg project, I asked David Nelson to tell me about the exact nature of its uniqueness. He told me that, although apparently a new strain of Foster endeavour, the studio's master-planning approach to projects was in fact deeply rooted in the earliest years of practice, in such proposals as those for Wates. This has involved looking at very large areas of land from a primarily urban design standpoint and creating comprehensive master plan strategies. By its very nature, the master plan provides the structure for the ordering of buildings and the spaces between them, so that these relationships may be controlled. Nelson observed that it is by this process that most ideal cities have developed and expanded through time.

He went on to explain:

“At Duisburg, our work really splits into two categories and two areas, both of

which emanated from master plan exercises. Duisburg is an industrial city on the edge of the Ruhr area. Its significance derives from the fact that it is located at the intersection of the Rhine and Ruhr rivers, which has confirmed its position as a trading port for centuries. It has a huge inner harbour, which links through the Rhine to Rotterdam, and also through to the Danube and into the Black Sea. The inner harbour is a canal harbour, where large barges have throughout the centuries brought wheat and other important supplies into the centre of Duisburg, and this provides the focus for Master Plan B. This harbour is completely lined with warehouse spaces and industrial buildings, right in the heart of the city centre. Over time those industries have changed in character and moved their location, generating in the process a semi-derelict

Clearly, the area of Master Plan B provided a rather unique industrial context, but what about the brief? Did that offer a specific emphasis? David Nelson stressed that the idea of the Master Plan competition was a re-examination of the whole area so that this “unloved” spot could be brought back to life.

This was also true in a more focused way for the area to the east of the city known as Neudorf, which was to become the site of the microelectronics park. In the recent past, the industries of Duisburg have been based predominantly on coal and steel, but these are now both in decline. A few years ago the Duisburg city council decided to investigate alternative industrial operations, with a view to harnessing these to regenerate the city. One of those targeted was microelectronics. The curriculum of the university already included microelectronics courses, while companies such as Nixdorf have research facilities nearby. In addition, a small group of microelectronics companies were already established on the site.

The area of the Master Plan A was predominantly one of residential properties, although the site itself also had a factory/industrial complex on it in former times. From the beginning, the Foster idea was to develop the overall site in a sequence of phases, starting with the Business Promotion Centre at the northernmost point, where it fronts onto Mulheimerstrasse, which links the city centre with the university. As the name suggests, the Business Promotion Centre is intended to promote and develop Duisburg, not only on this particular site but throughout the city as a whole.

When it came down to the actual development responsibility, the Business Promotion Centre was privately developed as the landmark for the entire site. Next came the Telematic Centre, which is further south towards the centre of the overall site, and provides a focus for the whole community in relation to microelectronics. Part of the brief was to create a market-place to accommodate exhibitions and information demonstrating the work of companies on the site. A restaurant and bar have also been included to create a social focus for the entire site.

Both the Business Promotion and Telematic Centres were completed in 1993, and the third phase of the Master Plan for the Micro Electronic Centre (MEZ) was recently completed. This third stage is a much larger development of some 9000m<sup>2</sup>, which is intended to provide very flexible space that will allow the extension of the other microelectronics activities on site. That space has the potential to be upgraded to equal the standards of office accommodation in the first two phases (Business Promotion and

Telematic Centres), or down-graded to an industrial level.

David Nelson explained the nature and function of the Business Promotion Centre:

“This was an unusual and difficult building from the very beginning. For example, there were two components in its design that were seemingly at odds.



Model of Duisburg microelectronics park master plan



Board room at the top of the Business Promotion Centre

One of these was the completion of a damaged existing residential terrace, while the other was the creation of a landmark building in its own right. This meant that the centre had to be a building that could stand alone, but also one that would integrate well with the surrounding residential elements. The project was also unusual in that it seemed to be on the very fringes of the normal German construction process. The whole thing was really more of a research project than just a building. As the design developed, the various systems, particularly from an environmental point of view where the technology was continually changing, had to be updated. This quite often meant redesigning while the building was already under construction.”

Nelson emphasized that the whole subject of environmental engineering is at its most advanced in Germany, where there seems to be a greater concern about environmental and energy-related issues than in any other European country or the world at large.

I was concerned to find out more about the private client for the Business Promotion Centre, and the role that the client had in the formulation of the design brief. It transpires that Norbert Kaiser of Kaiser Bautechnik was the client for this project, and he was simultaneously the mechanical and electrical engineer, the project cost controller, the construction manager, *and* the site supervisor. This meant that the project was unorthodox from its inception. The unusual nature of this contractual arrangement, however, whereby a research project was put together predominantly by one individual working with the



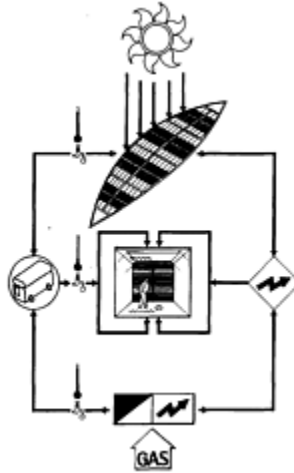
architects, facilitated achievements that would otherwise have been difficult to arrive at. For example, many of the systems developed, as well as the cost of those systems, would have been very different if the Foster partnership had been trying to do this within a typical, normal German construction process.



Night-time view of Business Promotion Centre

What Nelson described as conflicting components in the design of the Business Promotion Centre were seen by the Foster studio as offering a demonstration that good

architecture and environmental engineering could live side by side. In other words, the building had to look good as well as function well from an environmental point of view. The elliptical plan developed quite rapidly from an analysis of the shadow angle from adjoining sites, and also from the problem of tying in with the height of the residential blocks on the east and west elevations. The south-facing curved roof is intended to make the building appear much higher from Mulheimerstrasse and also later to receive solar arrays.



Energy system



Cladding detail showing the triple-skin wall



Clearly, this really was an unusual project both from the point of view of the overall site, the Master Plan context, and the unfamiliar contractual structure. But what about the technical issues? What were the major problems and concerns on that front? Nelson gave the following explanation of Foster design strategies in this area:

“We decided that this project should have a sealed glass external wall, which is unusual in present-day Germany. One of the main reasons for this was the proximity of the busy Mulheimerstrasse on the boundary of the site. To have allowed opening windows in that location would have invited the obvious problems of noise and air pollution within the building. Although the Business Promotion Centre is, from the technical viewpoint, probably the most advanced building we had produced at that point, it does not visually emphasize the mechanical services. We have had a long-standing ambition in the practice to reduce the size and visual impact of building services so that they remain very much in the background. Services should not dominate the architecture they serve. At Duisburg, the interior spaces give very few clues of their technical complexity. The ceiling is a pure white, plastered surface, concealing a whole sequence of water-cooled panels, which take heat away and redistribute it to the external plant. The external glazing is another example, with its three-layer sandwich. There’s a single sheet of glass on the outside, then behind that there’s a cavity containing sun blinds, and finally there’s a sealed double-glazed unit with krypton gas and low-E coatings. The assembly is rather complex in relation to traditional buildings, but its appearance is quite simple.”

The concept of on-site power generation has an economic basis in German legislation that permits power to be generated by individuals who can put their surplus back into the grid for credit. Using gas as an energy source gives a much cheaper unit rate than electricity, and generating your own power dramatically reduces running costs. The heat created is circulated through an absorption unit, which reverses it to cooling, rather as in a refrigerator. Using a similar principle, heat is transformed into cooling for circulation throughout the building. And what were the local responses to these design innovations and technical proficiencies? David Nelson stressed that the city of Duisburg and the various authorities were very positive and helpful. The Foster Business Promotion Centre was described by city officials as the “egg of Columbus”—a reference to an idea that cannot be improved upon. Legend has it that, when asked by the King of Spain to stand an egg on its end so it wouldn’t fall over, Columbus promptly broke the shell at one end, permitting it to stand unaided and perfectly straight. The Foster studio accepted this reference as a fine compliment, and Nelson went on to explain:

“The interesting thing about all of our work in Duisburg is that it’s more than just design tasks. It’s not just a question of pure architecture, because the projects have social, technical and environmental aspects to them as well. This should be true of all projects, of course, but some highlight these issues more successfully than others, and Duisburg is such a project. It’s also very symbolic for the practice because it was our first project to be realized in Germany. When it was started in 1988, awareness of and a focus upon environmental and

energy-related issues began to emerge. Duisburg brought with it new attitudes towards a whole range of projects that came into the practice in the 1990s.”



Micro Electronic Centre (MEZ), 1988–97



MEZ and Telematic Centre



View of the tower from Bethmannstrasse

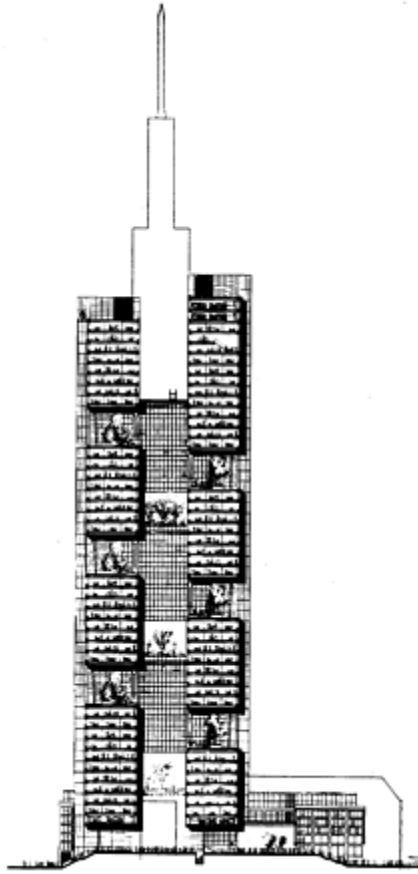
### **Commerzbank Headquarters, Frankfurt, Germany (1991–97)**

At first sight the Commerzbank Headquarters in Frankfurt, completed in 1997, seems to provide the natural development from the Business Promotion Centre at Duisburg, yet in other ways it appears to be the complete opposite in concept. Spencer de Grey explained that this is because the Commerzbank building is the world's first ecological high-rise tower. It was the outcome of an international competition held in 1991, and the Foster design transforms the typical characteristics of a large office building by developing new ideas in the ecology and working patterns of an office environment. The Foster studio, working closely with the bank and city planners, designed every office to have natural ventilation with opening windows. There are generous winter gardens, which spiral up the tower to become the visual and social focus of each four-storey cluster of offices. These gardens are linked to a central atrium, which runs the full height of the building, acting as a natural ventilation chimney for the inward-looking offices. Not only is the internal environment experimental in the Commerzbank, the whole form and structure of this tower seems innovative.

Spencer de Grey commented:

“The plan of the tower is triangular, with each side gently curved convexly to maximize space efficiency, giving the form of three ‘petals’ with a central ‘stem’. All the lifts, staircases and services are placed in the three corners, and the vertical circulation was designed to reinforce the village-like clusters of offices and gardens. Pairs of vertical masts, enclosing the cores, support eight-storey Vierendeel beams, which in turn carry the clearspan office floors. In this way, the offices are free of obstructing columns, while the Vierendeel girders ensure that the gardens are also uninterrupted by structure.”

At Duisburg, there was great attention to detail in relating the Business Promotion Centre to existing surroundings. But how does this ecological tower relate to its immediate environment? The 60-storey tower is just under 300m high, and rises from the centre of the city block adjacent to the existing Commerzbank building. The relationship with the surrounding neighbourhood is again stressed. By rebuilding and restoring the perimeter-edge buildings, where this was appropriate, the scale of the neighbourhood has been preserved. The principal entrance to the new tower is from the north, up a grand flight of stairs. As in the BBC Radio Centre project, the city block containing the tower is opened up by a diagonal route, providing a public space, a *Treffpunkt* or rendezvous for the people of Frankfurt. This takes the form of a winter garden, which houses restaurants, cafés and space for performances and exhibitions. The new route is entered through a gateway on the southern edge of the site, appropriate to the pedestrian scale of the Kaiserplatz. On the north side, however, from the Grosse Gallusstrasse with its larger-scale traffic movement, the tower rises directly from wide terraces of steps that preface its main entrance.



Cross-section showing central atrium and winter gardens



The tower from the central market

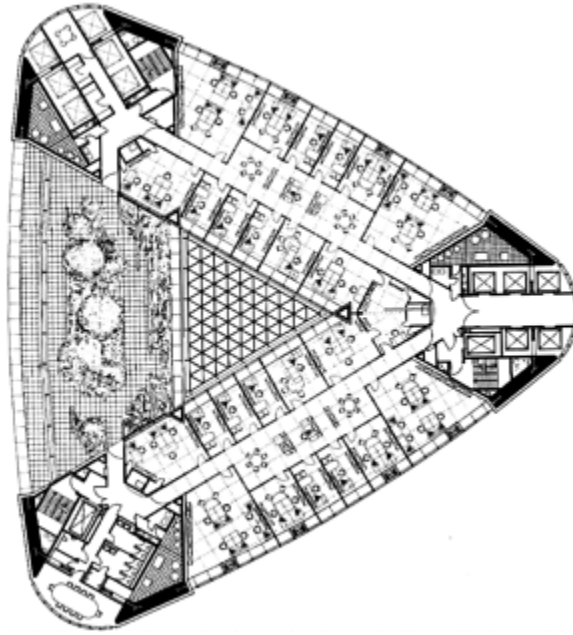




Public plaza restaurant



Winter gardens



Typical floor plan





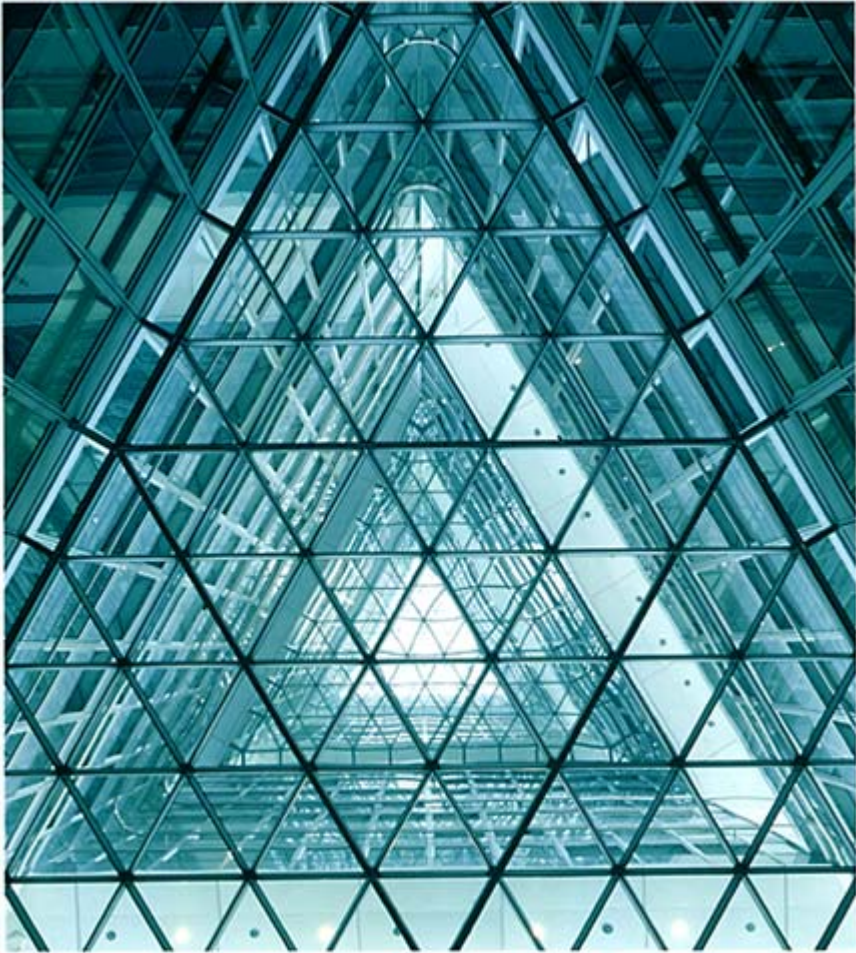
View from the river



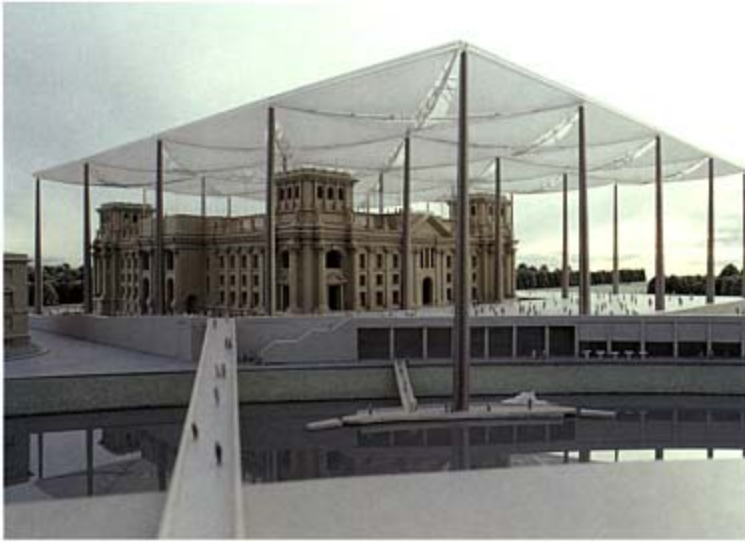
Competition sketch by Norman Foster

This leaves the question of how technology relates to this building as an ecological trail-blazer. The eight-storey Vierendeel girder system, supported only at the building's corners, provides the essential freedom for Foster's planning and environmental strategies within the tower. That again seems to recall Mr Eiffel's tower, and its interpretations in Foster works such as the Hongkong Bank and Century Tower. But in the Commerzbank the external facade is made up of a double-skin, double-glazed curtain wall with opening windows, attenuated upstand panels, integrated glare protection, and rails for a cleaning and maintenance system. The facades enclosing the gardens may also be opened. The double-skin facade, the gardens and atrium provide airy spaces around the office areas, which are protected from unwanted climatic interference—such as traffic noise, glare and overheating caused by direct sunlight, and cold and wind. The result is a healthy office climate, with natural and individually adjustable lighting and ventilation in all indoor areas, which limits energy loss. Building management is an essential part of the ecological system concept for the Commerzbank, yet the level of building management technology remains very low. Heaters, mechanical ventilation equipment and chilled ceilings only have to be activated as supports during extreme weather conditions. Room conditions can also be regulated on an individual basis, and cooling is achieved without CFCs by means of absorption technology. The air conditioning works entirely on external air and excess heat recovery. All the artificial lighting in the office areas can be controlled by the employees in response to levels of daylight available. Thirty-four departments of the bank, at present spread around Frankfurt, will be brought together in

this new building, which has 85 500m<sup>2</sup> of office area, allowing the combination of these technologies to result in substantial economies.



View of atrium from ground level



First-stage competition proposal, 1992

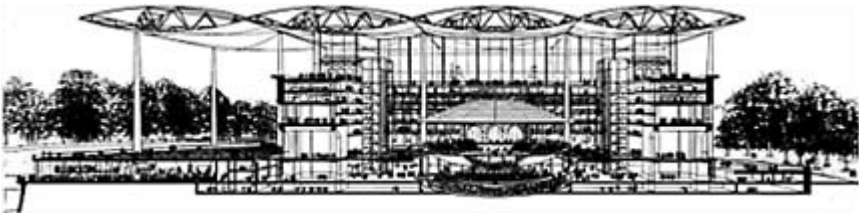
### **The Reichstag, Berlin, Germany (1992–99)**

Following the reunification of Germany, the decision of the German parliament to relocate from Bonn to Berlin was based on a very close vote. Similarly, the resolve to preserve the Reichstag and move the parliament back into the original building was also closely contested. Eventually, these resolutions set in motion an international competition, which was open to all German architects, with the participation of offices from 14 other countries by invitation. Foster and Partners was selected to represent the UK. Naturally, Foster wanted to succeed, although there was a suspicion that, given the political symbolism of the Reichstag, only a German firm could win the competition. To allay his colleagues' misgivings, Norman Foster decided to contact some of the competition organizers and to visit Berlin so he could meet with them and explore both their approach and the proposed means of assessment. (See Chapter 5.) After a number of visits to Bonn, Norman was able to satisfy himself that the judging of the competition would be fair, with the emphasis on design.

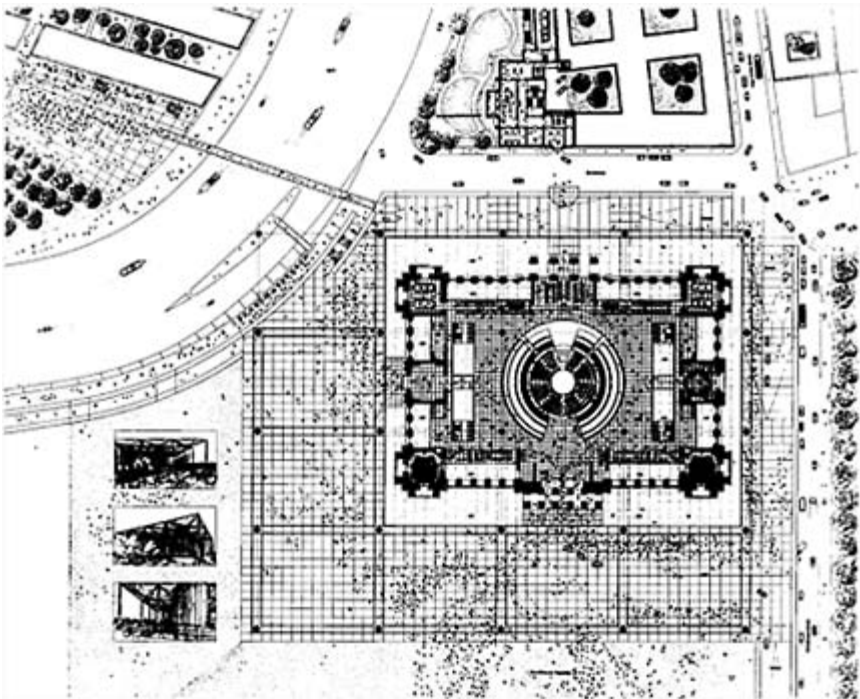
The result of the competition was the award of three equal first-place entries, a success that Foster shared with Calatrava and de Bruijn, while no German architects were included. This splitting of the first place meant that a second stage of the competition was unavoidable. Significantly, a parallel competition for the Spreeborg Area Master Plan was also launched. The Spreeborg plan centred on the projection and location of supporting buildings that would house various government departments. That competition was won by a German architect, the Berlin-based office of Axel Schultes, who produced an extremely powerful concept diagram that incorporated a strong east-

west link just to the north of the Reichstag.

Did the Schultes' master plan, then, have any direct effect on the Foster design for the Reichstag? The answer is a decided "Yes", because between the first and second stages of the Reichstag competition and their correlation with the emergence of the master plan, the requirements of the brief for the Reichstag project were entirely transformed. One direct result of the allocation of the ministries and their building requirements within the master plan was the subtraction of corresponding floor areas from the proposal for the Reichstag project. The consequence was the reduction of the original projected building area of 30000m<sup>2</sup> to less than half that—in fact a mere 9000m<sup>2</sup>. I asked David Nelson how he and his colleagues had responded to such a drastic revision in the requirements, and he told me:



First-stage competition, north-south section



Site plan

“We just had no alternative but to abandon all our ideas from the first stage, and start again. It’s important to stress that you should never have too much emotion about a scheme until it actually becomes the final project. There’s always a danger of falling in love with some idea, and not being able to kiss it goodbye! During the first competition for the existing building the organizers had put in the brief an area that was twice the size of the Reichstag. Naturally, this encouraged competitors to think in terms of extensions and ‘add-ons’. In our case, it led to the proposal to demolish the interior and rebuild it at a greater density. You have to realize that the mood of Germany had slowly but significantly changed, following reunification. What had originally been an exciting political concept was now coming under closer scrutiny within a climate shaped by economic realities. There is no doubt that the concept of realizing a more modest proposal for the building was quite central to the thinking of German MPs at that point in time.”

There is a sense here of a brief that changes in response to events. Perhaps this is something that reflects the various shifts of power and emphasis that have accompanied *Wiedervereinigung*—the German reunification. Clearly this project, by its very nature, could never be an easy one. The political issues alone were very complex. Obviously, all the interested parties had their own views, and the pro-Bonn lobby in particular was very active.

But what exactly did the submission for Phase 2 involve? Did Fosters prepare a single design for this second stage? One of the problems was that there was no fixed budget. Although Norman requested one, none was available. Four alternative design solutions were therefore prepared, with a range of estimates to show how more or less work could be carried out on the building. In addition to meeting the design conditions, there were two special requirements necessary for winning the competition:

- 1 the winner had to develop the project from stage 3 onwards (effectively, from the winning scheme stage) in a Berlin project office to be shared with all the consultants; and
- 2 the winning architect had to act as general planner for the project, which included taking responsibility for construction management and all the other consultants.

That certainly seems to have spelled out the architect’s responsibilities pretty well, but what about the client? Just who is the client for this project? David Nelson explained:

“In the first stage it was the Building Ministry. But it was intended that a new company eventually be formed to take responsibility not only for the Reichstag, but also for all the other new government projects in Berlin. In addition, a building-user group was established to act as a sub-group to the building committee. Its members are MPs and civil servants and its purpose is to keep an eye on the developing design. During the second stage we really had to learn just how the German parliament works. This knowledge was to become extremely useful. For example, we were able to suggest how the “faction rooms”, the very large committee rooms where MPs discuss policy, could be



accommodated within the building, as they had been in the original Reichstag, rather than in a separate structure. This concept, with its great convenience for MPs, was included in our third option for stage 2, the one that was adopted.”

A very good working relationship with the user group was established through this process, which meant that the design developed fairly rapidly, with most of the internal planning being agreed within a six-month period. But where was the design team based during all this time—London or Berlin? David Nelson confirmed that phases 1 and 2 were completed with the team based in London. That work was commenced in June 1993 and completed by the end of March 1994. This phase of the work was then extended in a number of specialist studies that were required by the users—particularly concerning the roof form—and these lasted until June 1994. The majority of the team members then moved from London to Berlin, to an office right opposite the Reichstag. Nelson quipped: “You can’t miss it, it’s the building behind the flag in the famous 1945 photograph.” Soon after that, Fosters ceased to act as general planner for the project and reverted to their normal role as architects.

As work progressed, the significance and emotional impact of the Bundestag’s impending move back from the West German capital of Bonn to the Reichstag in the original capital of Berlin gave birth to a desire to symbolize and memorialize the re-establishment and re-unification of German government. Sensitive to this heart-felt need of German MPs, Norman made some sketches indicating how the central part of the Reichstag could be formed to provide a significant feature immediately above the



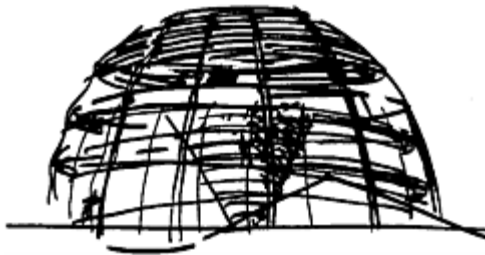
Norman Foster views the Reichstag wrapped by Christo and Jeanne-Claude,  
June 1995



Photomontage of final design scheme

Members' Chamber, a summation to the rebuilding of the Reichstag, an expression of the very centre of this new German endeavour. David Nelson recalled:

“The idea was to extend the chamber through to the roof beyond. Natural light had always been an important part of our design concept so it was a logical development. This was to become an integral part of the energy concept as well as fulfilling a symbolic role—marking the transformation of the Reichstag to New Bundestag. At night the mirrors which funnel daylight into the chamber would work in reverse—acting as a signal on the skyline to show that Parliament was in session. There were obvious analogies with lighthouses and beacons. This solution also combined ramps to a high-level public viewing platform which worked well with the location of the restaurant and public terraces at the main roof level. Norman’s first interpretation of these ideas took a drum-like form. When this was presented to our clients, however, although many liked it, it also gave an opportunity to those dissenters who favoured a copy of an antique dome or something like it.”



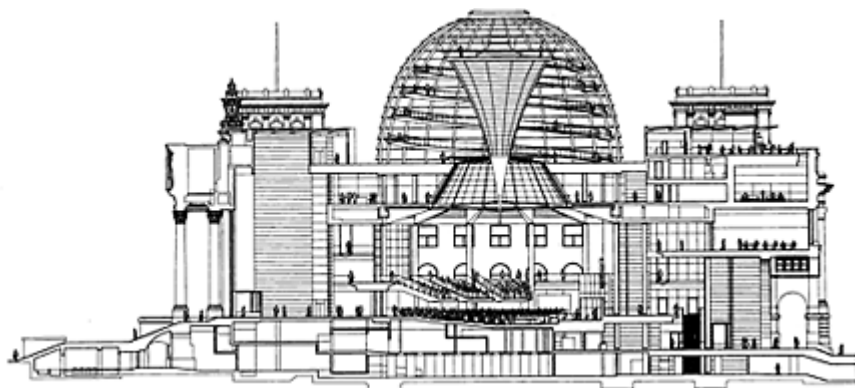
Concept sketch of dome by Norman Foster





Model views

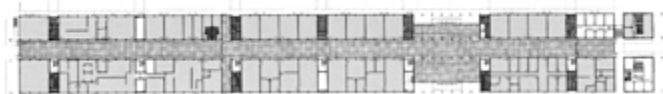
The debate over the form of this rooftop symbol became intense and very political. Some more extreme members even supported a proposal by another architect to reinstate a copy of the original 1894 dome. Eventually a structure that was closer in its outside appearance to a dome was prepared in a response to the Building Committee, which was steering the project. From the beginning Foster had vigorously and publicly opposed the idea of recreating the empty gesture of a dome—historic or otherwise. His solution that was finally to prove acceptable to both the client and architect is the opposite of a vacuous dome. On the contrary, it is a highly integrated structure which combines air extracts, natural and artificial lighting as well as public routes and vantage points. This design concept has been subsequently refined through extensive wind tunnel testing but, looking back, it is clearly rooted in the earlier drum-like proposals.



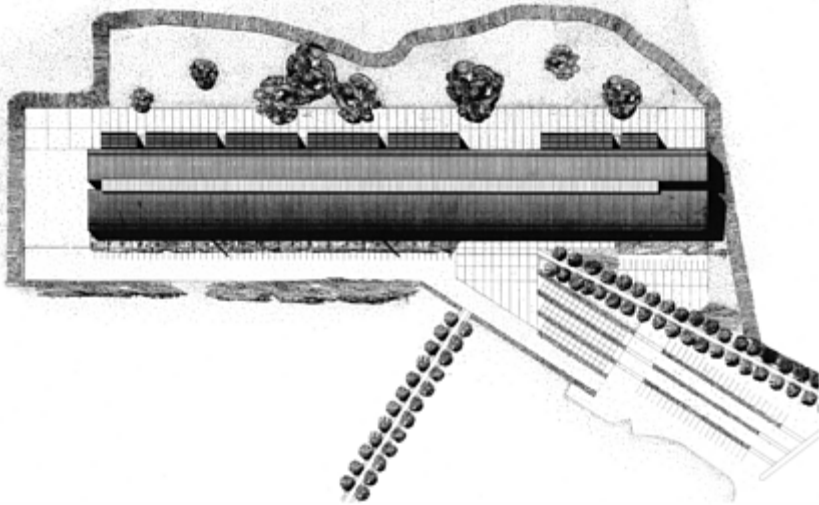
Cross-section showing main entrance level reinstated



Photomontage of final proposals



Ground-floor plan



Site plan



The south-facing facade

**Lycée Albert Camus, Fréjus, France (1991–93)**

A *lycée polyvalent* is a sort of “bridging school” that offers partly vocational education to students in their final three years of the normal lycée. The Lycée Albert Camus, the 2<sup>e</sup> *Lycée Polyvalent Régional de Fréjus* (in the Quartier Gallieni adjacent to France’s Côte d’Azur) has places for 900 students, with specialized teaching spaces as well as traditional classrooms. Fosters were invited to participate in a competition at the beginning of 1991, and the studio was confirmed as the winner the following autumn.

When I visited this building in October 1994, I was struck immediately on approaching the entrance, going down from the road through the vine-covered motorcycle park, by a similarity between the Fréjus concept and what has been described as the “Corsica House”. By this I mean the whole notion of keeping the building profile low on the approach or “blind” side, then opening up to the south and the view. Also, there is the use of the great overhanging sunshade again on the south side at Fréjus, with its curving profile of *brise soleil*—only at Fréjus it is metal rather than wood.

Fréjus is a rapidly expanding town, and its increase in population was behind the decision to build a *lycée polyvalent*. The site for the *lycée* straddles a hill, with fine views out to both the sea and the hilly landscape. The Foster design is linear in form, running east and west and capitalizing on the fine views to the south. The plan is based on the idea of a street, with all the classrooms opening off it. This “street” provides the social focus for the *lycée*. Externally, as I noted, the building is literally rooted in the landscape by careful tree-planting, through which the tree-forms echo the sweep of the roof.

But was this rooting of the building into the site, this seeking after organic form, the only design generator for the *lycée*? Spencer de Grey said:

“No, because we also considered the problems of the hot climate of the south of France. The method we chose for ventilating the *lycée*, for example, relies on the techniques we find in traditional Arabic architecture. We decided to use a concrete structure to provide the thermal mass that would absorb the temperature variations. This led in turn to the choice of an architectural form that would enhance natural ventilation, using the stack effect, therefore avoiding the need to ventilate the building mechanically. In addition, the two-storey internal street creates a sort of “solar chimney” to induce the flow of air through the building. Another traditional feature, a *brise soleil*, is also used to create shade on the south elevation.”

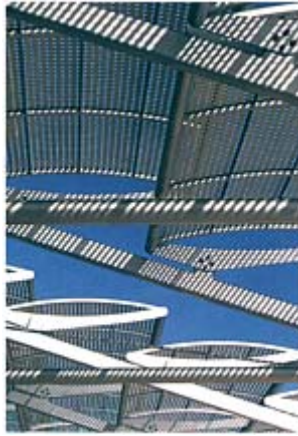
And what about the construction? Did this job present any special challenges or opportunities? Spencer told me that the timetable was tight, and the need for rapid construction was met by using a simple, repetitive concrete frame. This permitted maximum efficiency on site by allowing the sequences of construction to follow one right after another. The construction programme required the completion of a 243m-long building containing 14500m<sup>2</sup> of space in less than 12 months. Construction began on site in September 1992 and was completed in August 1993. The school was built by a local Fréjus contractor, Sobatra SA, which is a division of Nord France. Fosters maintained a full-time on-site presence throughout the project to control the quality of the finished product. By taking full advantage of the structural repetition, both the time and the cost for the construction were reduced. The school was completed within the client’s budget,



with a final construction cost of 80000000 francs, which was 5000000 francs below the original budget. But this is only the beginning to the planned economies, because the architects believe these will continue to accrue throughout the life of the building.



The brise-soleil and teaching terraces



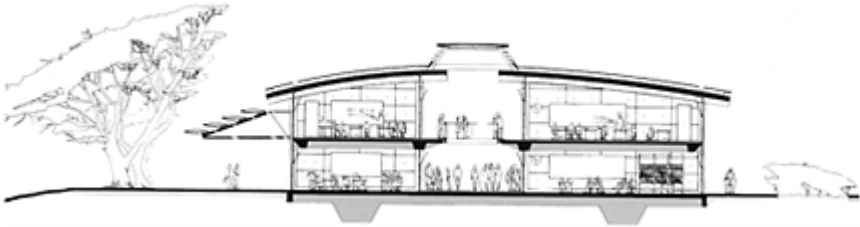
Brise-soleil detail

With reference to the structural design, it is important to note that the building's plan, with its long central street, gave the possibility of combining economy with elegance and speed of construction within the structural system, which was developed with Tony Fitzpatrick of Ove Arup and Partners. All this was achieved despite the fact that Fréjus is located in an earthquake zone. This meant that a series of modular structural units could envelop the various internal spaces at a construction cost comparable to that of smaller-span structures—all this by virtue of the repetition of units. Each unit contains a vaulted concrete roof shell, which uses the full length of the vault to span directly onto columns. At the first floor the construction is a regular concrete ribbed slab, with its columns located only along the street and the external elevations. The use of concrete gives a high thermal mass and radiant cooling to the building, and both of these features make a significant contribution to the building's low-energy profile. Also, the repetition of the modules allowed multiple use of high-quality formwork, producing excellent-quality finishes at an economic cost.

Spencer had mentioned the special problems of a hot climate, and the advantages given by the high thermal mass concrete. I asked him to discuss some of the other environmental issues, and he outlined Fosters' design aims. These centred on the provision of a comfortable internal environment throughout the year, with maximum use of passive environmental systems to heat, cool and ventilate the building. Those aims naturally dictated requirements, which were then incorporated into the architecture. The east-west axis of the building ensures good self-shading, and simplifies the external design of solar shades. This in turn reduces the heat gains to the building from the sun during the summer, but allows the low winter sun to penetrate into the building to provide some heating in that cooler season. The heavy concrete structure is largely exposed on the building's interior, allowing it to absorb heat and reduce the rate of temperature change within the building.

Spencer emphasized that the double-storey height along the street between the classroom blocks stimulates ventilation and allows daylight to penetrate to the internal

“facades”, while the classrooms are arranged on either side of this internal street with large adjustable opening lights on both external and internal facades that provide controllable natural ventilation throughout the year. The well-insulated concrete roof is covered by a metal membrane, while the air space between the two is ventilated to reduce any solar gain that penetrates to the interior. Mechanical ventilation is provided only where required by room function: for example, kitchens and laboratories. Air conditioning is available within the hotel training and catering areas, where required by the client, while the heating system uses conventional radiators supplied by a gas-fired boiler. All the major services are distributed within the undercroft or through service cores, with the final distribution generally concealed in the floor and the roof structures.



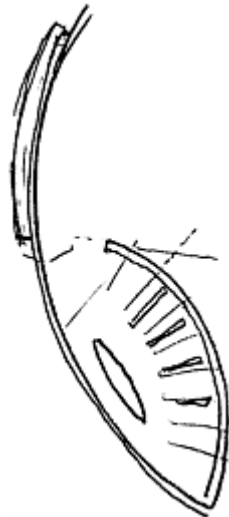
North-south cross-section



The central internal street from the main entrance

### Le Musée de la Préhistoire, Verdon, France (1992–99)

Although I have seen the model of Le Musée de la Préhistoire for Verdon, I have only a very general idea about this project. Therefore I asked Ken Shuttleworth to tell me something about its location, and how this building fitted into the site. He told me that the Foster design for the museum was directly inspired by the landscape that surrounds Quinson and the immediate area of the site itself, and that the proposed form of the museum involves a precise and deliberate incision into that landscape. That sounded like a familiar Foster strategy, reminiscent perhaps of the “Crescent” extension to the Sainsbury Centre. Shuttleworth agreed that there may be similarities, only at Verdon the obviously man-made intervention actually echoes the prehistoric gorges and the natural formation of the Verdon ravines. Fosters felt it important that a museum of this significance should be readily identifiable through its form. The purposefully graphic image of the plan therefore becomes the signature of the museum. This simple form, etched into the terrain, is a symbolic gesture that is intended to herald the formal presence of the building. The design of the building is then cut into the landscape. This required adjusting the adjacent contours until the two-storey building appears almost completely buried. Very little of the museum is visible from the surrounding area, with only the tall retaining walls that jut up above the earth to frame the entrance and announce the building’s existence.



Concept sketch by Norman Foster

The idea of cutting into the earth like that seemed to suggest, appropriately, an archaeological excavation. This should certainly be a fascinating museum. But what about its internal organization and spaces? I asked Ken Shuttleworth to explain how they



fit into the overall concept. He told me that, internally, the museum is organized on two levels, on one side only of a vast, top-lit, elliptical space. At ground-floor level this internal hall is open to all visitors, and forms a focus for reception, restaurant and public information, which are all open to this lower floor, allowing everyone free access to those facilities. The private spaces for research, administration and workshops are also at this level, but separated from the public areas behind clear glass screens. In this way, the public will be able to observe all the workings of the museum's organizations without interfering in any way with their operation. The main museographic circuit is located on the mezzanine floor, above the private areas. A long ramp, which begins in the central space and follows the curve of the high concrete wall, will take the visitor from the elliptical hall up to the museum at the mezzanine level. The museographic area at the upper level follows the brief in providing a collection of one-and two-storey internal spaces. The Foster design provides for natural light to the routes between those spaces. At the same time, the proposal allows complete flexibility in the arrangement of those spaces, which can reflect any desire for reorganization. Ken directed my attention to the model:

“Our design for the museum is based on the total integration of public and private areas that are gathered around a focal two-storey atrium. Natural light is a feature of this arrival/communications atrium, and in the main circulation areas, but natural light is restricted in the exhibition spaces, where it is not needed.”

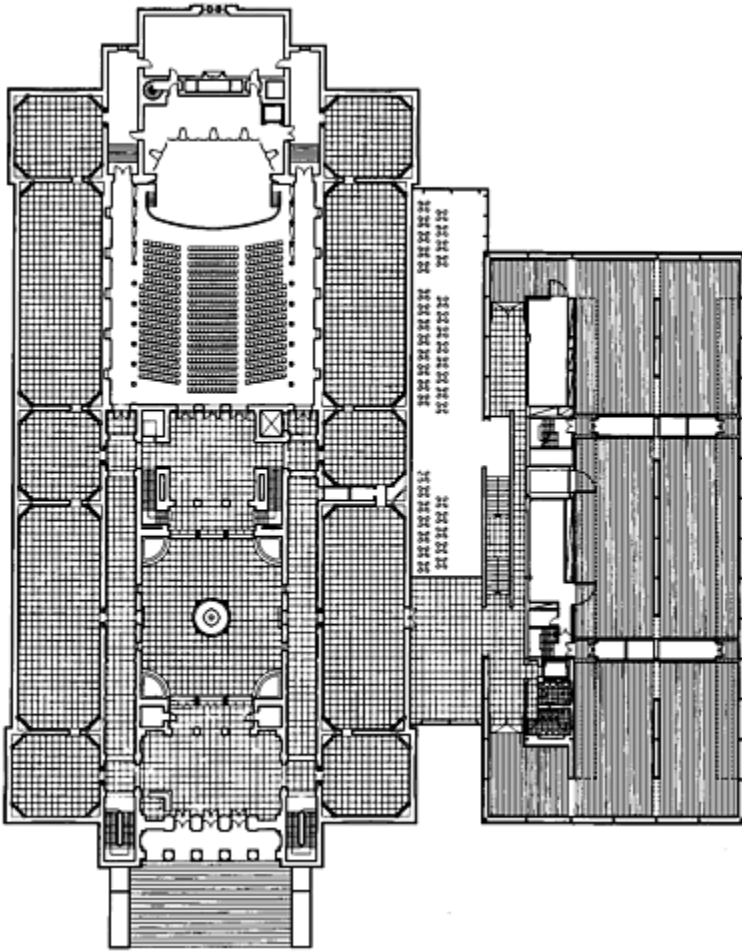
I was interested to follow up on Norman's earlier remarks about the Joslyn Museum, so I asked David if we could have some more detailed discussion of this project and its special problems. David said:

“We should begin with the client. There are many ways for a client to select an architect. Sometimes, with the aid of professional guidance, the client adopts the most logical process. Well, the Joslyn Museum board decided on a selection process; then Graham Beale, the curator, and Mrs Cohn, a key member of the board, together with their advisor, Bill Lacey, not only visited all the architects on their short list but also went to see actual buildings they had built. After this preliminary process, all the short-listed architects were interviewed in Omaha before the final selection was made. When the client uses such an approach, the message the architect receives is that this project is very real, and the client cares so much about it that no time or effort will be spared to get it right. The first time I went to Nebraska, Graham Beale was on vacation. Audrey Kauders and Marsha Gallagher took care of me instead and gave me a wonderful tour of the building. It was stunning—both spatially and in terms of construction quality. The stone detailing of the Joslyn Museum is exquisite, and reminded me of the quality in Santa Maria della Spina, on the banks of the Arno at Pisa. After such an introduction, we didn't need much encouragement to take on the project. The basic problems my hostesses revealed to me on that first visit—humidity control, the difficulty of serving food in two locations simultaneously, where to store packing cases et cetera—were balanced by their own deep

appreciation of the existing building and their awareness of its role in the community.”



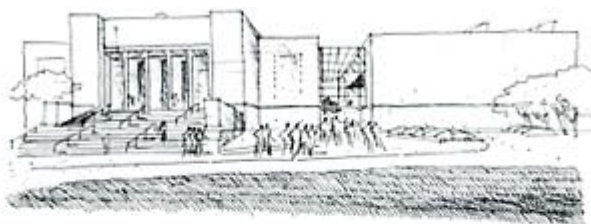
Aerial view of site under construction



Gallery-level plan

### **Joslyn Museum Extension, Omaha, Nebraska, USA (1992–94)**

Norman had given some indication of the innovative remedies that have been applied to these problems, but I wanted to know just how Fosters approached this important first American commission. David Nelson told me they had decided at the outset to produce a comprehensive strategic scheme. They believed this was the best way to demonstrate that they really did understand some of the museum's problems. The approach was successful, and they were appointed. But they still had to convince the entire museum board that the absolutely right solution had been identified. They therefore



Sketch by Norman Foster (above), cross-section (centre) and entrance (below)



Atrium restaurant between old and new buildings

examined other options for extending the museum to ensure they had found the best approach to the design.

I asked David to describe the range of options for the development of the Joslyn Museum. He told me that these were basically three:

- 1 to create more available area in the existing structure;
- 2 to explore an underground extension; and
- 3 to build a totally independent new pavilion.

In Fosters' view the first option would have only worked if the Joslyn board accepted inferior quality of space. Major changes to the existing structure were also difficult for various reasons. Reduced areas and other reductions in the programme would also have resulted from the implementation of this option. The second option meant building underground at various locations around the original museum—a strategy not unlike the one used in the Sainsbury Centre's crescent wing. Although this proved popular with some of the Joslyn board, the major problems included:

- 1 higher cost;
- 2 difficulties in gaining access and in providing satisfactory links with the existing building; and
- 3 impediments to food service and the moving of works of art from space to space.

Did this then mean that the third option had distinct advantages over the first two? David shook his head, although he admitted most people did believe that to be the obvious solution. In addition to the fact that it shared most of the access and connection problems with option 2, the totally independent building had major architectural implications. In the first place, it would have resulted in a direct confrontation with the existing building. Fosters believed that such an approach was inappropriate, because it would have generated a "conflict of significance". It was therefore rejected, because Fosters decided that the new extension should architecturally support the existing building and not compete with it. This only left Fosters' original concept of a new extension or wing directly attached to the original building. By relocating the northern car park, the emphasis of the overall site was switched back to the original front of the building, restoring to the original main entrance its truly dominant emphasis.

I asked David how they went about making this connection, this conjunction of the old and new at Omaha, and he told me that the new galleries and accommodation for the handling of art works are in a new block adjacent to the existing north entrance, with the height of this extension the same as that of the two flanking sides of the original building, but lower than the main entrance. This elevational composition guarantees the visual importance of the original museum. Between the old and new there is a linking space enclosed by glass, which provides a new entrance and restaurant. The light, transparent character of the link was chosen to minimize its visual impact on the original building. The old and the new are also coordinated and integrated dimensionally into the overall composition.

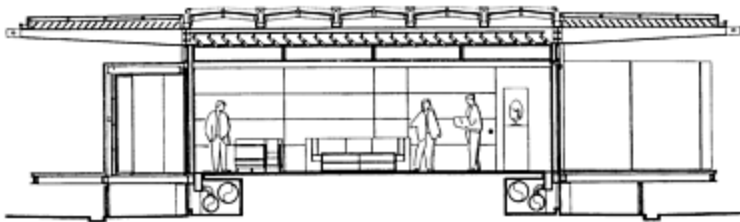
Integral with these problems of character, proportion and appropriateness of height and weight, the architects also had to deal with the question of material. In this connection there was a special difficulty to be overcome with reference to the choice of stone for the

new wing. From the very outset, Fosters' intention was to use the same stone as that of the original building—Georgia pink marble. Luckily, the same quarry still existed, but obtaining new stone to match the old was a different matter. Fosters worked originally with a local agent for the Georgia Marble Company, but he was not an expert in the technicalities of surface finishes. The result was that when the first samples arrived from the quarry they seemed much lighter than the original—in fact they were almost white.

There were a number of interesting and divergent accounts about the subsequent problems encountered in obtaining the correct stone and matching its appearance with that of the original Joslyn Museum. I therefore decided to leave this question for my final discussion with Norman Foster (see Chapter 5).



Main gallery interior



Cross-section through house





Bedroom

### **House in Japan (1986)**

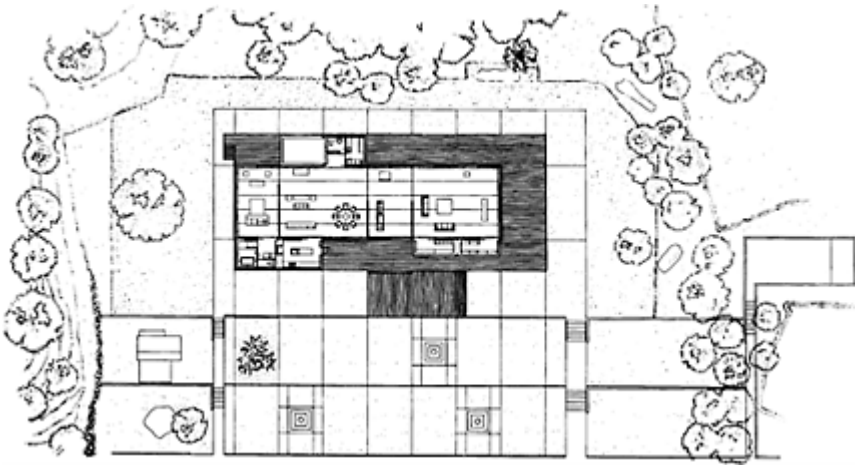
Japan has, of course, long held a deep fascination for Western architects, but it is important to understand exactly how the Foster studio became involved in Japan and Japanese culture. While the Hongkong and Shanghai Bank was being developed, a number of the bank team members first came into direct contact with Japan. Norman, Roy Fleetwood, Ken Shuttleworth and David Nelson all spent a great deal of time there developing components for Hong Kong. They followed close behind Norman, too, in visiting Kyoto and Nara. As David Nelson observed:

“Those temples and gardens not only raise your spirits and catch the imagination, they also succeed in making indelible marks on you as a designer. Qualities of light, and more particularly shadow, the interdependent relationship of inside and outside space, the use of consistency of materials—these are the touchstones of a humane and spiritual architecture that seems largely lost to us in the West today. But that was only the beginning of the problem. Having made our observations, and having been tempted by Japanese imagery, you become impatient to use this new-found knowledge, and can’t wait to find a means of expression. But translation is no easy task. Any literal attempt can easily appear *ersatz*, or at best misplaced.”

I asked David to give me an example of these translation problems. He remembered Ken

being so besotted with gravel gardens that he decided to build a small one in Belsize Park. Passers-by just loved it. But overnight it became the most popular cat litter in North London. David suggested that perhaps translation can only really work at the subconscious level. The “oriental” feeling that people have attached to the Hongkong Bank and Century Tower was never consciously intended. The “cathedral wall” of the ITN atrium, with its magnificent “Japanese” translucent quality, masterminded by Ken (this time subconsciously!), grew directly from the desire to screen out the adjoining, ugly buildings. After the Hongkong Bank was completed and the team was largely relocated back in London, a keen interest in Japan still persisted. The only thing lacking was an opportunity, and within less than nine months it came. Century Tower was the main project, of course, but linked to it was a smaller headquarters building for Obunsha and a private residence.

Until recently, this house design has been kept a



Site plan

guarded secret, and I was curious to discover just how its design and development fitted in with progress on Century Tower. Apparently the development of the house was undertaken almost in parallel with Century Tower, although the progress on the house was slower, owing to land availability and negotiations with various authorities. David pointed out that, in Japan, the design of a private house is a very personal experience for the owner. The architect is cast in both a leading and supporting role, and the entire process is centred on a dialogue between the two. It consisted of Norman’s presentations, usually in a rather formal atmosphere, followed by more informal discussions, which were usually held over dinner in a traditional Japanese restaurant. From the beginning Norman separated the presentations into two parts: (1) the house; and (2) the site and landscaping. Although their designs were, of course, evolved together.





Living area

I wondered what was discussed on those informal occasions over dinner, and David said:

“Oh, well, anything from the merits of ornamental nail covers in traditional timber construction to the problems of maintenance in timber hot tubs, and the subdivision of rooms or covered external spaces. And, clearly, the ‘literal translation’ was beckoning at every turn. We were forced to analyse exactly what were the essential ingredients of traditional Japanese architecture and which of these were more relevant today. This challenge was also two-directional. What was it that we could bring from the modern Western world that would make a comfortable fit with the ancient East? As the design developed, many of these issues became clearer, both to ourselves and to the client. The house was later described by our client, during one of our informal discussions, as ‘a modern home with a direct link to eleventh-century Japan’.”

Norman had the following comments to make after my discussions with David.

“Imagine a space—rectangular in form and generous in its proportions. This is the main space and it is lit by natural light from above. Depending on the time of day, the weather or the season of the year, the amount and quality of the light can be modified by adjustable louvres in the ceiling plane.

Wide variations of appearance are possible. For example, the ceiling can be tuned to appear translucent, creating a soft even glow. At the other extreme, this ‘light box’ can be adjusted to cast dramatic shadow patterns on the walls and floor planes. As night falls, artificial lighting in the roof opens up a new range

of possibilities; spotlights can emphasize pieces of sculpture or paintings and background lighting can offer calm settings for relaxing.

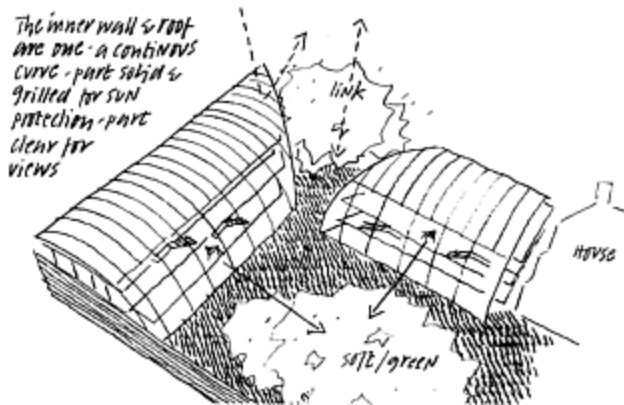
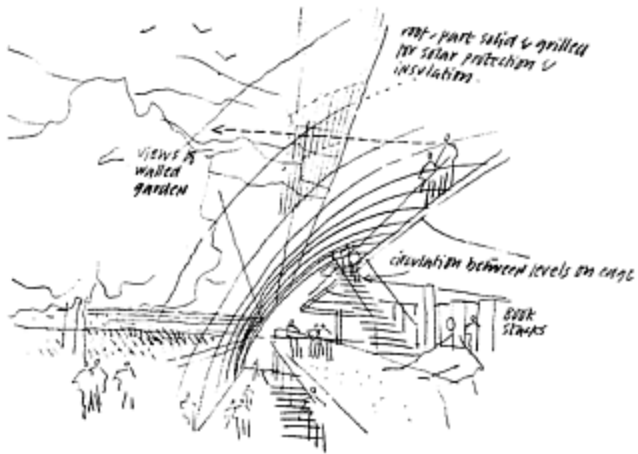
On the long edges of the space, there are smaller secondary areas such as kitchens, bathrooms and plant rooms. In between these secondary rooms the walls are transparent, just like the ends of the dominant space. Through these planes of glass there are long views to the greenery of nature beyond.

My description could paint a picture of two buildings. One, small and domestic, is the country home for an art collector in Japan. The other, much larger and public, is the Sainsbury Centre for Visual Arts at the University of East Anglia, in Britain.

Of course, both projects are dramatically different in appearance. But what the French might describe as the *parti*—what I might enthuse about as the ‘spirit’—are really the same, although each is specific to its own particular place. It is the shift in scale that allows this shared diagram to enjoy such an intriguing double life. One could play a fascinating game by charting the links and points of departure between the many other projects which have been debated by all of us with Malcolm during the preparation of this book. But that is probably another book in itself.”



Exterior view



Concept sketches by Norman Foster

New Faculty of Law, Cambridge University, UK (1990-95)

Cambridge University has an outstanding record of commitment to modern architecture that goes back almost half a century. Time and time again, Cambridge has taken the lead in appointing the best contemporary architects to design its new buildings. Now the Foster project for the new Law Faculty reveals itself to be one of the most striking and innovative university buildings of the 1990s. Spencer de Grey had the main responsibility for this design. He is a Cambridge graduate, and I asked him to tell me something about the context for the Law Faculty, and how Fosters have responded to this challenge. He made the following observations:

“The project is at the very centre of the Sidgwick site, with its fine lawns and mature trees, and adjacent to Jim Stirling’s celebrated History Faculty [1964]. Our aim has been to preserve this enviable context, while giving the Faculty of Law a new focus. The building includes the Squire Law Library, five new auditoria, seminar rooms and common-rooms, as well as administrative offices. Close by are the Institute of Criminology, the University Library, and the principal Arts Faculty buildings. This project is confirmation of the university’s desire to provide the most up-to-date facilities for teaching and research.”

In terms of context and conservation, before getting down to the design I wanted to explore the problems of fitting the new Law Faculty into its surroundings. To ensure that the new building does not intrude upon the established skyline, there are only four storeys above ground, with a further two floors below ground level. Spencer, however, assured me that it would have a *gravitas* appropriate to its purpose, which Fosters aimed to achieve by the use of beautiful and durable materials. The single rectangular plan form is terminated dramatically with a diagonal cut to respond both to the form of Stirling’s History Faculty and to the fine trees on the lawn in front. The ground floor has administrative offices and study rooms for the teaching staff. Below ground the two floors are taken up by the auditoria, book stores and the student common-room, and these are all lit naturally by a full-height atrium amplified by structural glass floors on the north edge. The interior is designed to be a luminous and highly efficient space, which is unified in theme but also carefully considerate of the range of activities it houses.

But what about the structure? Are some special structural features or techniques used to achieve these design objectives? Spencer confirmed this:

“The structure has been designed by Anthony Hunt Associates, and it incorporates both *in situ* and precast concrete elements to achieve a high degree of tolerance combined with quality finish. From the board piling and deep basement construction, five raking columns rise up to support the northern edge of each floor. Precast beams then allow these floors to span, uninterrupted, onto concrete riser ‘cores’, which support and brace the southern perimeter of the structure. The concrete floors are enclosed above ground by a triangulated steel Vierendeel structure, cylindrical in section, to which the cladding systems are fixed. This triangular format allows the repetitive use of a single-glazed panel size. The triangular form was developed to maximize structural efficiency.”



Exterior view

I wanted to know if the technological features are also linked to these structural innovations, and Spencer explained that, on the exterior, the curved layout of the north facade's structural silicon glazing develops into a stainless steel roof, while the east and west facades are also finished with glass, which is treated to combat solar heat gain and glare. As a function of the triangular steel-work geometry, the west wall forms a sinusoidal curve in plan. Reconstituted Portland stone is used to clad the south facade, reflecting the solid form of the building opposite. The Law Faculty offices are then clad with translucent glazing incorporating clear horizontal vision strips, which also include opening windows for natural ventilation. The Law Faculty is evidence of the partnership's strong commitment to education. Equally, it embodies Norman Foster's concern to create humane modern buildings that offer positive responses to their surroundings, while addressing the needs of an energy-conscious client.



Atrium, with library staircase (top); interior of staff and library reading areas (centre); cross-section (below)

I asked Norman Foster for his comments. I was interested, in particular, in the garden context of the new Law Faculty. The fact that this not only connects it directly with the monastic, collegiate tradition, but also plants it, as it were, within the realm of the farmhouse and its union with the walled garden.

“The building is surrounded by lush lawns and mature trees and its near neighbours include James Stirling’s wonderful History Faculty building. This low, green garden context is the essence of Cambridge. An important consideration for us, therefore, was to minimize the apparent size of the building on its site and to preserve its natural setting.

Looking at the building, it is quite deceptive. It has a relatively small footprint, yet it provides 8500 square metres of accommodation and does that without going above four storeys. That was partly achieved by digging the

building into the ground, so that its physical mass is reduced, but its curving glass facade also allows it to recede visually.

Its rectangular plan is cut on the diagonal to respond to the pedestrian routes across the site and the form of Stirling's building. The cross-section is manipulated to allow us to get natural light and views to the lower levels, while burying the lecture theatres below ground. The library occupies the top three floors and enjoys uninterrupted views of the gardens. A full-height atrium forms the focus of the main entrance and visually links all the different levels to create a feeling of spaciousness within what is a tightly configured building. Natural lighting is an important part of the equation and it is used to dramatic effect, especially in the library.

Externally various devices provide sun-shading, and the building incorporates opening windows for natural ventilation. These factors also contribute to the building's energy efficiency. The combination of its partially buried structure and an exposed concrete frame means that the building has a high thermal mass and is therefore slow to respond to changes in outside temperature; together with the high insulation values we were able to achieve, this allows it to rely on mechanically assisted natural ventilation throughout. The only spaces that require occasional additional cooling are the lecture theatres.

We have also installed a lighting management system to reduce energy consumption, while heat recovery coils, linked to the air extract, reclaim heat from the extracted air. Interestingly, the building's environmental performance was put to the test during its first summer—one of the hottest on record—and I am happy to say that it performed extremely well.”

It is clearly a matter of pride for the citizens of Barcelona that among all the benefits to accrue to their city from the 1992 Olympics there is nothing to rival the Collserola Tower as a symbol of Barcelona's new, vibrant and ambitious spirit of the 1990s. It is important to realize that Barcelona is the foremost metropolis of the entire Mediterranean coast. Its citizens have traditionally gone up to the mountain of Tibidabo to escape the pressures of modern urban life, and they have taken the northern route into the mountains instead of south to the sea because, for a century or so, Barcelona has been largely cut off from the sea by a vast sprawl of industry and railway tracks. Tibidabo, on the other hand—with its bars, restaurants, Church of the Sacred Heart (an ornate confection from the early 1900s) and observatory—has something for everyone. On hot, still days, the mountain is a refuge from the smog that sometimes blankets the bowl of the city.



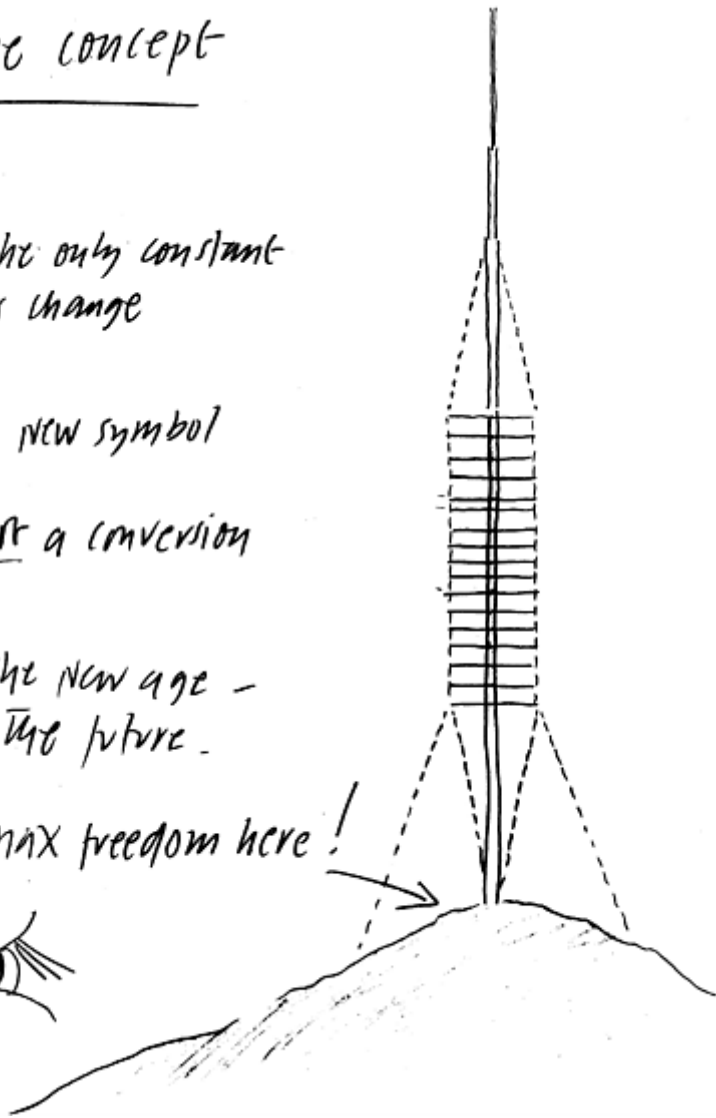


Senior Common Room



## The concept

- The only constant is change
- A new symbol
- not a conversion
- The new age - the future.
- max freedom here!



Concept sketch by Norman Foster

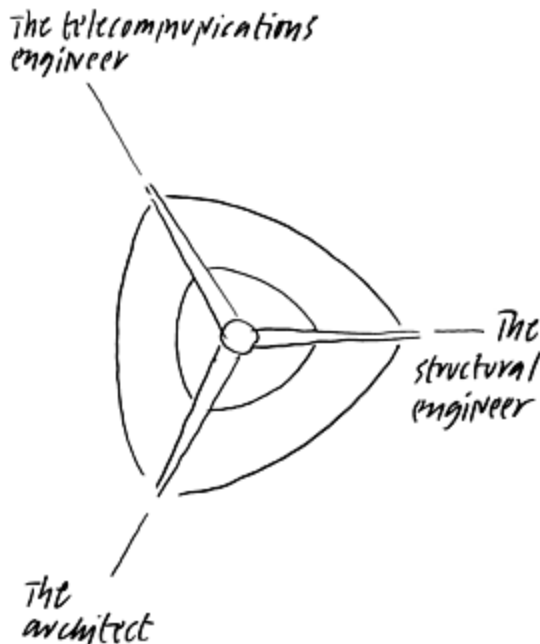
### **Torre de Collserola, Barcelona, Spain (1988-92)**

I therefore asked Ken Shuttleworth what, with the coming of the Olympics and the associated programme to replan areas of the city, had been the attitude of Barcelona and its government to Tibidabo. Apparently, under the leadership of its mayor, Pasqual Maragall, who was in office for more than a decade, the city council (or *Ajuntament*)

committed itself to preserving the hills around Tibidabo as a natural, semi-wild park with its Mediterranean pines. This is the Park of Collserola. On the hill of Collserola, 440m above sea level, sits the Torre de Collserola, which rises 288m into the sky, but it could not have been conceived without the foresight of Mayor Maragall, who is among the most charismatic of a group of new-style European civic leaders. Together with the mayor of Nîmes, Pasqual Maragall has been one of the major civic patrons of contemporary architecture. Since the end of the Falangist dictatorship in 1975, Catalunya—certainly the most advanced region in Spain in modern times—has regained its political and cultural position in Europe. When the national telecommunications company, Telefonica, and the two regional television operators all came to Mayor Maragall with separate proposals for new transmission towers in the area of Collserola Park, he grasped the opportunity to turn this conflict with the natural environment into a project for a new monument for Barcelona.

Maragall, who had successfully secured the selection of Barcelona for the 1992 Olympics, was determined that the profusion of communication towers in downtown Barcelona would not be repeated in the Park of

*The team concept = The design concept*



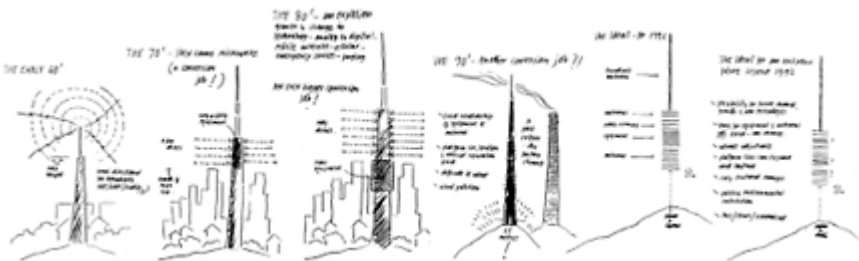
The ideal relationship, sketch by Norman Foster

Collserola. He brought the three television companies together in discussions that lasted two years, and when it became clear that the *Ajuntament* would not give in, the three bodies reluctantly agreed to cooperate. The rivalry between the television companies is rooted in traditional tensions between Madrid and Barcelona, and was intense. Maragall's achievement was therefore remarkable, and in February 1988 a limited competition was launched by the *Ajuntament* for the design of a single new tower—"a monumental technological element"—which would combine the technical requirements in a new symbol that would enhance the image of Barcelona.

The tower project inevitably became linked to the construction programme of the Olympic Games, and it was soon clear that the Foster contribution would have to be ready for the start of the Olympics in July 1992. This meant that the design team had to get off to a fast start, but just what were the ideas and precedents that Fosters considered as they approached the design of this exciting monument? Ken Shuttleworth provided these details:

"We collaborated with the London office of Ove Arup and Partners as engineers. As it happens, the Arup office was almost in the shadow of the British Telecom Tower, a crude yet not unmemorable structure of the 1960s that resembles a circular office block. Certainly, the Arup team must have glanced up at that form from time to time. Of course, there are telecommunication towers in all parts of the developed world—most of them like giant chimneys, with a central shaft that contains all the cables and technical apparatus, as well as the lifts and stairs. But Arup advised that such an approach would require a diameter of 25m at the base, which was totally inappropriate in that environment.

"Norman made a sketch comparing such structures with factory chimneys, those symbols of an obsolete industrial culture. We thought of Centrepont Tower in Sydney, where a slender concrete core is stabilized by a series of cables. Another possibility was a steel mast. While it was necessary to study existing precedents, however, the team was well aware that telecommunications was a field of constant and rapid change. Flexibility was clearly vital in our design. Fortunately, Arup had a telecommunications expert in Bill Southwood."



Sketches by Norman Foster outlining development of telecommunication towers from the early 1960s

My interest was to probe the role of engineering in the design of this project, and I asked Ken for his evaluation. He explained that:

“Engineering is at the heart of any Foster design, although it did not dictate the form of the Collserola project. Norman always insists that, on such a special site, engineering is not enough.” The eventual project director, Robin Partington, has described Collserola as “100 per cent architecture and 100 per cent engineering”, while his counterpart in the Arup office, Chris Wise, defined it as “engineering with an architectural objective”. The demand for a strong architectural idea with memorable impact came, of course, from the tradition of all the magnificent monuments in the city itself. From a purely functional point of view, the future users of the tower (brought together as a special holding company in which the city also had a stake) were concerned above all that it would work well as part of a communications infrastructure serving Catalunya and the rest of Spain. High among the priorities were:

- 1 that the antennae and dishes that broadcast and relay signals should be unobstructed; and
- 2 that the tower be robust enough to withstand the high winds, which can easily black out transmissions: for example, the prevailing wind from the mountains, the *tramontana*, can gust up to 234km/h.

The constraints of the park environment were readily understandable. In addition to the technical and environmental constraints, however, were there other factors that had to be taken into account? Ken commented that the tower design had to be environmentally acceptable, which involved slenderness rather than a massive concrete chimney. And there was also a political dimension, in that the slopes approaching Collserola form a desirable residential neighbourhood, making them a sort of Hampstead of Barcelona. As Robin Partington had observed, the area was packed with lawyers, who could have put up stiff opposition to anything they didn't like.

Although five firms were invited, it was basically a Spanish event. In fact Fosters were the only non-Spanish practice to be involved. The other four included the Catalan classicist, Ricardo Bofill, who proposed an exaggerated classical column on a base, in the Adolf Loos *Chicago Tribune* tradition; and that remarkable engineer architect, Santiago Calatrava. At one stage Norman apparently believed that Calatrava would be the winner, but his entry, which owed a debt to the “Skylon” of the 1951 Festival of Britain, seemed to emphasize architectural form over functional necessity. Calatrava's design combined elegance with formality, but it clearly did not persuade the consultant engineers employed to advise the users.

What then are the persuasive characteristics of the Foster design? How was the London entry so different? Ken explained:

“The Foster-Arup scheme—which has changed little in its realization—consisted in essence of ‘a stick plus shelves’. Basically, it is an exercise in minimalism, as different from the ‘chimney’ towers of the 1960s as the electronic world of the 1990s is from the age of black-and-white television. The basic idea was to start the ‘shelves’ or floors at the lowest level suitable for transmission—defined as 65m above ground. This meant that at ground level

the area of the structure was very small. The middle section of the tower as proposed consisted of a series of floors to accommodate the antennae, dishes and other equipment: to provide the desired flexibility these floors had to be large in area. Above this operational sector, a simple radio mast formed the top section of the tower. To keep the structure minimal, a separate building would house signal-generation equipment and other services at ground level. The tower has a public viewing gallery served by a passenger lift, but security considerations required that public and service access be kept separate.”

In terms of continuity—what Norman calls “consistency”—the Barcelona tower was very much built on experience already established during a previous collaboration. Arups fielded the same team—led by Tony Fitzpatrick and Chris Wise—that had worked with Robin Partington and Ken on King’s Cross, the Rennes Viaduct, ITN, and Century Tower in Tokyo. They devised the structural system that enabled the Foster architectural concept for Collserola to stand up! Norman envisaged this tower as “pure sculpture...the most minimal needle on a sensitive skyline”, but it had to be made to work.

Arups’ design defined the tower’s primary structure as a circular, hollow, reinforced concrete shaft, which carries the whole weight. This is braced by three vertical trusses of high-strength steel. The floors are suspended within this format. Below each floor, the trusses are connected to the central core by parallel-strand steel guys. Above the floors, the guys are of Aramid fibre (which is as strong as steel but does not interfere with the electronic signals). Six great prestressed guys anchor the whole structure to the mountainside. To conform to Norman’s idea of “the most minimal needle”, the top 80m of the tower is a steel mast that tapers to a mere



Looking up the concrete shaft



Exterior view of the lower floors

0.7m at its tip, where a small crane is mounted.

This whole structure is set in a base of reinforced concrete that is 20m across and 5m deep, and carries a load of 10 700 tonnes into the rock. This means that the primary structure has the stiffness of a conventional office tower, the hollow shaft and prestressed guys (320mm in diameter) providing stability in the strongest winds.

Winning this competition was yet another triumph for Foster-Arup collaboration, but I asked Ken how this alignment of architectural and engineering objectives actually worked in the Collserola design. He revealed how much discussion went into determining the shape of the 13 floors (12 to carry transmission and relay equipment, with one for public viewing). For broadcasting purposes it was necessary to achieve the greatest possible perimeter at each level, which meant that circular floors would have been ideal from a functional viewpoint. But the ideal floor plan, structurally speaking, would have been triangular. In either case, a supporting structure of three trusses from the central core was the minimum requirement for stability. In engineering terms, the eventual floor shape was a compromise—a triangle with curved sides. But Norman refused to admit that this was actually a compromise. He used the Collserola floor plan in one of his sketches as a

diagram to demonstrate how this project represents the great collaboration of a trinity of professionals: architects, structural engineers and communications engineers. Norman sees it as a truly dynamic shape that characterizes several Foster projects—for example, the Commerzbank tower in Frankfurt. He believes it breaks down rigid geometrical ideas in favour of an expressive sculptural quality that is still rooted in structural truths.

There is another remarkable aspect to the construction of those floors. Fosters had some earlier experience in Spain (on the Bilbao Metro system), but there were still many uncertainties regarding Spanish fabricators and constructional procedures. The appointed contractor, Cubiertas, had no similar experience, and strategic problems could have developed between architects, engineers and contractors. Fortunately, Cubiertas appointed a well-respected independent engineer, Julio Martínez Calzón. After his appointment, Foster and Arup worked in tandem with Calzón, agreeing on methods and procedures at every stage as they went along. It was necessary to save time. To speed the process and reduce costs slightly, Calzón had an ingenious idea. It was not without precedent, but he suggested that the 13 main floors could be built around the core at ground level and then jacked up 65m to the required level. It was a daring



The “Torre Foster” at night

proposal, as these floors weighed a total of some 2700 tonnes. But Fosters and Arups responded by rethinking the floor design in consultation with Calzón to make his idea feasible.

Cubiertas began by laying the foundations, then constructing the concrete shaft to its full height of 206m. It required support, after it reached 120m, with temporary stability guys. Then began the task of building the floors: each one is more than 5.6m deep, so that the 13 levels add up to 73m, or the height of a 25-storey block of flats. By June 1991 the whole floor structure was finished and ready to test. The jacks were charged and the whole assembly was lifted on the core *just a single inch*. Would this tactic work? There

were an anxious couple of days of waiting. Then, after 48 hours, the exercise proved successful: the floors had not slipped.

But this was only the beginning, really, because now began the task of lifting the floors up to their final position. In fact, this went rather quickly, at a rate of about 4m an hour. Thousands of local people apparently looked on as the new landmark took shape. Many of them were expecting a disaster, but there was none. Once the floors reached their final position the main steel guys and upper Aramid fibre guys were secured in position. The main guys were anchored in huge reinforced concrete blocks. And, finally, the telescopic “car aerial” mast could be jacked upwards through phosphor bronze bearings. For Norman, this job presented a whole new way of working. Fosters had rather less control of detail than they were accustomed to, but they also realized that this was the only way the work could be done. In any case, the Torre de Collserola is a very different building from all the others on the Foster drawing-boards.

Barcelona is, of course, one of the cradles of modern architecture. Allowing for all the competition among the city’s established monuments, by Gaudí and others, how did the Torre de Collserola finally fit with Barcelona and its citizens? Ken explained that the Torre de Collserola is not only visible from the distance, it is also visible within many panoramas stretching out from the city centre. At one moment it is seen in conjunction with the spires of Gaudí’s Sagrada Família, while the next it appears across from the new Olympic buildings on Montjuic hill. It had already become a city landmark by November 1991, and city taxi-drivers would point it out to their passengers as “the Torre Foster”. The Torre de Collserola has contributed more to the Barcelona skyline than any building since Gaudí’s religious masterpiece, and its really original form seems to have truly captured the Catalan imagination.

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Norman often speaks of the “bridge idea” as being one of the most central recurring themes in the studio. Yet, as far as I know, the Millau project is the first actual bridge that has come from the Foster partnership. The Hongkong Bank is based on a bridge idea; and the Barcelona tower could be thought of as “a bridge on end”. In that way both are related conceptually to the Millau Viaduct, which started life in 1994. That was when the French Department of Transport and Public Works held a limited competition for ideas for the Millau Viaduct, which is to form part of the new A75 autoroute between Clermont Ferrand and Beziers. This motorway will cross the Gorges du Tarn, near Millau, and is scheduled to open in the year 2000. The viaduct is part of a motorway that will bypass the congested town of Millau, which is extremely dependent on tourism. The French government had therefore focused its concerns upon preservation of natural beauty in the area, and the future of Millau itself.





Exterior view

### **The Millau Viaduct, France (1993)**

The original Foster proposal was a multi-span, *inverted* suspension bridge, with spans of up to 665m. The idea was to minimize disruption of the valley's landscape by limiting the number of support points. To control wind and other forces that might throw the bridge out of balance, the deck was to be restrained by a net of tension cables. There was a proposal to locate a restaurant and exhibition hall inside the viaduct, beneath the deck, at 250m above the river Tarn, which would provide spectacular views of the surroundings. These facilities would be linked to the valley floor by panoramic lifts and,

from ground level, visitors could go on to Millau by either boat or bus. Access to the panoramic restaurant would be from the south abutment with the motorway by means of a monorail suspended below the bridge deck. Adjacent to the south abutment there would be motorway car parking, public footpaths and rest areas. Access to the north abutment, the highest part of the viaduct, would be reached only by monorail, and panoramic footpaths would allow access to the views and landscape at that upper level.

The client's response to the competition entries was not to declare an overall winner, but to use the best submissions from architects and engineers as a basis for assembling a number of teams with a new mission—to study certain promising solutions in greater depth. Sir Norman Foster and Partners were asked to study a series of cable-stayed bridge ideas. This work is being carried out with Fosters' French engineer partners Europ Etudes GECTI, SERF, and Sogelerg.

I asked Norman Foster to elaborate on the problems of the Millau challenge and the strategies adopted for their solution. He told me:

“Our task was to examine the multi-cable solutions for the Millau Viaduct. Our team was convinced that the choice of this solution derived from strong, demonstrable reasoning and logic. The study is based on an understanding of the site itself: its analysis led us to determine the location of the piers and has suggested a number of shapes. The choices made impose other constraints in turn, and the process continues. The study incorporates the same logic and leads to a precise and powerful solution.”

In particular, I was interested to hear from Norman his own evaluation of the site-specific conditions. He said:

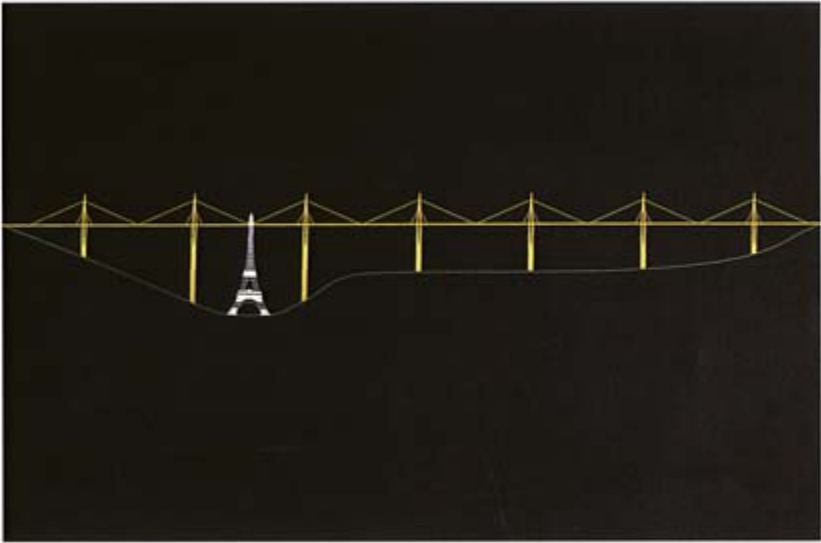
“The crossing is not only of the River Tarn, or of the Plateau de France...but this crossing of over two kilometres also embraces the Puechas wooded slopes and the agricultural land of the Issis village. It is on a scale of the whole site from *Causse* to *Causse*. The viaduct will form a direct link between the edges of the plateaux that dominate the landscape—the *Causse Rouge* to the north and *Causse de Larzac* to the south. This very wide span of the site, which presents itself as a very large space, suggests an even distribution of the piers, since no intermediate feature punctuates the crossing between the *Causses*.

“Now, if we stick to traditional solutions of concrete or steel, with span lengths on the scale of the site, then a 170m span appears to be a good initial compromise. But this solution would involve the use of 14 piers, which would be difficult to accommodate on the valley slopes. Besides, that many piers would form a barrier across the landscape.

“We then tried a longer span. By pushing traditional techniques to their limit we could increase the span to 260m. But that meant that the deck thickness would increase (to approximately 14m at the piers), which would increase wind pressures and bending stresses. So, in order to reduce the wind effect, it was necessary to make the deck considerably thinner. This may be done by introducing stays within the structure to take up deck loads, thus reducing the bending stresses and consequently the deck thickness. A further advantage of



Competition models



Scale comparison with height of Eiffel Tower



Photomontage of the revised design

this approach is that it also allows spans to be increased. The stayed bridge technique is perfectly suited to spans ranging from 250m to 500m, without any marked increase in deck thickness. The best adapted span length for the Millau Viaduct site is approximately 350m, which would give seven evenly spaced piers, the positioning of which respects constraints established by the topography and geology. If, for example, we try to reduce the number of piers to six then these would be larger, with increased wind forces in the stays, and higher costs. In addition, with six piers rather than seven, their distribution would not correspond with site characteristics.”

Consistent with Fosters’ progress from Willis Faber, the Sainsbury Centre and the

Hongkong and Shanghai Bank, they seem in the Millau project to assume the full Roman, Renaissance mantle of architect-engineer, and I asked Norman to comment on the detail of this.

“We cannot divorce engineering structure from building form. At a detail level the more than 2km span, when subject to temperature variations, could produce a displacement at the ends of the viaduct of up to 1.0m. This means that the end piers must be flexible. Instead of one thick shaft, therefore, we divided the pier in two.

“In addition, the structural operation of the multicable stayed structure is very specific. When a span is subject to a load, it bends: in doing so, the span pulls at the stays, which in turn tug at the mastheads. If the masts are thin they will bend as well, preventing the stays from acting to suspend the deck. And the solution is to design a mast with two ‘legs’, spaced apart in a rigid and stable form.”

I asked Norman if there were other factors concerning the wind and the viaduct in use.

“Well, the deck will be shaped like an aeroplane wing, to reduce wind resistance, and all lateral barriers follow this principle. Very importantly, the design ensures that the landscape remains visible to motorists through the lateral structure, the whole providing a spectacle of masts and stays above their heads as a demonstration of the technological feat that makes their journey across this awe-inspiring landscape possible.”

More recently, the practice won an international competition for the Millennium Bridge in London, continuing its close collaboration with structural engineers—in this case Chris Wise of Arup’s. Sir Anthony Caro, the sculptor, was also a member of the team.



Photomontage of the Millennium Bridge, London



the project starts with a master plan to tackle these issues—which are both social and environmental. The master plan is a frame-work for action—not only by us but also by other architects and developers. It identifies old structures, which can be revitalized through new uses—places where new parks and public spaces can be created, areas for affordable housing, buildings to promote new industries, structures to bring life back to the River Ruhr. It is more about the overall effect of diverse interventions—many of them very modest, others more ambitious. And it is of course an on-going process.

**MQ:** I understand that, but what concerned me was that if you think of the Hongkong and Shanghai Bank, if you think of the Torre de Collserola, these are clear images. They are what you have called icons. But, going through the Duisburg projects, I find it difficult to assess what they are really like because the illustrations don't tell us very much.

**NF:** Duisburg is not about a single emblematic building. It is more about the collective power of diverse interventions—perhaps architecturally not so high a profile as the examples you list—but socially very important. And of course it starts with a master plan. David was saying to you that, in recent years, there has been a whole new area of activity for the practice through its approach to master planning. I agree that, more recently, we have had some major opportunities in master planning. But then master planning has always been at the core of the practice. As early as the mid-1960s, the earliest days of Team 4, we were doing master planning for the Wates housing at Coulsden in Surrey that created a framework within which Atelier 5, amongst others, could work.

**MQ:** Could you give some examples of master planning related to your projects?

**NF:** If you look at the individual buildings that we have designed, they are all locked into their context by an attitude to urbanism and planning. The meandering footprint of Willis Faber for example was a conscious response to the grain of a medieval market town with its pattern of winding streets. Nîmes, too, grows out of the geometry of the urban structure of that city with its Roman origins. In every case, these solutions are about master planning. There is nothing recent about this approach—it has been at the core of the practice since the beginning.

**MQ:** This means that master planning has always been a central element of Foster work. Are there other





Duisburg Inner Harbour master plan, 1990–9: Grachten, new ecological canals

similar activities today in your studio which are really rooted in the past?

**NF:** Yes. It is a bit like saying that another new development for us is the design of certain components of buildings. We have always designed components for buildings, but we have done it previously for a particular building. In Willis Faber for example, we designed the ceilings, the escalators and the floors. It has become a tradition which has evolved from a body of experience over many projects, tested and demonstrated over the years. The difference now is that individual manufacturers are coming to us and, instead of saying design us a building, they are asking us to design elements such as door handles, a ceiling system, or a walling system. This is not really a new departure, it is only new in the sense that we are not designing them in the context of a particular building.

**MQ:** May we return to master planning for a moment?

**NF:** Well, King's Cross is a good example. There we produced a master plan centred around a major new landscaped park. This followed from an analysis of the grain and urban structure of London. But research showed that compared with other European and American cities, London is rich in its number and range of green open spaces—they were an important inspiration for the design. But, within that master plan, following the volumetric rules that we had established, the majority of buildings at King's Cross would have been done by other architects. I was instrumental in persuading the developer to use the project as an opportunity to bring in architects from outside the United Kingdom. Perhaps that doesn't seem very revolutionary today, when here in London there are now more foreign architects at work, but this was not at all common at the end of the 1980s.

**MQ:** Could we now discuss one of the Duisburg projects—the Business Promotion Centre?

**NF:** Yes, some of the lessons learned from this little building are now being developed in more sophisticated projects—the Reichstag for instance. In simple terms, the

Promotion Centre burns gas in a co-generator to make electricity. That makes electricity more cheaply than can be bought from the National Grid. The waste heat from that process is converted into cooling through a heat-absorption machine, which then provides the air conditioning free of cost. Normally this is a very energy-consuming and expensive element. The solar array for the roof, which is south-facing and informs the profile of the building, will also supply heat. This is fed into the heat-absorption machine to provide a further component of free cooling.

**MQ:** What about the technology of construction?

**NF:** The construction and material standards in this building are very high. Although the external wall looks very conventional, it is highly sophisticated. It is many layered and can sensitively tune louvres to modify views or block solar gain. It acts like a warm overcoat, so that in this northern climate you need hardly any heating, even in the extremes of winter. The heat from the people and the business machines is sufficient to keep the building warm. Although there is a heating system, you only use it to warm up the building after it has been closed down for a long weekend or a public holiday. In terms of the practice I think this small project is a milestone in addressing the issues of energy and ecology, in the same way that in the past such buildings as Willis Faber and Stansted were to prove widely influential.

**MQ:** My next question has to be: "How do you manage to afford this level of technological sophistication?"

**NF:** The answer lies in the fabric of the building. You see, the floor and ceiling sandwich is extremely slim because there are no voids for ductwork and piping. Most air-conditioned buildings use air as the cooling medium and you need a large volume of air with big ducts to achieve it. But this building uses chilled water instead, which can be piped within the thickness of a layer of plaster. It is an exercise in miniaturization, equivalent to a car radiator embedded in the plaster of the ceilings. The result is that there is less wall, less foundations. Even though the space for people is the same, the overall height of the building is significantly lower. With less external wall therefore, you can afford a higher-quality wall. There is thus a synergetic relationship between the energy concept and the design of the building and its performance. It is also a very joyful building to be in.



Steiger Schwanentor public pier, Duisburg



Grachten ecological canal

**NF:** It feels surprisingly traditional inside because it

**MQ:** Joyful? That sounds good. But what's it really like to work in such a technological masterpiece?

doesn't have a lot of the things that we take for granted in so-called modern buildings. There are no unsightly grilles, ceiling tiles and so on. It's a very friendly building. It is also very specific to the German working environment, where there is an emphasis on cellular, individual offices.

The person who was instrumental in introducing us to the project, Norbert Kaiser, who was both a developer and engineer, had some very interesting preconceptions, but these had never really been put to the test. I felt very strongly that, because of its ecological ambitions, this was a project that we really should do.

**MQ:** Looking at the project, as it is revealed in the photographs, confirms it's obviously important to stress that this simple-looking building, this deceptively simple-looking building, in fact conceals a lot of sophisticated technology. This is its real strength as a building design. Can you give me an idea of the range of work that you are doing in Duisburg?

**NF:** Well, apart from our own projects our master plan has already created opportunities for other artists and architects. One of the public parks is being created by the Israeli sculptor Dani Karavan. A prime warehouse is being transformed into a new museum of contemporary art by the Swiss team of Herzog and de Meuron, and one of our own new water canals is nearing completion.

The harbour itself is being revitalized with new cruise boats. These are served by a floating pontoon, which we designed and was finished last year. It can accommodate tidal changes by gentle ramps, which work for everyone including those in wheelchairs. On the street side, the design integrates information, public toilets and offices for the boat operators. In that sense it is both architecture and urban infrastructure. At a small-scale level, the harbour wall itself is being rebuilt with stone balustrades to a standard detail that we have established for the city. In this context you can perhaps understand why we would enjoy the prospect of converting a small warehouse into the "Hafenforum"—a place for meetings and a centre from which the administration will execute the master plan.

Duisburg itself is also a part of the larger metropolis of North Rhine Westphalia. There

are analogies with Los Angeles in that it is quite normal for the locals to drive long distances on a fast network of urban motorways—leaving work to dine in one city and then onto a club in another city before returning home at the end of the evening. Within this conurbation we have a variety of projects—a family home in Ludenscheid, a corporate headquarters in Mulheim, a design museum created within the old power station of a local mine in Essen.

**MQ:** Can you talk about the most recent project in Duisburg?

**NF:** The Micro Electronics Centre opened in May 1997. It is part of the inner city complex, which contains the Business Promotion Centre and the Telematic Centre. Together they show that the newer industries are clean, can create new urban parks in their midst and can co-exist alongside housing and schools. This newest building is flexible space spread over four storeys, adaptable for a wide range of manufacturing needs—workshops, clean rooms, laboratories, think-tanks and the like. The work spaces are grouped around two internal courts, which link the building to the public world of the street outside. These buffer spaces serve both areas, with a lively café and a place to introduce children to the language of computers called “Future Kids”.

In some ways it is our contemporary version of that early factory for Reliance Controls.

In 1967 it was considered revolutionary to abandon the traditional workers’ shed and management box in favour of a single democratic pavilion for all—with production and administration separated only by a glass wall.

The newest building in Duisburg is exactly 30 years later, but it is still pioneering the social issues of the workplace. Here the building is integrated into the inner city.

Unlike an earlier generation of factories, it is not banished to an industrial ghetto on the outskirts. Also, internal spaces are more human, varied and flexible.

**MQ:** Do you think that Duisburg is more important than Commerzbank?

**NF:** No, both are equally important in their own ways. As I have said, the story of Duisburg is not that of one single building. It is more about moving forward on many fronts at the same time with a wide variety of initiatives. Commerzbank is a single building—a symbol of economic power. Being the first ecological skyscraper, it is an ecological statement as well. Although one is not comparing like with like, they are of course both about urban regeneration.



Torre de Collserola, Barcelona, 1992



Power station converted to become Essen's New Design Centre

**MQ:** As you know, I have written a lot about the revolutionary Finnish architect, Reima Pietilä. One of Pietilä's favourite observations concerned the architectural competition. He said: "If you enter a competition it is important to have a good idea, otherwise you may win first prize and find you have nothing on which to build." Over the past four years, I have several times heard you say how important it is to hold on to a good idea, and not let it get away during the development stage. Do you have some further thoughts on that subject?

**NF:** The importance of a "good idea" sounds, in retrospect, over-simplistic. Architecture embraces so many conflicting demands that it is easy to see how a strong theme in the early stages of a design can be diluted or whittled away over time. Perhaps this raises the issue of acceptance.

A radical concept—or idea—can be rooted in sound common sense but, unless the

reasoning behind the design is understood by those who are going to use it or sanction it, then it will never be accepted. So that leads to the need for good communication, whatever the medium—words, models, animation, drawings...



Telecommunications centre, Santiago de Compostela: model photomontage, 1996

**MQ:** I remember the Intelsat Competition for Washington, which John Andrews of Sydney won. And Reima Pietilä was so late that he had to take his drawings to Washington, finishing them on the way in the aircraft. But one of your real strengths is being able to produce fine drawings under great pressure and at the last minute. A legacy in part from Yale, I suppose.

**NF:** I had never thought of that connection—but a good example might be the Collserola Tower. The concept was radical—unlike any communication structure that had ever been proposed. Was it elegant sculpture—the most minimal intervention on a sensitive site? Or was it innovative engineering to support platforms in the sky—freedom to welcome changing technologies in a volatile industry? Or was it a symbol of the Olympics—visible on the skyline from principal vistas within the city? Of course it was all of these things.

I remember arriving in Barcelona with the presentation drawings to meet the rest of the team before the interview with the competition jury. Over tea in the hotel lounge, less than an hour before we were due to appear, I began to worry about how the jury would react to the image of a tower that was so shockingly different. In one sense we had reinvented the communication tower. Although I knew that our concept had evolved out of the most vigorous analysis of the telecommunications and environmental issues, the jury might pre-judge the tower before there was an opportunity to fully explain the rationale or the story behind it.

With the minutes ticking away, I tried to recreate in my sketch book the history of such structures starting with familiar images and then, step-by-step, showing the value judgements that led to our alternative proposal.

I copied this sequence of images at large scale with felt-tip pens onto the back of the mounted presentation drawings. This then became the introduction to the proposal. I am sure that this was a key factor in winning over the confidence of those who were judging, which in turn helped us to win the competition.



**MQ:** You have talked about the process of “reinvention”—reinventing the office tower, the international air terminal and now the communication structure. Can you talk a little about innovation?

**NF:** Some projects, perhaps because of the client, the point in time or the location, provide the right circumstances to innovate. Other projects might follow which are opportunities to further develop or consolidate those ideas. But the ability to look at each project as if it was the first—to start with a clean sheet of paper—is an important part of the creative process.

I am reminded of the Mayor of Santiago de Compostela who had similar problems to Barcelona and had admired our Collserola Tower. He approached us with the idea that we could do a similar, perhaps more refined tower, for his city. But Santiago is not Barcelona. Aside from the difference in scale, Santiago is a pilgrimage city—the dominant icon is the cathedral and its silhouette is a marker on the skyline for the millions of pilgrims who trek towards it every year. Philosophically, I questioned the idea of a new tower competing with the historical symbol of Christianity, especially when the site for the structure was a prominent location, highly visible from the cathedral square. By going back to the first principles of communications engineering, we were able to demonstrate that all the needs could be met by an elevated platform rather than a vertical structure. The original forest on the site could be recreated and the platform, or “mirabel”, could also be a public space, offering stunning views out to the Atlantic Ocean or across the historic city. The result is a powerful symbol. It is quite special to its place. That



Telecommunications centre, Santiago de Compostela: model view



Great Court, British Museum, 1994–2000: view of the original entrance, 1852



The crowded entrance today



The proposed new entrance opening into the Great Court

is what I mean when I talk about “the clean sheet of paper”.

**MQ:** I began my original discussions with the partners by talking to Spencer. He concluded our first exchange with a shopping list of the main recurring themes in the work of the Foster studio. They were:

- the urban context, which embraces the physical context as the *genius loci*;
- the social context, which acknowledges the fact that architecture is primarily about people;
- lighting, especially natural lighting, providing the poetic dimension of architecture;
- design clarity, which ensures that the building concept is reinforced by the needs of the client;
- reinvention of the building form—which you have already talked about;
- the use of appropriate materials and attention to detail throughout the work.



Does that describe the essence of what the Foster studio is about?

**NF:** Yes, but I would like to add a couple more headings.

First, we cannot understand the social and urban contexts, achieve any clarity of design or reinvent a building type unless we are in close touch with the needs that generate the buildings. Communication is important in the process and I have touched on that in our conversations.

**MQ:** Communication. Yes, that must have a high priority.

**NF:** Without that, you can lose the essence of a design concept, the passion to make it work and get it built. Communication is the essential flux in a studio. You can literally see it connecting individuals into teams, and bridging gaps between us and the many outside specialists and consultants. And then, secondly, there's the importance of research.

**MQ:** Body of knowledge!

**NF:** When David says you can dive straight into design methods, he perhaps takes for granted that he is leaping off a research platform. At times I think we are so close to what we do and how we do it, that we take our approach for granted as if it was normal practice. The reality is that it is highly individualistic.

**MQ:** Does that complete our shopping list?

**NF:** Well, there's also the historical context. It has always been a factor, sometimes below the surface, sometimes more dominant, as for example in the Sackler Galleries at the Royal Academy.

**MQ:** And in that context, I'd like to quote from my recent conversation with Spencer. He said: "Who would have thought that when Norman set up practice in 1967, when the first five years saw buildings like Reliance Controls, Olsen, IBM Cosham and Willis Faber, that the practice would become an authority on the re-use and transformation of historic buildings? When we go to meetings to talk about St Pancras, the Treasury, the British Museum—or abroad, the Reichstag—we are accepted as leading experts on how to make successful interventions into historic structures. Extraordinary! When Norman set up the practice in 1967, he was seen as a radical new force in contemporary architecture. At that time, the idea that the practice might develop to encompass creative rehabilitation—the art of bringing life back to historic buildings—was unthinkable."

**NF:** What is really interesting is that those projects excite us because of the radicalism we bring to the task. We are not like a conventional practice, which might specialize in the restoration of historic buildings, acting in an entirely passive role. What we are talking about is something very different.

**MQ:** In Spencer's words, the Foster studio does not approach historic buildings "as fuddy duddies" because you are "not laden with historical preconceptions". In this context could you talk a little about the Joslyn Museum in Omaha, your only completed building to date in the USA?

**NF:** When we researched the history of the original museum you could see from the archival photographs that there was a powerful physical link with the city at the time of its creation. When you drove along Main Street you could see the great portico in the distance—it was a signal—and you turned off the road in front of it to arrive in style. All this was in total contrast to the reality which confronted us in 1992 when you had

to



Joslyn Art Museum, Omaha, 1930: the original grand entrance

drive past the building because you couldn't approach the entrance at the front. It was blocked off, so you had to drive around the streets at the back into a residential area and take a turning before you found yourself in the service yard. Finally you had to drive past that and park alongside the building, entering through a sad little porch which had been tacked on in the 1960s. It was a totally suburban experience, and had nothing to do with the original building, which was quite noble.

**MQ:** This sounds more like urban design than working in an historical context on the nature of materials?

**NF:** Of course it is—although we can come back to materials in a moment, because that is also an important part of the urban story. But the first important step was to re-establish the physical relationship with the city: to return the ceremonial steps to life—open up the old entrance—defer to the original museum and reinforce it by adding on a new wing. To bring back and celebrate the approach from the front for the people, and to relegate the back for service access only.

Those archival photographs in black and white showed a pure white building. We thought this was due to the over-exposed nature of old photographs but nothing could have been further from the truth. When we saw stone from the original quarry it was actually white. We realized then that the incredible pink colour of the Joslyn was the consequence of a weathering process. It had only become pink because, as it weathered over time, it became faceted so it reflected the light in a different way, which gave it this rose colour. The way we finally got the stone to match the pink of the original building was to cut it so that it replicated the weathering that had taken place on the existing stone. I guess you could say that this is a last-minute thought on the importance of trying to understand the nature of materials.

**MQ:** As usual with a Foster design, there's more to the Joslyn Extension than meets the eye. And this must be particularly true of the Reichstag—could you elaborate?

**NF:** After we had debated whether to enter the competition for the Reichstag, I made the decision to go to Germany and talk directly to the politicians through meetings and lunches. One of these was with Peter Conradi, who was later to be a member of the Building Committee for the project. I came back reassured that the organizers were

sincere in their intentions. On this basis, I invited a number of individuals from outside the office to join the team—such as Norbert Kaiser, the client for one of the Duisburg projects, and Willy Vossenkuhl, a philosopher whom I met through Otl Aicher. I also included Helmut Jacoby, an architect and delineator I had worked with over many years. It was really quite a diverse team. I fed into the process quite a lot of what I had absorbed at the meetings with the politicians in Bonn. One of the things that they voiced was the importance of some kind of public open space, because traditionally the Reichstag had always been a gathering point at times of celebration or protest, such as the removal of the Wall or even a Michael Jackson concert! We recreated this symbolic space on a plinth with a large umbrella roof above. The Reichstag itself was an important part of this composition—but it did not dominate and was consciously transformed by the new elements. It has to be remembered that in the first stage of the competition there was a stated need to provide a considerable amount of space—some three times more than the existing building could provide. The plinth, an important element of our first-stage design, was a device to create that extra accommodation in a way that did not diminish or devalue the importance of the Reichstag itself. The roof, which was to harvest energy, unified the composition and defined the new public space for these outdoor gatherings.

**MQ:** And then you came up with other radical solutions.

**NF:** It is not possible to separate the design directions from the way in which the client structured the decision-making process. I understand that the first-stage jury had to reach a unanimous decision and this led to the selection of three projects—one of which was ours. This was followed by a series of meetings during a two-day period of intense public debate in the Reichstag. Part of the proceedings included presentations from another competition, which was the master plan of the wider Spreebogen area. The winning project took the form of a long linear block immediately adjacent to the Reichstag with a considerable amount of accommodation for chancelleries and administration. It was already apparent that there was an overlap between these two competitions. Therefore it did not come as a surprise that very significant changes followed in the new brief for the second-stage competition. The amount of space asked for was a fraction of the original requirements. The authorities suggested that the competitors should modify their plans accordingly. But in our opinion there



Reichstag, Berlin: the new debating chamber under construction, 1997

was no alternative but to start again—from the beginning—with a clean sheet of paper!

**MQ:** So how did you approach the Reichstag the second time around?

**NF:** I presented the scheme to the second-stage jury with David Nelson, Stefan Behling

and Mark Braun and we concentrated on the needs of Parliament, the history of the Reichstag and the issue of ecology. First we demonstrated to them that we knew the inner workings of Government—what actually went on behind the scenes—in a degree of detail that the politicians themselves were not aware of. We showed them a diary—a year in the life of the Reichstag. We demonstrated that they could put more space in the Reichstag than they were envisaging. In other words we queried their brief and suggested that it could be improved. For example, the Faction Rooms—meeting rooms for the individual political parties—could be put back into the historic building. That would ensure better space utilization, bring the building to life for more hours of the day and night, eliminate long walking distances to adjoining buildings and therefore improve communications.

**MQ:** And what was the response to this challenge?

**NF:** They saw the logic of it. I don't think anybody else had looked at the needs that really generated the building or even questioned them at such a fundamental level. We also re-examined the history of the Reichstag and we demonstrated a strong case to reinstate the historic public main level and open up the steps on the west front to make an entrance for everyone. In this approach, we also reaffirmed our original idea from the first-stage competition that the roof should be a public open space, to offer a new perspective on the city of Berlin, and symbolically to place the public above the politicians who are answerable to them.

**MQ:** Then I believe you went on to persuade your clients that, consistent with Germany's enlightened legislation, the new Reichstag should be translated into a low-energy, ecological building?

**NF:** Yes. Prophets like Buckminster Fuller many years ago predicted the kind of global crises which are now the subject of international summits and media headlines. We know that buildings currently consume half the world's energy and significantly add to the spiral of pollution through the consumption of non-renewable fossil fuels—a major factor in global warming. Given the symbolic importance of the Reichstag we suggested that it could be an inspiration to the nation and the world at large—as an ecological flagship. I also suggested that this approach should be justified on moral grounds—but if that was not acceptable then, given the very high energy costs of running the Reichstag at that time, then there was a strong economic argument for doing so anyway.

**MQ:** So what was the outcome?

**NF:** The outcome is that the Reichstag will be the first public building to be powered and climate controlled using totally renewable sources of energy. It will now use fuel from vegetable energy sources such as rape seed oil, burning those in a co-generator to produce electricity. Further energy is provided by photo-voltaics on the roof, although this is a relatively minor part of the concept. Waste heat from this process is converted into cooling by a heat-absorption machine. Water is used as the medium to transport summer cooling or, in winter, heat around the building. This follows from the experience of Duisburg. Combined with natural ventilation from the courtyards, it is a very human and precise way of controlling the internal environment. In summer, surplus heat is deposited 400 metres deep into an underground lake, to be recovered later as a thermal source in winter.

**MQ:** What level of improvement can you provide over what would be considered the traditional solution—the one for example that you found at the time of the competition?

**NF:** There are three levels of improvement. First, the new power plant will not only satisfy the demands of the Reichstag but will also serve the wider quarter of other new buildings as well. Second, the original installation would annually emit some 7000 tonnes of carbon dioxide into the atmosphere. We will bring that down to a mere 500 tonnes a year—a fourteen-fold improvement. Finally, there will be significant savings in the annual running costs.

**MQ:** Apart from the use and arrangement of the Reichstag's internal space, and the questions of heating and ventilation, I know there has been considerable emphasis on the development of the roof. Could you bring us up to date?



Reichstag, Berlin: model of the dome



The dome under construction

**NF:** As I became more immersed in the project, I felt that the degree of internal change, and the transition from Reichstag to Bundestag, merited a symbolic change to the exterior. The present solution grew out of earlier versions, which were all concerned with public space and environmental control. They channel natural light into the main chamber below and also extract air as part of the ventilation system. Berlin is a low-rise city, and this permits horizon light to be channelled into the heart of the building via a cone-shaped reflector. At night, when Parliament is in session, the device is in reverse and acts like a beacon to signal that the process of democracy is taking place. The structure which houses these devices also contains an elevated public viewing platform, accessed by helical ramps. Apart from stunning views of the city and beyond, this platform also places the public symbolically above the politicians.

**MQ:** There's very definitely an ecological theme in your work.

**NF:** Yes. We have talked about two examples—but there are of course others.

**MQ:** Perhaps, as I suggested at the beginning, any summary here is doomed to be incomplete and inconclusive. We started out with five items in the shopping list, and now we are already up to nine.

**NF:** Do you think we should settle for ten, Malcolm?

**MQ:** That's what I've really enjoyed about working on this book. We can tease each other, survive to another day and go on talking. But seriously, now that Fosters have got involved in bridge design, I'm wondering where that activity fits in thematically? How about the Millau Bridge? Do you have any further thoughts on that?

**NF:** I suppose you could place this in the architecture of infrastructure. Traditionally the architect's role relates to buildings, but it could be argued that the physical impact of infrastructure on the environment is equally or at times even more important. For example, we've already talked about the importance of the communication tower on the urban vistas of Barcelona. The Millau Bridge has similarities in that its appearance will have dramatic implications on a significant area of wild natural beauty in the Massif Central. The need for this bridge grows out of a new network of autoroutes, which link European countries—in this case France and Spain.

**MQ:** But how did you get involved? What was the real challenge to Fosters here?

**NF:** It is difficult to imagine the heroic scale of the crossing—from one plateau, across a valley, to another plateau. It is a road in the sky—two and a half kilometres long. At the deepest part of the valley you could place the Eiffel Tower below the road with room to spare. I talked of the delicacy of the intervention in Barcelona. At Millau, a similar respect for the landscape led again to a search for the most minimal solution—the most delicate man-made foil to nature.

**MQ:** And I understand that this “delicacy” has created real problems in modelling and representing your design for the Millau Bridge?

**NF:** Yes, it is difficult to model the cables to scale. The result is that all the published drawings or montages show the cables as a dominant element against the sky. In reality they would be far more gossamer-like; from some viewpoints they would be minor elements in the overall composition.

**MQ:** Traditionally, in the modern world, and particularly in France, the bridge has been the province of the engineer. Yet here we have the top rank of French engineers and bridge builders competing for the Millau project, and along comes a total outsider, both English and an architect, who steals the show and the prize. How was this possible?

**NF:** You have to remember that on this project we were only one part of a larger team of French engineers. I was led to believe that our joint proposal received a majority vote by the jury. I shall try to imagine why that was the case. Clearly, the philosophy behind our design was different from many of our competitors, who saw it as an opportunity to create a major span over the River Tarn with minor spans leading up to that big event. For us that would have been an empty, formal gesture because the river is physically a very small element in the landscape—from most viewpoints it is invisible, a non-event.

**MQ:** What did you see as the main issue?

**NF:** The challenge for us was not to exaggerate the span across a narrow river but to bridge across a very wide valley. It is after all labelled on maps as the Gorges du Tarn. We celebrate the crossing of this great divide with a regular structure that marches

across the valley, to make the road connection as slim and elegant as possible. By refining the vertical and horizontal elements, this scheme uses significantly less material than any of the other solutions. So it is not only more minimal, but compared with the other designs, it was also more economical, less expensive and less risky.

**MQ:** Would you like to comment on how you work with other specialists?

**NF:** I think there are probably misunderstandings about that. I could never be a part of a design committee—it's a contradiction in terms. But a design team with strong leadership is a different matter. Ideally everyone has a shared sense of values—a total commitment to excellence regardless of the size or budget. Quality is much more about an attitude of mind. It also helps if there is enough shared respect and self-confidence for each member of the team to challenge the others' specialist skills. Again it comes back to a spirit of enquiry. The same is true within the studio. It starts with myself and my partners, going back over more than 20 years. Relationships like these take time and maturity to establish. They extend outwards from that core through younger directors—more than half of the practice is based in Riverside, with the rest spread out around the world, through a network of project practices, currently eight in number. The average age in the practice is still quite young—barely over 30. When we last counted, the practice embraced some 30 languages.

**MQ:** A word about engineering and engineers.

**NF:** I've often made the point that for me most of the buildings that have stood the test of time were stretching the boundaries of structural capability when they were created. Even the so-called vernacular buildings were the most economic enclosures of their day—optimizing on the available materials, responding to the climate as well as building space.

**MQ:** And the way that you work with engineers?

**NF:** Maybe I am too close to articulate something that I take so much for granted. It was Stefan Behling who recently commented that I had pioneered a way of creatively collaborating with engineers. Perhaps it starts with challenging the way that architects and engineers are traditionally trained. The outcome for most is that the architect is expected to design a building, which the engineer then makes stand up. For me the first project which challenged this approach was the Reliance Controls Factory. There was the structural engineer Tony Hunt, the talented mechanical engineer Loren Butt and a brilliant quantity surveyor called John Walker. It was the nucleus of a highly creative design team—the exact opposite of the traditional sequential approach. Subsequently, we have worked with many other talented engineers, too many to enumerate here.

**MQ:** In the conversations with your partners I have gained some insights about your role in the practice. How do you see your role as being different from others?

**NF:** Unlike anyone else, I am involved in the design of all the projects. This is not necessarily to the same extent for every project and it may vary over time. I also have a direct relationship with the client on most projects. In some cases, that may not be regular, but it would still exist at significant stages in the evolution of the project.

**MQ:** Could you talk about some of the individuals in the practice more specifically—beyond the conversations that I might have already had?

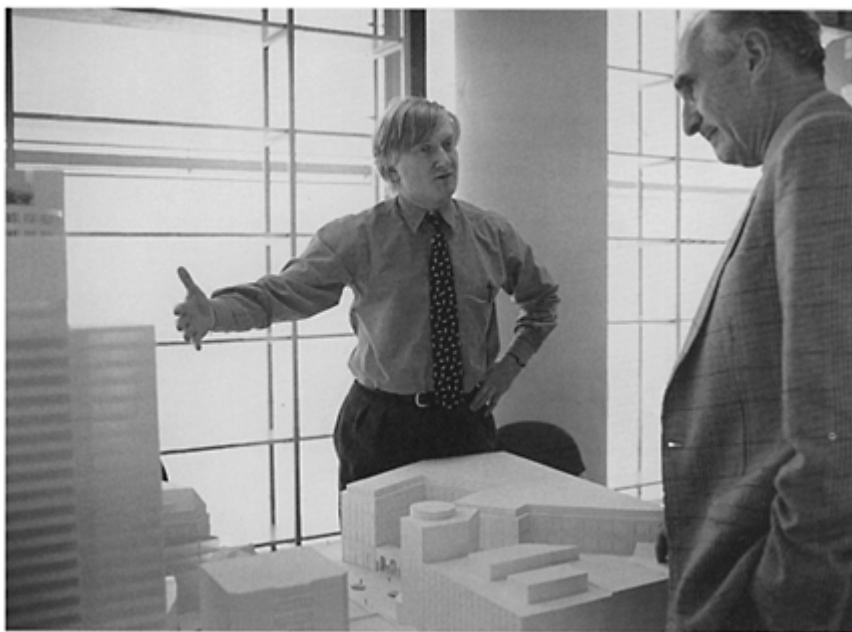
**NF:** Well, whether by accident or design, your reference to my partners as individuals is very accurate—they are highly individualistic. In terms of personalities, we all

complement each other. I had, many years ago, established a pattern of working closely with each one of them on the projects that they were heading out. That still continues but, thinking back, it was probably the Hongkong Bank that established the basis for the present partnership. Spencer came back to London after having established with Graham our first office in the Colony, as it then was. Spencer did this at more or less the same time Ken and David moved out to join Graham in Hong Kong. It was a testing time. Both Spencer and I were very close to the Bank project, so it meant a huge amount of stress and long-haul travel. Tempting though it was to move to Hong Kong, I knew that the consequence would be a vacuum when the Bank was eventually finished. So simultaneously



Norman Foster at the Foster Studio, Riverside Three





Spencer de Grey reviews the Commerzbank proposals with Sir Jack Zunz from Ove Arup and Partners



The directors at their weekly meeting at the Foster studio, Riverside Three

Spencer and I built up a “new” practice in London, to which the others could return. The challenge was to create design opportunities, from scratch, which would not be an anticlimax after the Hongkong Bank. Thus, whilst the Bank was under construction, in London we were working on such projects as the BBC, Renault, Stansted, the Frankfurt Athletics Stadium and Nîmes—quite a rich portfolio.

**MQ:** But what about a permanent structure for the practice, a true partnership?

**NF:** I was very fortunate—if you had asked me to write a list of the people who I would most want to work with then it was those who returned from Hong Kong, Ken, David and Graham. In other words, if you also include Spencer who was already with me in London, it was virtually the present list of partners. By the time I did take the initiative to make them partners, we were, in terms of sharing responsibility, already working as

a partnership. When they first started in the practice more than 20 years ago, I had less direct contact with them—that has grown over the years as they have surfaced and the relationships have become more personal. Most of them started as team members, which explains why they are so good at running teams with quite a lot of mobility between projects. Our backgrounds are all different. For instance, David comes out of a design school rather than an architecture school like the rest of us. But this doesn't affect the way in which we work. Inevitably some designers are more intuitive—others are more analytical. Such differences reveal more about our personalities than our schooling. In any case the studio is a training ground, which may explain why it has spawned more new practices than any other, whether generated by ex-partners, associates or employees.

**MQ:** Would I be right to assume that areas of responsibility are divided between partners?

**NF:** You have to remember that we are all design driven. I would venture to suggest that this would even extend to Barry Cooke—our finance director—who recently joined us as a Partner. His role has become increasingly important. He enables us to have freedom to be creative as architects in an increasingly competitive world. If you had a financial director who wasn't creative, then he would inhibit design. But Barry is sensitive to the design ethos of the practice—the motivation to continually strive to produce the highest quality of design. This is totally the opposite of a commercial practice with financial policies, which are commercially driven. It is a delicate balance to be able to invest in a practice infrastructure, which can allow you to compete for large-scale projects on a world scale but still be personal enough to work at the level of door handles and single family homes.

**MQ:** What about the administration or coordination of the practice?

**NF:** As directors we all participate in that, but Graham plays a key role—in some companies he might be called managing director. He works closely with another director, Mark Sutcliffe—who was one of my first students in the mid-sixties. Charles Rich is also part of that team, whose background is the construction industry. Its no accident that they all sit in the same area of the studio so that communication is excellent—Barry will often join their discussions. It was a very talented German photographer, Rudi Meisel, who observed the dynamic way in which people in the practice would come together and disperse—looking at drawings, examining models, cross-checking with visiting consultants, joining in client meetings. It is quite difficult to convey this physical spirit of interaction and communication that takes place in words. I believe that it has a lot to do with the physical concept of the design studio with its large volume, big benches and everyone close together, making things.

**MQ:** There must be many invaluable people in the studio?

**NF:** Yes, of course. There are brilliant younger directors who have grown up through the practice—Robin Partington, John Silver, Andy Miller, Paul Kalkhoven, Brandon Haw and Stefan Behling, who is also a Professor in Stuttgart. There are far too many individuals to list, but we couldn't operate without our model shop, which is headed out by Chris Windsor and Neil Vandersteen. Their team consistently produces models, mock-ups and prototypes of outstanding quality, in a highly interactive manner. Katy Harris, who runs our audio-visual centre, also plays a central role, which is much

wider—assembling information and images on all our projects as well as carrying out lateral research. John Small as a designer has a very special place—more recently working together with Giuseppe Boscherini on



World Squares for All, 1997: Space Syntax analysis of pedestrian movements at Trafalgar Square



The consultant team visit Trafalgar Square

the many products that I referred to earlier. Some individuals, like Huw Thomas, will tend to focus on certain kinds of projects. Others, like Max Neal and Tim Quick for example, will tend to concentrate on projects in one country—in their case, work in France. Then there is Mark Braun who heads the Berlin practice, and Uwe Nienstedt in Frankfurt, supported by Sven Ollmann. In Hong Kong there are Winston Shu, Grant Brooker and Mouzhan Majidi heading a large practice. The practice is so mobile that, by the time this book appears in print, many of them will have relocated either back here in London or somewhere else in the world. Talking in this way, it crosses my mind that the practice still works without the need for any formal organization charts or written hierarchies.

**MQ:** Could we return back to what you and what the practice is really about—design.

How about design in the urban context?

**NF:** Well, early in 1996, Spencer and I brought together a small group of individuals that we knew to pool experience and explore the issues of the city. I invited individuals that I had known or had worked with in the past. David Kerr is a traffic planner with a keen interest in both vehicular and pedestrian movement; Bill Hillier heads Space Syntax, a group from the University of London and has pioneered the study of how the movement of people relates to outdoor spaces; Ricky Burdett is an architect turned academic, with a passion for the social issues of the city; Peter Heath, another architect, is concerned with the physical detail of urban landscaping. It was the overlaps between these specialists which fascinated me. We would meet for breakfast at two-week intervals to discuss issues and to explore how we could apply our skills as a team. The first opportunity was to come at the end of 1996 when a competition was announced for improvements to a major area of central London. The 22 acre site extended from Trafalgar Square through Whitehall to Parliament Square and beyond, and then from St James's Park to the Thames Embankment. We won the competition with a brief to improve the quality of the urban environment, to make it better for Londoners and visitors alike, to achieve a better balance between pedestrians and cars, to improve access and public transport and finally to enhance the settings of the many historic buildings.

**MQ:** I'm rather tempted, at this point, to suggest that the tenth Foster theme must be "anticipation"!

**NF:** Sometimes there's an element of coincidence! But to continue, at one of our breakfast meetings we were examining Bill Hillier's Space Syntax computer printouts which showed a southerly drift of pedestrians through Trafalgar Square, across a busy road, only to end up on a traffic island. On paper it didn't seem to make sense. So we decided to go and look at it on the spot. We sped off in the office minibus and arrived like tourists in Trafalgar Square. Although all of us had lived and worked in London for many years we had never walked the city like a visitor. It was a revealing and very different kind of experience. The centre of the Square was quite dead but, as in the print-outs, there was much more activity to the south. It was not just a question of crowds feeding the pigeons but people dashing through the traffic to reach a small traffic island south of the Square. Following them, we soon realized why. It was simply the best place to point a camera or video recorder. From here the best views of London could be seen and captured—there were all the picture postcard views of Trafalgar Square, Nelson's Column and so on. Interestingly, it was also historically significant, with a seventeenth-century equestrian statue of Charles I, who was beheaded across the way in Whitehall. There's also a plaque set in the pavement to show that this spot is the geographical centre of London—the place from which the distances on all those motorway signs are measured!

**MQ:** It would be interesting to have Bill Hillier trace the circulation, flow and return, of pedestrians in Trafalgar Square. It would surely rival Jackson Pollock or Cy Twombly!

**NF:** Bill Hillier pioneered these techniques and we have worked closely together on many projects. The important point about these techniques is that they are valuable design tools. They can check, cross-examine or challenge an intuition. They can give new insights into familiar problems, but they can never be a substitute for creativity.

**MQ:** How fascinating. Just two things come to mind; when we were in Washington last weekend, we went to the National Gallery to an exhibition of Victorian painting. There was one quite extraordinary view, from between the columns of the National Gallery, towards St Martin's. We drove that way this morning, coming from the hotel, and cut through Trafalgar Square. I became aware then of something that I had known for



Whitehall and the Cenotaph



Parliament Square



Old Palace Yard

Key areas within the World Squares master plan as they might be in the future

a long time but I was unable to describe. There is nothing celebratory about the Square's sculpture. It is rather a dull space, really.

**NF:** Yes—and when you trace the movements of people, study the connections and observe how the spaces are used, then you start to understand why it all works so badly. A small instance—the pavement in front of the National Gallery is so narrow and crowded that you are almost forced into the traffic. It is so tight that people have to step up onto the lawn next to the Gallery—you can see the strip of bare earth where the

grass has been worn away. Meanwhile, on the opposite side of the road, on the edge of the Square, the pavement is monumentally wide and totally deserted. But of course I am only describing one part of the analysis. All this has to be seen in the context of much wider studies. The analysis of traffic that was also undertaken in this area is related back to London-wide modelling to identify the separate needs of buses, taxis, trucks and private cars. The eventual design outcome of our study is a programme of major improvements such as pedestrianizing the south side of Parliament Square, the north side of Trafalgar Square, Old Palace Yard, together with enhancing Whitehall and developing new pedestrian cross-routes and opening up access to beautiful hidden courtyards, which are presently inaccessible. This work is really an extension of our urban design in Nîmes—but infinitely more complex and on a much larger scale.

**MQ:** Perhaps you could say something about another project in that area—your Lycée in Fréjus? I've several times heard you refer to its urban inspiration. When I was writing about Alvar Aalto in the early 1980s, I studied the way he planned some of his buildings and organized their interior spaces; I described these configurations as "Aalto's Urban Fragments".

**NF:** You can explain Fréjus in several different ways, but the architecture integrates the various facets into one whole. Think of it as several different diagrams. First, the urban diagram. This is a response to the long ridge of the site which opens up to sun and distant views. It is this side which also contains fine mature trees, unlike the approach from the roadside which is relatively barren. Externally this suggested a linear building. On one side there is the public entrance—alive and noisy with the arrival and departure of buses, cars, mopeds and bikes. By contrast, the other side facing south is private—quiet, green, leafy and sunny—like the countryside beyond a small village, where the students can stroll and relax. If we take the analogy of the building as a village then we could explain the social diagram. The big sky-lit entrance hall, which links the outdoor spaces on either side, is the equivalent of the village square or *place*. It even has the café, with its tables and chairs, which spill out into the space. Extending out on either side from this social focus is a street or boulevard—an "inside/outside" space, which is full height and runs the length of the building. Like the square, they are flooded with natural light from above and, like a street, they are alive with movement, crossed by bridges and walkways linking the two levels of classrooms. But we can also look at the school in another way. Its heavy concrete vaults march heroically across the site. They appear more massive because of the contrast with the filigree louvres and what appears to be another roof—the waterproof membrane, pencil-slim and hovering above the concrete vaults.

**MQ:** That would account for its physical presence.

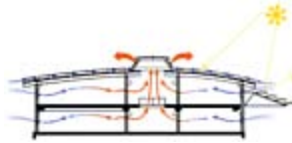
**NF:** Of course, the appearance of what I describe involves all kinds of value judgements, with many subjective visual decisions. But it can also be described in terms of an ecological or economic diagram. The combination of double roof and thermal mass is a centuries-old device in traditional Mediterranean architecture. Here at Fréjus I described the square and the street as "inside/outside" spaces. If you look closely they have the same opening facades as the outside walls. And the skylights are also openable ventilators. The outer roof can heat up but also protect the thermal mass of the vaults below. Air is pulled through the classrooms to the street, which acts as a

solar chimney. The result is a building cooler in summer, warmer in winter, which does not have to resort to mechanical devices like fans or refrigeration. Then there is another dimension—what is economic or affordable? In southern France you can build more for less with higher quality if you exploit the potential of concrete.

You start to see that the architecture embraces these different diagrams—the urban, social, spatial, ecological and economic. They can each be superimposed on the other. But then there are also those innumerable quantitative judgements. The deliberate contrasts of different spaces and textures—dappled shade, colours, proportions. Perhaps the final acid test is one of popularity—how do the students, teachers and



World Squares for All: pedestrianizing the north side of Trafalgar Square; as it is today (above) and as it might be (below)



Lycée Albert Camus, Fréjus: cross-section showing environmental concept (above)



Inspiration from Arabic houses with double-skinned roofs (below)

parents feel about it? By all accounts it is so popular that parents now forge their addresses so their children can be sure to go there!

**MQ:** We still have a little time, space enough for one more theme, for some parting thoughts. A provocation to stimulate our next conversation. Where we happen to finish talking here today will offer the beginning of something else, perhaps in another place and time.

**NF:** You talked about education and tried to draw me out earlier. I think that for designers it is important to cultivate the art of questioning—for example, to be able to find out what really generates the need for a building. Then to be able to question those needs by developing the skills of being able to listen—through that process, to identify the right questions and develop the ability to work with people of different skills, to cross the boundaries. This cannot be separated from the art of making. How can you design something if you don't know how it is made and you don't understand the materials and processes?

**MQ:** This whole idea of the creative dream—having to “question beyond the dream” in order to define an ideal—has its roots in the basic concept of questioning. An idea, like any unproven theory, must be put to the test. It's a combination of belief and disbelief, isn't it? It is a determination to hold onto an idea until the very end of the design process. And I wonder if this attitude in you has anything to do with your experiences at Yale?

**NF:** Well, thinking back, the studio here is, in many ways, like the design studio in Yale. It is essentially a single space, open 24 hours a day, seven days a week. After studying at Manchester, where you had to go home in the evenings, perhaps work through the night and then start again back at the school, I remember the culture shock of going to the States. You could work at Yale any time of the day or night. It opened on the first day of term and closed on the last day of term, which was incredible—a great luxury and stimulus.



**MQ:** If I had to characterize the Foster studio, I would say that it has a strong work ethic combined with a determination to succeed. These might be seen as Yale-like, American qualities too. I remember that my father had a strong sense of the work ethic, which he always linked with being “the early bird”. One of his favourite mottoes was: “You have to get up early, and get on your toes before someone else gets on them!”

**NF:** The point that you make about being on your toes I think is a very good one. At the time I was at Yale there certainly was a very strong work ethic.

**MQ:** What I am trying to get at is that there are ways in which a school cannot be like an office. You can’t actually duplicate in a school the questioning and searching that goes on in a practice.

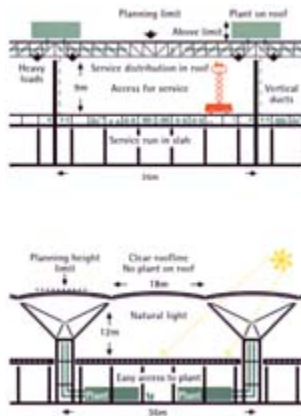
**NF:** That is certainly true. But I do remember at Yale that we did have access in the studio to a structural engineer and, even though it was not real-life, it made a significant difference to the quality of design. Then there was another link with reality at Yale. When Paul Rudolph issued a new design assignment, we always assumed it was the latest commission that had just come into his practice. He delighted in using the Masters’ class in that way—and it was certainly good for us!

**MQ:** We’ve talked in great detail about many projects—from master plans for city centres to interior design details. If you were to summarize your philosophy, what do you think it would be? What is its essence?

**NF:** There is a consistency of approach that runs through all the work and underpins it—a consistency which for me is rooted in curiosity, a need to take things further and go beyond what I have done before. At a personal level I take pleasure in cross-country skiing marathons, but still cannot escape the urge to improve on my last performance. I undoubtedly design buildings with my colleagues in the hope that some of them will shift the boundaries of knowledge. At best what I am searching for is not just a new standard but a new model for a particular building type—a kind of reinvention.

**MQ:** Do you believe you have achieved this?

**NF:** Yes—looking back I believe it is possible to identify those milestone projects with other ones in between which consolidate or further develop those original concepts.



Mechanical services traditionally in the roof were placed in the undercroft at Stansted



### Roofscape

**MQ:** Could you give some examples?

**NF:** Well, at Stansted we virtually reinvented the airport terminal. The consequence of our research was to question the conventional solution at the most fundamental levels. We ended up by literally turning the traditional airport upside-down.

Before Stansted a typical terminal would have a roof which was weighed down with building services such as air-conditioning plant, ductwork, pipes and grilles—usually hidden beneath a suspended ceiling. Not surprisingly this required a heavier and more expensive structure to carry the additional loads. But there were also other problems—for example, mechanical plant needs regular servicing and eventually has to be replaced. It is difficult to access the roof for such maintenance without disrupting passenger movements on the concourse areas below. Then there is the question of energy. Because the roof is so full of equipment it is virtually a black box which needs to be artificially lit—the lighting adds further to the heat loads which in turn require more expensive refrigeration. Not surprisingly the spaces left over for people were, for the most part, grim and anonymous.

By comparison Stansted is essentially about joy and light. This is because all the services which condition the building and were traditionally in the roof, were relocated in an undercroft below the passenger concourse. The roof could then be liberated as a graceful assembly of structural trees and vaults, able to admit natural light by day or act as a reflector at night. Literally and metaphorically this roof lightened the passengers' experience of the terminal—allowing discreet shafts of sunlight to sparkle on the floor and civilizing what before had been an oppressive environment.

But there were also other benefits—dramatic savings in energy for example. Maintenance is very easy because everything that needs servicing or changing is directly accessible. The undercroft also offers great flexibility for change over time—baggage-handling systems can be replaced or new security systems added. At Stansted the mainline railway station was integrated into the building even during the construction phase.

Perhaps the proof of our innovation at Stansted is the extent to which this new model has since been copied by architects and airport planners all over the world—in many cases down to the detail of variations on the structural trees.

**MQ:** And how does your new Hong Kong Airport fit into that story?

**NF:** It is a good example of developing the model further—showing how it can respond to a more complex multi-layered cross-section and extending the scale probably to the limits of one single building whilst still maintaining legibility and orientation.

**MQ:** What other examples would you cite in the field of innovation or reinvention—what building types?

**NF:** Certainly in the workplace—offices and factories. Also in communication structures.

**MQ:** Could you cite one last specific example?

**NF:** Yes. The Hongkong and Shanghai Bank. I think it altered the idea of the high-rise office building for ever, because mindful of the Bank's desire for a powerful public symbol and flexible business space, we ended by inventing a new form of spatial organization. Before this building, every skyscraper had a central core filled with services and vertical circulation. The design for the Bank broke this tradition by fragmenting the core and dispersing it to two of the four edges of the floor plates. Without the interruption of a solid core, what emerged was a series of more humane and adaptable spaces. Meanwhile, at ground level, the idea of a bank being a fortress penetrable only by workers and rich clients was completely revolutionized by lifting its base off the ground and creating a very friendly and popular public space beneath it.

**MQ:** How do these shifts in thinking come about?

**NF:** Perhaps it is about a willingness to go right to the essence of the challenge. To return to the basics before the process of design even begins—to submit all the elements to painstaking research and analysis—the social as well as the technological—the aesthetic and the practical.

Questioning, listening, looking, balancing the laws of nature and the constraints of the real world—materials, methods of production, time and cost—all these elements come into play.

**MQ:** How do you pull it all together?

**NF:** Of course, the process has to reach a point of integration. For me, the optimum design solutions integrate needs which, at the beginning, seem to be in conflict. You put in all the groundwork, to try to identify and ask the right questions, analyse, research, look and think. Sometimes you might seriously question the brief. Then, given intensive preparation, a creative pattern or exploration begins. That is the synthesis. Sometimes it might flow smoothly, other times it might be an agonizing process. The outcome might be a solution which looks disarmingly simple—even obvious. You wonder afterwards why it was a struggle—physically and emotionally; it is not a process which can be easily rationalized into words.

If, for example, you have the responsibility to give an historic building a new lease of life by upgrading it, you might be confronted by a range of options or possibilities. Do you preserve the old simply because it is old? Perhaps the oldest part is ugly—perhaps it obscures something which is later in age but more beautiful. What do you preserve or reveal? Maybe you can add something of today which is even more beautiful. The sense of awareness of history is often heightened by the context of the new. Many of these judgements are essentially aesthetic.

**MQ:** How do you balance the technological with the human?

**NF:** Technology can be an exciting catalyst for innovation. Bridges that appear to float in the sky, high-rise buildings that defy gravity, airports the size of city-states built on artificial land masses—all of these possibilities we owe to technological advances made in the late twentieth century. We also have the means to elegantly harvest energy, create clean fuels, reduce pollution and dramatically improve the quality of

urban living.

But technology is only a means to an end—not an end in itself. Design decisions are often a complex mix of value judgements and it is difficult to subject those to a checklist mentality.

**MQ:** How do you mean?

**NF:** Well, if I took the analogy of flight then you could say that checklists are central to the process of getting airborne. There are items concerned with checking the airframe and the controls—you tick these off just as you do for separate items related to the power plant. Because without the right combination of aerodynamics and thrust, there will be nothing for us to aviate. Then there are other items relating to the avionics and radios—because without these we could not navigate or communicate.

**MQ:** That seems a good analogy. Surely it proves the point about the value of identifying architectural themes—is that not the equivalent of your checklists for flight?

**NF:** Not really, because they are only one part of the story. Checklists might play a vital part in the safe conduct of flying but no checklists can create the poetic dimension of flight—the magic of staying aloft, both defying and working with the elements—a precarious balance of nature and the man-made—emotionally and intellectually thrilling.

**MQ:** And the equivalent in architecture?

**NF:** Those things that you cannot quantify—the illusion of calm and tranquillity in a noisy world—the feeling of space in a crowded city—the shock of the familiar in a different context—the magic of light under a leaden sky—creating order amongst chaos—turning drudgery into pleasure—the subjective dimension alongside the rational.



Norman Foster, 1994

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