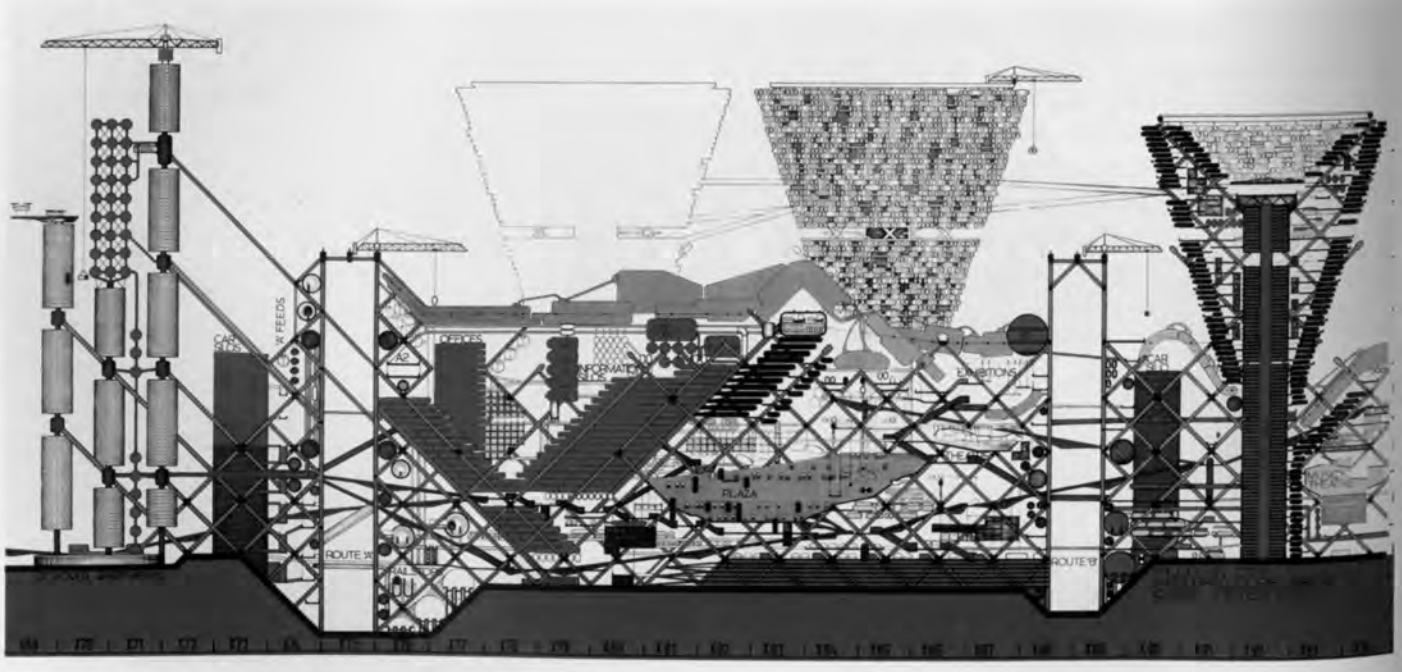
26 HIGH TECH 1967–1991

The application of new technologies to everyday building construction is a major theme in the history of twentieth-century architecture. Louis Sullivan and Auguste Perret used steel and reinforced concrete frames in otherwise traditional office blocks and apartment buildings (see Chapter 4), preparing the way for Mies van der Rohe and Le Corbusier to give these materials full expression in a new Modernist architecture. This was the architecture of what Reyner Banham called the First Machine Age, the age of the railway and the factory, the ocean liner and the power station. But by the mid century, machinery was taking on a new character. The typical machine was no longer a steam engine, but an automobile, no longer the exclusive concern of specialist engineers working for industry or government, but available on the open market for ordinary people to buy and use. Even the domestic environment was being transformed by small machines like refrigerators, electric cookers and vacuum cleaners.

Archigram

The Second Machine Age had dawned. How should architecture respond? In the early 1960s a group of young architects recently graduated from London's Architectural Association (AA) school began publishing a small-circulation magazine called *Archigram*. It served as a justification for continued project-making of the free, futuristic kind that the group's members had enjoyed as students. Some of these projects have since become famous – Peter Cook's Plug-in City of 1964, for example, and Ron Herron's Walking City of the same year. No-one, least of all their authors, envisaged actually building these cities. They were pictorial provocations like scenes in a science fiction comic. But they were inspiring because they questioned the most basic assumptions about the nature of architecture, especially the assumption that it was an art of static formal composition. Plug-in City, despite its monstrous scale, was based on a dynamic and fundamentally individualistic idea: that dwellings would take the form of living 'pods', not too different from automobiles, that would be mass produced in factories, sold on the

Section of Plug-In City, Max Pressure Area. Peter Cook, © Archigram, 1964. Not a static, formal composition but an ever-shifting urban configuration.



Reliance Controls Factory, Swindon, Wiltshire, UK. Team 4, 1967. Diagonal bracing, not strictly necessary in every bay, takes the basically Miesian structure in a new direction.

open market and plugged into a three-dimensional service infrastructure. Walking City was also dynamic, in a more obvious and literal way.

So was the Archigram group showing the way forward for an architecture of the second machine age? The irony is that conceptually its projects were already a reality. American trailer parks, for example, can be seen as examples of dynamic urban form combining communal infrastructure with factory-made living pods. And mobile cities had existed for a long time in the shape of ocean liners. These existing forms, however, did not count as architecture. They needed to be brought into architecture's cultural orbit before they could begin to influence actual buildings. This was the service that Archigram performed. It encouraged practising architects to look beyond the construction industry, borrowing technologies from other fields and allowing those technologies to influence the look of their buildings. In the event, Archigram's influence would be as much aesthetic as conceptual.

Among Archigram's approximate contemporaries at the AA were Richard Rogers, Michael Hopkins and Nicholas Grimshaw, who, for the next three decades, would inject something of the spirit of those science fiction fantasies into the real architecture that came to be known as High Tech. But it was a fourth architect, Norman Foster, from a less privileged background and trained at the Manchester School of Architecture, who gave High Tech its steely sense of purpose. It was not a 'movement' exactly, though its protagonists were all known to one another and often collaborated, especially in the early years of their careers. It would be more accurate to say that High Tech was a 'style', though the superficial connotations of the word seem inappropriate for an architecture that was based as much on concepts and principles as on aesthetic preferences.

A definition

The main features of the style were as follows: the use of synthetic materials like steel and glass rather than natural materials like wood and brick; an almost moralistic code of honesty of expression with no sham structures or false facades; a preference for prefabrication rather than on-site construction, and the expression of that preference in the form of the building; and a tendency to ignore functional and social distinctions, combining different human activities in large, flexible spaces. Note that the High Tech style had nothing to do with what we would now regard as high technology – that is, digital technology. High Tech was pre-digital, inspired by the physicality of machines, not the virtuality of the internet. The typical High Tech building was a factory on an open site, like Reliance Controls near Swindon in Wiltshire, which is generally recognized as the first High Tech building. Completed in 1967, it was designed by Team 4, a partnership between Richard Rogers and Norman Foster with Su Rogers and Wendy Cheesman.

Reliance Controls did not look much like an Archigram fantasy. The direct influences on it were more mainstream, in particular the Cummins engine factory at Darlington in County Durham by Kevin Roche and John Dinkeloo, completed just a few years earlier. Roche and Dinkeloo had been associates of Eero Saarinen in the United States, but Mies van der Rohe was the underlying influence on their elegant glass-walled, flat-roofed factory with its exposed steel frame in pre-rusted Cor-Ten steel. One small technical detail of the building – the neoprene gaskets used in its glazing – was adopted by Team 4 and was to play an important part in the story of High Tech. But if Reliance Controls, like Cummins, was essentially Miesian, it was also a cheap and practical building, a simple shed combining production and office functions in the same space. Only the external cross-bracing of the steel frame gave any clue to the structural expressiveness that would later become a prominent feature of High Tech.

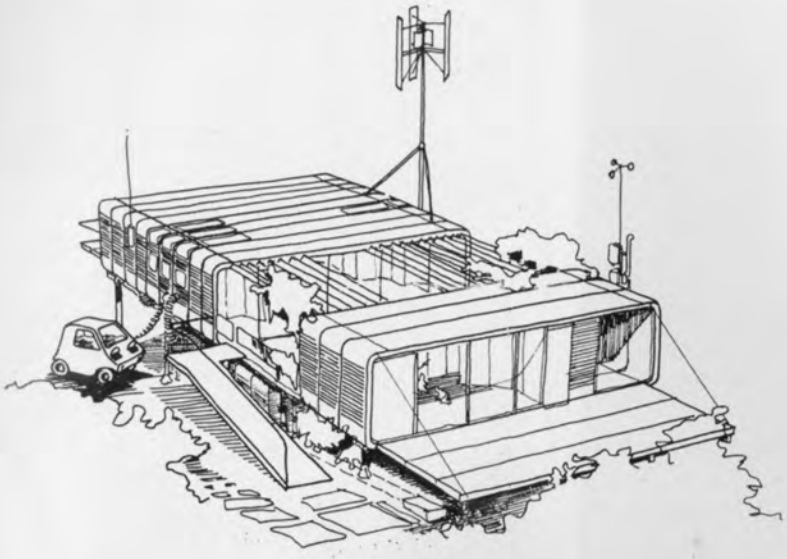
Another candidate for the title 'first High Tech building' is a glass-clad spiral of plastic bathroom 'pods' attached to the back of a Victorian house in London as part of its 1967 conversion into a student hostel. It was designed by Nicholas Grimshaw, then in partnership with Terry Farrell, who would eventually defect from the High Tech camp to become an important Postmodernist (see Chapter 24). The concept of a plug-in service tower that was itself an assemblage of plug-in units was like a small fragment of Peter Cook's urban vision.

Norman Foster

The partnership between Rogers and Foster did not last long. Soon each was designing simple sheds on his own account in subtly different interpretations of the High Tech credo. Foster's earliest solo efforts were object lessons in the conversion of unpromising clients' briefs into high-class, not to say historic, architecture. The first of these was an office and amenity building in the London docks for Fred. Olsen Cruise Lines, built in 1971. London's dockers were used to insecure employment and poor working conditions. Clients and users alike might reasonably have expected some cheap temporary or portable buildings to accommodate the necessary toilets and showers. What Foster gave them was a two-storey building wedged between two warehouses that combined facilities for both dockers and office workers in unprecedentedly egalitarian juxtaposition. Its front wall was made entirely of storey-height mirror glass sheets held in structural neoprene gaskets. British architecture had never seen a wall like it. Foster had flown to America to discuss its detailed design with the specialist supplier, establishing the principle of collaboration between architect and manufacturer that was to characterize his practice in the years to come. In the same year, now working with Michael Hopkins, he converted a similar unpromising brief, this time from the giant computer company IBM, into a single-storey, deep-planned, glass-clad office and amenity building of extreme simplicity. It was meant to be a mere stop-gap before the completion of a new headquarters building on an adjacent site, but the 'temporary' building stands to this day at Cosham in Hampshire and is remembered as one of the milestones of early High Tech.

These early Foster buildings, for all their slickness, were rather calm, quiet presences. Richard Rogers was more willing to be expressive, adopting for a time a vehicle-like style with round-cornered windows fixed in lightweight panels by neoprene gaskets. In 1968 he designed a 'zip-up' house for a competition sponsored by Dupont. It took the form of a highly insulated yellow tube, like a big refrigerator, on pink telescopic legs. Its low-energy technologies were prophetic. The drawings indicate a roof-mounted wind-powered generator and a small electric car plugged into the house for recharging. Nicholas Grimshaw also saw the potential of lightweight panels and neoprene gaskets. The walls of his Herman Miller furniture factory at Bath, finished in 1976, could be dismantled and reattached in different configurations by unskilled labour in response to changing functional needs. In practice, this rarely if ever happened, but such flexibility and indeterminacy, even if only theoretical, were important principles of High Tech.

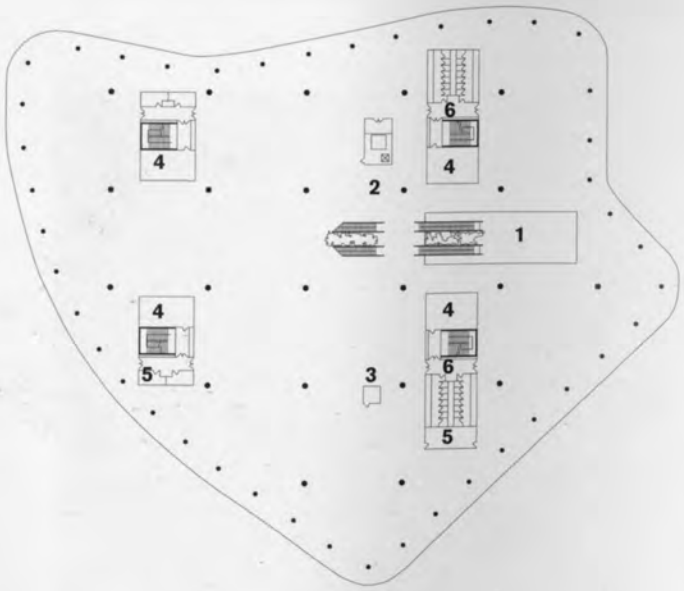
IBM Headquarters, Cosham, Hampshire, UK. Norman Foster, 1971. Utter simplicity: open planned and flat roofed with external walls of full-height glass in neoprene gaskets.



Zip-up House. Richard Rogers, 1968. A 'yellow submarine' on pink legs, but the wind turbine and electric car were prophetic.

By the mid-1970s Norman Foster's 'simple shed' manner was being adapted to suit prestige buildings on sensitive sites. His headquarters building for the insurance company Willis Faber & Dumas, completed in 1975, was proof that High Tech and the city were not incompatible. The three-storey building in the centre of Ipswich has the expected open floor plans, unified by a central atrium and a cascade of escalators. In effect it is one large flexible volume. A rooftop restaurant and a basement swimming pool (now altered) complete Foster's vision of a new kind of workplace – open, collaborative and social. The continuous, serpentine, frameless-glass external wall, literally reflecting the urban context, is only the most visible innovation in a building that set a new standard in the design of office blocks. It was universally admired, won several architectural awards and is routinely listed among the most important British buildings of the century.

Herman Miller furniture factory, Bath, Somerset, UK. Nicholas Grimshaw, 1976. In theory, panels of glass and GRP can be unzipped and rearranged when replanning demands it.



First floor plan

1. Escalator
2. Service lift
3. Document lift
4. Plant
5. Storerooms
6. WCs

0 10 20m
30 60 ft

Willis Faber & Dumas exterior and interior, Ipswich, Suffolk, UK. Norman Foster, 1975. High Tech comes to town and solves the 'context' problem by reflecting the surroundings – literally.

While Willis Faber was being built, Foster was planning a prestige building of a different kind: the Sainsbury Centre for Visual Arts on the campus of the University of East Anglia. It was a bold step to imagine that a flexible, factory-style plan might be applicable to an art gallery, a building type traditionally organized as an enfilade of classical rooms. But there was some sense in the idea. A modern art gallery has to accommodate temporary exhibitions that are more like installations than traditional picture 'hangs'. This is not too different in principle from the periodic reorganization of a factory production line. But the Sainsbury Centre is not only factory-like in its plan, it actually looks like a factory – a big, open-ended shed on a grassy site near Denys Lasdun's famous 'ziggurat' student residences of ten years earlier (see Chapter 21). A Foster building is almost always unanalyzable into two basic categories of space: 'servant'

and 'served'. The distinction is usually attributed to Louis Kahn (see Chapter 22). At the Sainsbury Centre, the servant spaces – plant rooms, toilets, air ducts, switch rooms and so on – are all contained in a thick external envelope formed by the side walls and roof combined. The served space is the plain, uninterrupted rectangle, 7 metres (23 feet) high, contained by this envelope. Aluminium and glass panels held in neoprene-gasketed frames form the outer layer of the envelope.

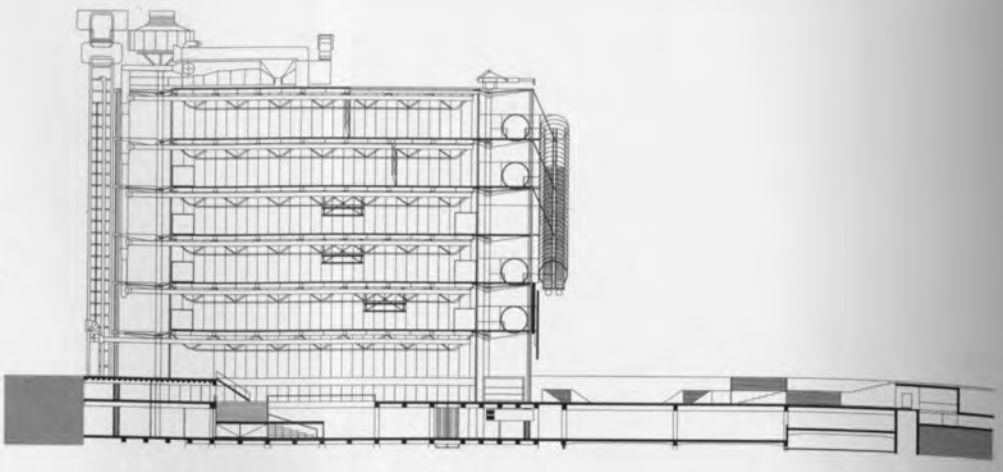
Willis Faber and the Sainsbury Centre mark the culmination of the first stage in the development of High Tech. It might have ended there with these proofs of the efficacy of flexible plans and demountable enclosures had not Richard Rogers, in partnership with the Italian architect Renzo Piano, won the 1971 international design competition for a new arts centre on the Beaubourg site in the centre of Paris. The completion of the Centre Pompidou in 1977, and its phenomenal success as a public attraction, boosted High Tech's credibility and took it into new territory. Pompidou is like a six-storey version of the Sainsbury Centre – a rectangular slab of served space flanked by linear servant zones. The building occupies only half of the site, the other half being left open as a sloping piazza, never without some kind of street entertainment. In early versions of the design, the elevation facing this piazza was an interactive electronic billboard; in the actual building, a flight of escalators in a glass tube snakes diagonally across it. On the other side of the building, facing the relatively narrow Rue du Renard, a close-packed row of brightly coloured service ducts explodes every preconception of what a street facade should look like. This is the Archigram comic-book vision made real, although it probably owes more to a 1961 paper project called Fun Palace by another denizen of London's Architectural Association, Cedric Price.

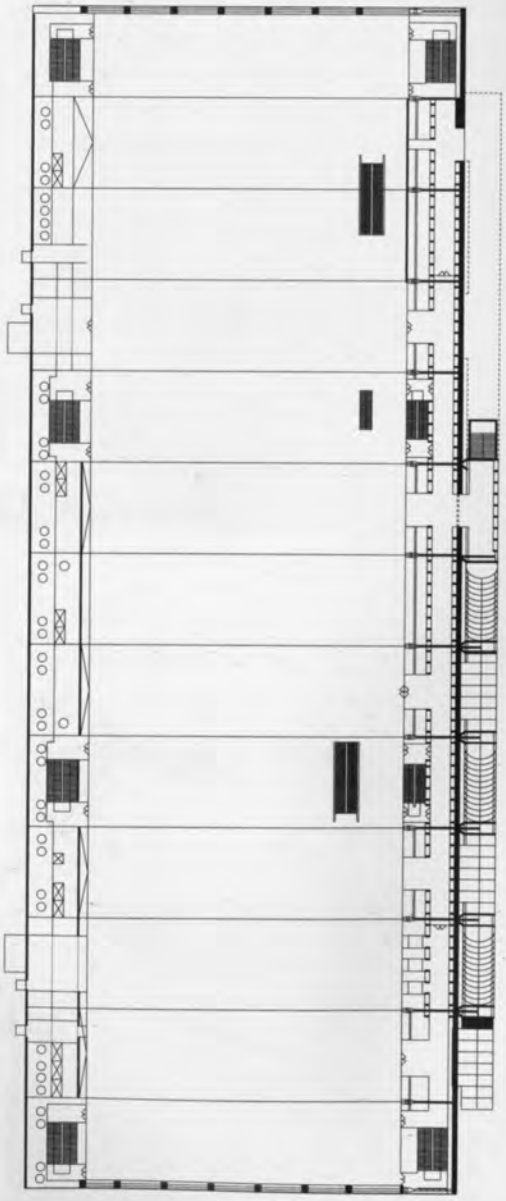
Sainsbury Centre for Visual Arts, University of East Anglia, Norwich, UK. Norman Foster, 1978. A big column-free space, not unlike a factory, ready to accommodate changing exhibitions and installations.

Sainsbury Centre exterior. Structure and services wrap around the space; factory-like in appearance as well as concept.

Section and second floor plan

0 10 20m
30 60 ft





Centre Pompidou, Paris, France. Renzo Piano and Richard Rogers, 1977. Football pitches of flexible, fully serviced space created by an ingenious tensioned structure.

Centre Pompidou

High Tech's preference for flexible plans was taken to an extreme in the Centre Pompidou. The client's brief included a library, a museum of modern art, another of industrial design, a theatre and a cinema, not to mention all the cafés, restaurants and shops essential to any modern cultural venue. But the brief hardly mattered because, in principle, anything could happen anywhere. Every arrangement was to be provisional. Achieving this degree of flexibility required engineering on the scale of bridge-building. Steel trusses spanning the whole width of the building were too heavy to be supported on simple columns. Their weight had to be balanced by pivoting brackets known as 'gerberettes' (named after their inventor, Heinrich Gerber) anchored to the ground

(Above) Centre Pompidou detail. Exposed pipes and ducts on the Rue du Renard side of the building.

who initiated this trend, in his Italian pavilion for Expo '70 in Osaka, which featured a tensioned external steel structure not unlike a miniature, single-storey version of the Pompidou frame. As we have seen, Norman Foster, and his then partner Michael Hopkins, had been content to tuck structure and services away neatly behind slick skins or louvred screens. But after Pompidou came a rash of otherwise straightforward industrial buildings made into eye-catching architecture by external steel frames, often painted in primary colours. Richard Rogers's 1982 Inmos microchip factory in Newport, south Wales (a convergence of 'High Tech' in the stylistic sense with 'High Tech' in the digital sense) is perhaps the best example. Its plan, naturally, is a plain rectangle, single storey, with external walls of square, detachable panels. These walls are hardly noticeable, however, in the glare of the elaborate apparatus that looms overhead. Structure, services and circulation are all combined in a central spine. Air-handling units, important to create extra-clean manufacturing conditions, are lined up on the roof of the spine between tall steel frames from which the exposed tubular roof trusses are

(Below) Renault Distribution Centre, Swindon, Wiltshire, UK. Norman Foster, 1982. Gothic High Tech: masts are anchored to the ground like reverse flying buttresses.

by tension rods. The football pitches of fully serviced space that this structure created have proved over the years to be less a source of joyous freedom than of expensive awkwardness. Interior spaces still had to be created, suitable for human activities such as sitting in an audience, walking round an exhibition or drinking a cup of coffee, and this proved more difficult in practice than in theory. The heavy engineering was also problematic, requiring frequent renovation. Fireproofing, for example, was a headache from the start. In a road or railway bridge, steelwork can simply be painted to prevent corrosion, but the steel frame of a building must be covered in some form of insulation so that it doesn't weaken and collapse in a fire. A few years after completion of the Centre Pompidou, spray-on insulation could be seen slowly dropping off the building in great grey globs. An internal frame would have been easier to fireproof, but this frame was exposed to the weather; its 'expression' was an essential part of the architecture.

And here we come to an important aspect of the High Tech style, indeed the aspect with which it is most associated in the public eye: the exposure of structure and services – the bones and guts of the building – on the outside where everyone can see them. It may have been Renzo Piano

(Above) Schlumberger Research Centre, Cambridge, UK. Michael Hopkins, 1985. A tent like a circus big top covers a winter garden at one end and a drilling test rig at the other.

Hopkins House, London, UK. Michael Hopkins, 1976. The architect's own house, a homage to the Eames House in California of thirty years earlier.

suspended by tension rods. The whole arrangement is like a functional diagram – symmetrical and perfectly legible. All steelwork is painted blue.

Norman Foster's response to this challenge was the Renault Distribution Centre in Swindon, completed in 1982. Its steel frame is arranged in square bays with masts at the corners from which slightly domed roofs are suspended. This time the steelwork is painted bright yellow. Red was also a popular colour, for example in Richard Rogers's 1981 Fleetguard factory at Quimper in north-west France and Nicholas Grimshaw's Ladkarn factory in London of 1983. The bright colours soon went out of fashion but the roof suspension structures, now painted black, lived on in, for example, Grimshaw's Oxford Ice Rink of 1984 and Michael Hopkins's Schlumberger Research Centre in Cambridge of the following year.

Hopkins, leaving the Foster office in the mid-1970s to set up in practice with his wife Patty, produced some of the most inventive and refined High Tech buildings, beginning with his own London house of 1976. Essentially a homage to the Eames House in California of 1949 (see page 194) it is a rare example of a domestic application of the style.

Perhaps only architects can live comfortably in a box made of profiled metal and glass.

The Schlumberger Research Centre, built for an oil exploration company, is the most spectacular of Hopkins's industrial buildings. Two parallel, single-storey Miesian blocks with exposed roof trusses house offices and laboratories. Between them rises a tent like the big top of a three-ring circus. It shelters two drilling test pits and a 'winter garden' that serves as a meeting place for the researchers. The choice of a tent rather than a solid building to cover these quasi-external spaces was inspired. Its steel frame is external and equipped with all the raking struts and tension rods that had by the mid-1980s become de rigueur in a High Tech building. Fabric structures of this kind, sheltering inside/outside spaces, became something of a Hopkins trademark, even after he had undergone a mid-career metamorphosis, replacing steel and glass with brick and timber as his default materials.

This transformation began in the new Mound Stand at Lord's Cricket Ground, completed in 1987. For construction planning reasons, it made sense to preserve and renovate the old arcaded, brick base of the stand before erecting a steel superstructure crowned by a fabric canopy. Hitherto unfamiliar with brick as a material, Hopkins seems to have fallen in love with it. He proceeded to build a series of important buildings for British establishment clients, including the Glyndebourne opera house in Sussex, completed in 1994, and the new parliamentary building in Westminster, Portcullis House, completed in 2000 (see page 414). These can no longer be classified as High Tech, though they share at least one important characteristic of that style: its insistence on complete honesty. A brick wall in a Hopkins building is always a real, loadbearing structure, not just the facing of a steel or concrete frame.

Lloyd's Building

In 1978, perhaps reassured by the success of the Centre Pompidou, another British establishment client, the Lloyd's insurance market, engaged Richard Rogers to prepare a development plan for the organization's various premises. Unsurprisingly, this brief eventually turned into a proposal for a new building in the City of London. It was to be one of

(Above) Glyndebourne opera house, Sussex, UK. Michael Hopkins, 1994. The High Tech doctrine of truth to materials still applies. Brick arcades are genuinely loadbearing.

(Left) Mound Stand, Lord's Cricket Ground, London, UK. Michael Hopkins, 1987. The renovation of an existing brick arcade seems to have converted Hopkins into an enthusiast for natural materials.

the two culminating masterpieces of High Tech completed in 1986, the other being the Hongkong and Shanghai Bank (see below). Whereas Hopkins's style altered and softened as the establishment commissions began to arrive, Rogers stuck to his High Tech principles even for the bowler-hatted gentlemen of this 300-year-old institution. The basic idea was simple: the market or trading floor, traditionally known as the Room, would be accommodated in a single, multi-storey, rectangular space surrounding a central atrium with escalators. This would be the served space. Everything else – all the servant elements, including lifts, toilets, escape stairs, mechanical plant and ductwork – would be fitted to the outside. The complex visual outcome of this strategy is shockingly like a piece of pure engineering, an oil rig perhaps, or a power station. The clarity of the underlying diagram is further obscured by the stepping down of the Room on the south side, exposing the glass barrel vault over the atrium like a fragment of every High Tech architect's favourite nineteenth-century building, the Crystal Palace. Every element conforms to High Tech principles: lift cars are fully glazed wall climbers; toilets are housed in separate metal-clad pods with round windows; escape stairs are boldly articulated; plant is contained in modular towers like stacks of containers; air ducts, both horizontal and vertical, are tubular, with dimpled silver casings. The main structural frame is concrete, not steel, to avoid the fireproofing problems of Pompidou, but it is nevertheless cast in steel-like profiles, with cylindrical columns, brackets and diagonal bracing.

(Left) Lloyd's of London, London, UK. Richard Rogers, 1986. A complicated exterior makes possible a simple multi-storey 'omniplatz'.

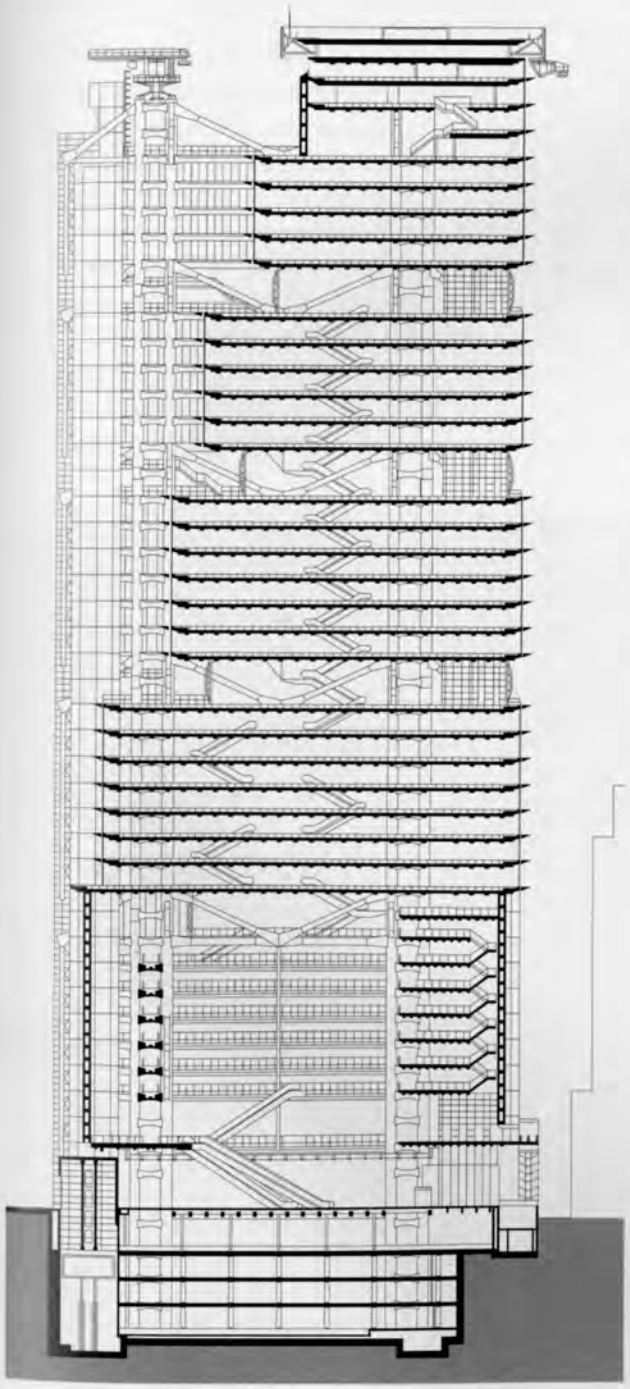
(Opposite) Lloyd's of London, interior. The atrium is animated by escalators. Note the concrete columns with steel-like profiles.

Hongkong and Shanghai Bank, Hong Kong, China. Norman Foster, 1986. Three multi-storey suspension bridges rise side by side to different heights, creating an indeterminate form.

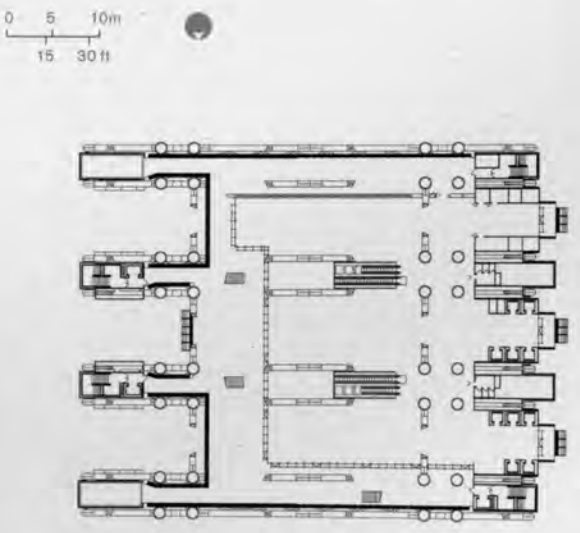
Hongkong and Shanghai Bank

Meanwhile, in Hong Kong, Rogers's friend and rival Norman Foster was talking to another venerable institution, the Hongkong and Shanghai Bank. The bank had occupied its 1 Queen's Road Central site since 1865. Its current building, designed by Palmer and Turner in the mid-1930s, was well loved, especially for its Art Deco banking hall, but was short of office space. The brief to Foster was simple, therefore: stay on the same site, keep the banking hall, and build a skyscraper to accommodate the offices. It is worth remembering this original brief when looking at the completed building. Why does it look like a multi-storey suspension bridge? Because it was originally designed to bridge over the preserved banking hall. At some stage in the development process it was decided that the banking hall could go after all, but it was too late to rethink the bridge idea.

But perhaps the bridge idea also appealed to Foster for other reasons. That preference among High Tech architects for open, flexible spaces is hard to satisfy in a conventional skyscraper because the central structural and service core leaves only a relatively narrow strip of usable floor around the perimeter. Foster therefore rejected a central-core plan and instead gathered the servant spaces and vertical structure on either side of the served space – an arrangement that naturally implied a bridge-like structure. Having created an open space on each floor, he then tackled the other unsatisfactory aspect of the conventional skyscraper: that every floor is spatially divorced from every other floor. To move from one floor to another, one must pass through an intermediate enclosed space, either a lift or an escape stair. Space, in other words, is discontinuous, and flexibility of use is compromised. Foster's solution was to unify the served space by means of escalators, as he had done on a smaller scale at Willis Faber, and indeed as Rogers was doing at Lloyd's. These two innovations – the bridge-like structure and local circulation by escalator – amounted to a reinvention of the skyscraper.



East-west section and plan at level 28/29



Many alternative designs based on these principles were produced during the development period, including the so-called Chevron scheme, which structurally treated every individual floor as a suspension bridge, resulting in a proliferation of diagonal tension members. The final building is less radical but revolutionary nevertheless. Bridge-like horizontal structural elements occur at intervals in the height of the building, with between seven and nine floors hanging from each one. Continuing the multi-storey suspension bridge analogy, there are really three of them, like three towers placed side by side, each rising to a different height. This creates the impression that the building is unfinished, that the two lower towers might one day be extended upwards to match the highest. The form is partly the result of local regulations to prevent overshadowing. Floors are also set back in the other direction, between the massive composite steel masts. But the indeterminate look is quite deliberate. It is as if the building were a system temporarily configured for a particular situation rather than a fixed, finite form. Nobody believes that the lower towers will ever actually be 'finished' or the missing sections of floor filled in, but the unfinished look is in tune with High Tech's flexibility principle.

So, if the structure is essentially a bridge, what does it now bridge over? The answer is nothing, just an open paved area, which, paradoxically, has become one of the building's best-loved features. Accessible to the public at most times, it is a popular shady picnic spot. It is also the very unconventional main public entrance to the building. Two angled escalators appear to have been lowered onto this pavement from above like gangplanks. Taking the up escalator, one rises through the glass 'underbelly' of the building into a cavernous ten-storey-high atrium that has been created by simply omitting the lower floors of the central multi-storey bridge. The 'front door' of the building is therefore a horizontal shutter closing off the escalator when not in use. It could hardly be more different from the grand classical portico that one traditionally associates with bank entrances.

In the design and construction of the Hongkong and Shanghai Bank, Foster's habit of collaborating with building component manufacturers became standard procedure. It was even given a name, though a rather dull one: 'design development'. Representatives of the Foster office were sent out to work with specialists all over the world. The structural steelwork came from Britain; the external cladding, including the very complex aluminium sheathing of the fireproofed external structure, came from the United States; the prefabricated toilet and plant modules stacked up in the service towers came from Japan. Every element of the

Eden Project, Cornwall, UK. Nicholas Grimshaw, 2000. More organic than High Tech, like frogspawn or some weirdly fruiting fungus.

building was rethought from first principles. Almost nothing was taken from a standard catalogue. The result was one of the most technically advanced buildings of the twentieth century – and one of the most expensive.

In the Lloyd's Building and the Hongkong and Shanghai Bank the principles of High Tech were triumphantly vindicated. Those buildings marked a high point but also a change of direction. The style's main protagonists, now firmly established, began to explore new architectural territory. Already in the mid-1980s Norman Foster was designing a 'mediatheque' in Nimes in the south of France, for a site opposite the well-preserved Roman temple known as the Maison Carrée, in very un-High Tech materials: concrete, bronze and local stone. A note in Foster's handwriting on an early sketch states: 'No diagonals in structure – must not look industrial'. Richard Rogers began to take an interest in traditional urban form, a topic remote from the usual concerns of High Tech. Eventually, in 1997 he wrote an influential book on the subject called *Cities for a Small Planet*. Even Nicholas Grimshaw, most dogmatic of the group, showed signs of shifting his interpretation of High Tech principles. The cluster of geodesic domes at the Eden Project in Cornwall, completed in 2000, suggest an organic rather than a technological inspiration. They appear to have grown spontaneously in their disused-quarry site, though in fact they were painstakingly constructed on a mass of temporary scaffolding.

Stansted airport

One late High Tech building, completed in 1991, deserves special mention because of its enormous international influence. Stansted Airport (London's third, after Heathrow and Gatwick) marks a turning point in the design of airport terminals. Norman Foster brought to the job a personal interest in flight (he is an experienced pilot) as well as his by-now formidable analytical design skills. The main idea, following the usual High Tech preference for spatial simplicity, was to house all of the public functions – departures and arrivals – in one big room. Passengers would be able to see where they were going and would no longer be completely reliant on stress-inducing signs and announcements. But the most influential aspect of the design was the lightweight, billowing roof. All mechanical plant is consigned to an undercroft, relieving the roof of the usual clutter of ducts, access walkways and suspended ceilings. Air, water, electricity and artificial light are supplied to the space via the four-strutted, tree-like steel columns. Following publication of the building, tree-like columns almost instantly

London Stansted Airport, Essex, UK. Norman Foster, 1991. A high, day-lit space, roofed by square domes and cleared of the clutter of mechanical and electrical services.

Chek Lap Kok Airport, Hong Kong, China. Norman Foster, 1998. The design principles of Stansted applied at a much larger scale on an artificially extended island.

became an architectural cliché, cropping up in forecourts, bus stations, and railway platforms everywhere. But more importantly, the example of the big public hall with an unencumbered roof admitting daylight to the heart of the building was followed by airport designers around the world, from Richard Rogers in Madrid to Kisho Kurokawa in Kuala Lumpur and Renzo Piano in Kansai, Japan. Foster himself refined the form in Hong Kong's Chek Lap Kok airport, opened just after the colony was handed back to China in 1997, and at Beijing's huge Terminal Three, completed before the opening of the 2008 Olympic Games (see Chapter 33). These later versions, with their flowing, computer-generated forms, make little Stansted look almost primitive, like a pre-war biplane.

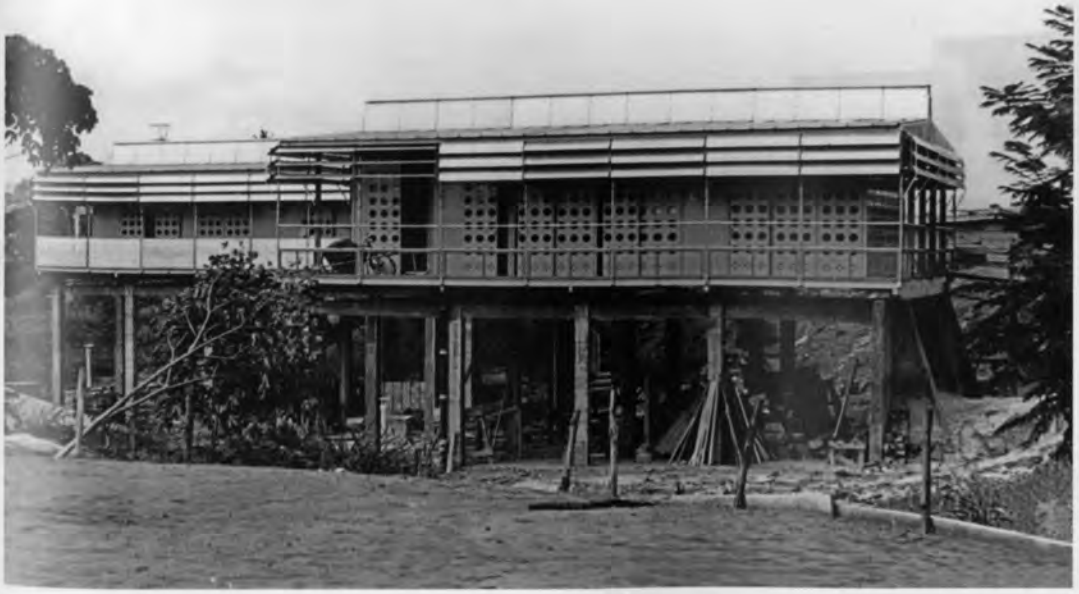
By the turn of the century the High Tech style had lost its distinctive identity, but the architects associated with it – Rogers, Foster, Grimshaw and Hopkins – now fêted and honoured, continued to run large international practices. They were turning into the grand old men not just of British, but of world architecture. A 2014 BBC television series devoted to them was called *The Brits Who Built the Modern World.*

Jean Prouvé

Jean Prouvé was president of the jury that awarded Renzo Piano and Richard Rogers first prize in the Centre Pompidou competition of 1971. But this was by no means his only contribution to the progress of modern architecture. He had earned his place in its history long before he became an inspiration to High Tech architects.

Prouvé was not an architect but a creative metalworker who drew his inspiration from the constructive potential of the materials he knew – steel and aluminium, especially in the form of sheets, folded, pressed and welded. Though always a believer in the benefits of industrialization and mass production, he began by making crafted furniture and special components for architects, and arguably remained in that role for the rest of his career. In the 1920s and 1930s he collaborated with Le Corbusier's studio, including Pierre Jeanneret and Charlotte Perriand, with Robert Mallet-Stevens, and with the Beaudouin and Lods partnership, for whom he designed and made the innovative metal and glass external cladding of the House of the People in Clichy on the outskirts of Paris, completed in 1938. After the Second World War he experimented with prefabricated housing units as emergency accommodation and succeeded in building a small permanent development, which still exists, in the Paris suburb of Meudon. In the early 1950s his workshop at Maxéville employed 200 people, but he was a better craftsman than a businessman and, needing more investment, he allowed it to be taken over by L'Aluminium Français, who eventually wrested it from his control.

One of Prouvé's buildings has in recent years become something of a monument, though a prefabricated and portable one. His Tropical House, prototyped in 1949, was designed as a house suitable for colonial administrators in Africa. It vaguely resembled a bungalow on stilts, with a shallow, pitched roof and a surrounding balcony/verandah, but its legs were steel and its walls were aluminium panels, some of them with circular windows. In theory it could be made in France, packed neatly into the cargo hold of an aeroplane and erected quickly on its African site without much need for local labour or materials. In practice, the cost of manufacture and transport was far too high for the project to be viable. Three Tropical Houses nevertheless made it out to Africa, one to Niamey in Niger and two to Brazzaville in what is now the Republic of Congo. In 2001 the Brazzaville houses were 'rescued' and brought back to France for restoration and exhibition. Whether they served as demonstrations of Prouvé's creative genius or as symbols of late colonial hubris is a matter of debate. There is no doubting their value on the modern art market, however. One was sold at auction in New York in 2007 for almost $5 million.



Tropical House, Brazzaville, Republic of Congo. Jean Prouvé, 1949. Fabricated in France and assembled in Africa to house colonial administrators, in practice it proved too expensive.