

Chapter 5 Space

Is mobility a new kind of place? Boosters of the new economy promoted "anytime, anywhere" as a value. Did they succeed? In all societies, people seem willing to devote, on average, between an hour and an hour and a half a day just moving around. As Ivan Illich pointed out back in 1974, the typical American devotes more than 1,600 hours a year to his car. He sits in it while it moves, and while it stands idling. He parks it, and searches for it. He earns the money to put down on it, and to meet the monthly instalments. He works to pay for petrol, tolls, insurance, taxes and tickets.¹ In Seattle today, commuters spend 53 hours a year stuck in traffic, over and above their normal commuting times. They burn 81 gallons (307 litres) of petrol while their cars stand motionless.

Aborigines dream in the vastness of the outback. Dream time for modern man takes place in traffic jams. Some designers argue that we should start designing the experience we have on transport routes, not just the hubs and intersections where we depart, and arrive. We should shift our design attention from fixed aspects of physical infrastructure, they say – such as tracks, buildings, and vehicles – and focus more on the experience of moving around. It is indeed an under-studied experience. Social scientists do endless research into the impact on behaviour of television, or the computer, but there have been few behavioural critique of modern mobility. This is a gap, because moving around has transformed the way we experience 'here' and 'now' and 'there' and 'then'.

Design policy for the space of flows is a hot debate in the Netherlands, where I live. In probably the most designed country in the world, the national architecture institute, NAI, recently staged a huge biennale on *Mobility*. Mobility's curators drove around Dutch motorways in a car which contained four cameras. Highways are the most intensively visited public space in the Netherlands, they argued; the experience of driving along them should be more carefully designed. To critics, the exercise suggested that architects care more about what things look like, than about the processes that lie behind them. Having set out "to come to grips with the issue of infrastructure," *Mobility* did not question the causes of mobility, still less ponder how to modify its rapacious growth. But the event did start a nationwide debate² Some planners question whether we need spatial planning at all in this era of dynamics and flux. Luuk Boelens, a planner working with Europe's

High Speed Train network, believes we should devote "more attention to the *genius fluvii* in the network society – the spirit and atmosphere of movement, of dynamics, of changeability".³

What would it mean to design for the perpetual mobility? As a too-frequent traveller, this writer has long pondered the curious state of mind induced by modern movement. As well as being thresholds between land and air, modern airports, for example, are gateways to complexity. Through them, we enter the operating environment of global aviation, one of mankind's most complicated creations. But in airports, although we are isolated from the rhythms of the natural world, we remain ignorant of how this artificial one works. The result is to reinforce what philosophers call our ontological alienation, a sense of rootlessness and anxiety, of not quite being real, of being lost in space. Aviation is typical in many respects of the way the whole world is going: saturated with information and systems; complex but incomprehensible; an exhilarating human achievement, and a terrifying prospect, at the same time. During the twentieth century we marvelled. Now, it's time design got to grips with these ambiguous features of our technological society.

Different kinds of space affect the way we think and feel. Airport or transport nexus building plans, of the kind you would find in an architect's office, say almost nothing about the quality of our interaction with mobility space, the operating environment within which airports, airplanes, electronic signals, and people, interact with each other continuously on a global scale. And yet it's the aviation system as a whole determines what architects would call the *programme* of an individual airport building – and it's a phenomenal system. In 1993, the world's airlines first carried more than one billion passengers on scheduled flights in a single year – that's equivalent to one sixth of the world's population. Airlines also carried 22 million tons of freight that year – almost a quarter of the total value of the world's manufactured exports. It took something like 12 million aircraft departures to carry such stupendous quantities of people and goods around the world. These were to and from about 16,000 airports in the United States alone – perhaps 30,000 in the world? Nobody actually knows: no single organisation represents them all.

The aviation system's earthbound infrastructure is simple compared to the complexity of its operating environment, or aviation space. The aviation system, of which airports are one component, is distributed not just in space, but also in time. Airports exist at the intersection of airways – the space through which aircraft pass – which are densely criss-crossed, in three spatial dimensions, and at different times – by the routes planes are flying, did fly, and will fly. Aviation space is saturated with electronic information from humans and machines, chattering out directions to thousands of aircrew – and onboard computers – at any one moment. The fact that people – passengers, aircrew, ground staff, air traffic controllers and the like – are part of the system, too, means that, when it comes to complex environments, the banks and dealing rooms that feature so prominently on television as symbols of modern space are simple compared to airports. Airports are the most advanced smart buildings on earth.

Expansion of the system, and in particular the rate of building of new airports, is staggering. By 2003 there were 600 million or so airline arrivals per year; 300,000 people are in the air at any one time above the United States alone. Once a year, Airports International magazine lists hundreds of new airport projects around the world. Many are in places this writer, for one, has never heard of – exotic towns spending tens and hundreds, even billions of dollars on new facilities. No single entity is coordinating this phenomenal expansion of world aviation. It's just happening. Compound growth in air travel and transport of six per cent or more is a visceral response by the market to apparently limitless demand. Thousands of airlines further complicate the picture. The break-up of Aeroflot produced 800 new ones in the former Soviet Union alone. Politically, airports have become economic and political touchstones against which cities and regions measure their status in the world. In post-Cold War Europe, more than 300 emerging cities or regional entities are competing with each other to attract increasingly mobile capital and jobs. For them – and for hundreds of other cities and regions around the world – an airport has become a strategic priority.

These huge flows of people and matter and information are increasing in volume and power all the time. The biggest international airports and major hubs – the United States alone has 30 – are like giant pumps that greatly increase flow through the whole system. Phenomenal costs land on those places that wish to join the hub club. A single 747-capacity runway costs around \$200m. An international passenger terminal ranges from \$100 million upwards. Once road

and rail links, baggage handling systems, air traffic control systems and so on, are factored in, the capital cost of an international airport quickly exceed a billion dollars. Japan's Kansai airport cost \$15 billion – insofar as anyone actually knows the full amount, or is prepared to say.

The ground traffic generated by all those workers, passengers, well-wishers, cab drivers and so on, is enormous too. Los Angeles International generates more than 150,000 vehicle trips a day in and out of the central terminal area alone. That number excludes traffic in long-stay car parks, warehouses, nearby hotels, and their suppliers. For planners, an airport is like designing a traffic system for a city with more than half a million inhabitants. Airports also have huge workforces. Frankfurt, whose workforce is well over 40,000, is the biggest single-site employer in the whole of Germany. London's Heathrow, in order to handle more than 1,000 airliner movements a day, employs 55,000 people directly – meteorologists, air traffic controllers, pilots, cabin crew, cleaners, caterers, check-in staff, baggage handlers, engineers, firemen, police, security guards. Heathrow's staff numbers exclude more than 300,000 or more people employed by a myriad suppliers. All those van drivers and sandwich makers. Airports are also the world's largest employers of dogs.

It is only because airports are multinational businesses in their own right that costs on this scale can be sustained. Indeed, commercial activity on the ground, not aircraft taking off and landing, is one of the main drivers of airport design. Less than 50 per cent of Heathrow's earnings come from landing fees or servicing aircraft. International transit passengers *not* flying spend an average of \$35 a head at Heathrow's hundreds of shops, restaurants, hairdressers – and four caviar bars. Heathrow is also the largest market for Havana cigars in the world – including Havana.

These powerful forces drive the way both space and time are designed. In the olden days, when airports were planned and operated as transport utilities – if only for an elite – engineers and operations people would have regarded an idle passenger as evidence of system inefficiency. Not today. Mobility is just one of the products on sale at a modern airport. To commercial managers, 'passenger discretionary time' or 'dwell time' – the time spent by passengers killing time between flights – is a sales opportunity. The management of dwell-time to optimise commercial yield is one reason – traffic jams are another – that between

1950 and 1990, the proportion of time spent in the air by passengers on a journey has steadily decreased. The transport economist John Whitelegg has observed that the amount of time each person devotes to travel is roughly the same regardless of how far or how fast they travel. Facilities are sited further apart, and people have to travel further to reach them than they did 70 years ago. "Time is money, we are told, and increasing mobility is a way of saving time", says Whitelegg; "but how successful are modern transport systems at saving time?". If air travel is any guide, the answer appears to be: not very much.⁴

In fact, the faster we go the less time we feel we have. Following on from the work of Ivan Illich in the 1970s, the German sociologist D Seifried coined the term "social speed" to signify the average speed of a vehicle (and its passengers) after all sorts of hidden time costs are added in. So in addition to 'getting to the airport' time – and dwell-time once you get there – Seifried reminds us about the time spent earning the money to go on the journey in the first place. Some urban designers have introduced the concept of time planning to take account of these hidden costs of travel. Air travel purists, wedded to the fantasy that air travel denotes fast and efficient mobility, face worse disillusion ahead. London's Gatwick, for example, has developed a \$40 million airport theme park whose target is one million people a year – 'travellers' whose only destination is the airport itself.

Apart from shopping and leisure, airports are used with increasing intensity by businesses, especially virtual corporations that have forsaken headquarters buildings for a life on the road. The growing amount of business carried out across national boundaries in the new economy has fuelled demand for meeting rooms, exhibition and showroom facilities, business centres, and other non-travel-specific facilities – inside, next to, under, and on top of, most new airports. Airports have replaced science and business parks as the epicentre of business real estate.

These multiple programmes and agendas – operational, commercial, political – are one reason when writers like Deyan Sudjic started talking about airports as cities – "cities of the air" – airport managers were quick to adopt the same language. The comparison is not fanciful. Cities and airports cover large areas, and both are a complex of intersecting transport systems, economies, buildings, and people. The crucial difference is that cities have inhabitants; at airports,

everyone is transient. Herein lies one element of the airport's existential ambiguity. The American writer Richard Sennett regrets the trend for cities to become more like a pump for traffic, than a place to live. He attacks planners who describe a local airport as a 'traffic-flow support nexus'. "When public space becomes a derivative of movement", says Sennett, "it loses any independent experiential meaning of its own. On the most physical level, these environments of pure movement prompt people to think of the public domain as meaningless... It is catatonic space".⁵

The word catatonic is horribly apt as a description of the way these great modern spaces make us feel. What is going on, when they have this effect? Any space, including artificial space, affects our minds and our bodies. But artificial environments shield us from phenomena like climate, and particularly daylight, whose cycles in the natural world expose us physically to the reality of constant change. In an optically static environment, like most airports, the body is physically desensitised from its sense of time. In an essay called *The Poetics of Light* the American architect Henry Plummer observed that "our very sense of being is based on an experience of process, activity, and movement. We seem to find an image of our own existence in the changing lights of the natural world". Moment-to-moment mutations of light also provide what the philosopher Henry Bergson called "lived time", and Ernst Cassirer "a consciousness of sequence". I was reminded of this when, wandering slack-jawed around Anchorage airport en route to Japan, I accidentally stepped outside into an Alaskan night: it was literally like waking up from a dream. Startled by the cold, dank spooky Alaskan air, I lost my bearings for a moment. Where was I? Nature, the real world, seemed alien. Luckily, a blast of noise, and the warm embrace of kerosene fumes, reminded me where I was.

Lived time, natural time, cold, dank spooky Alaskan air time, stands in stark contrast to the so-called objective time of clocks and departure times at airports. According to the psychologist David Winnicott, loss of temporality is a feature of the psychotic and deprived individual, in which a person "loses the ability to connect the past with the present". The bridging of the present into the past, and into the future is, says Winnicott, "a crucial dimension of psychic integration and health". So there you have it. Air travel, by scrambling your mind-and-body clock, creates the preconditions for psychosis. So that's another reason it makes you

feel strange!⁶ This should not be news to architects. In the 1930s, a well known investigation called the Hawthorn Study⁷ analysed a connection between light and mental comfort. Hawthorn's work represents the pre-history of environmental psychology – a specialism that gave us the term 'sick building syndrome', and the development of so-called 'environmentally porous' new buildings. The smartest new structures now let fresh air and daylight in.

Airports and other advanced transport systems, like the High Speed Train, pose two main challenges to a designer wishing to improve the experience for its users. First, the designer confronts contradictory operational and commercial agendas; second, she has to tackle the impact of complex artificial environments on our physical/mental state: and third, the design and re-making of these spaces never stops; indeed, the rate of change accelerates.

The contradictory agendas of airport operators are by themselves an intractable problem. The architect is one of the few people – along with the planner and the economist – who grapples materially with the big picture – the totality of the aviation system. Amsterdam's Schiphol Airport is “run” by a small group of people, but they do not direct what the 50,000 people who work there do. Almost everyone is a specialist in one bit of the system' the main task of their senior people is to manage the interactions between conflicting agendas. In such a context, the chances of an architect imposing a coherent and stable design solution are small. We will return to the consequences of that in a moment. The second problem – of artificial space which isolates us from the rhythms and sensations of nature, can at one level be tackled by letting in fresh air and daylight – as any parent, opening a child's window at night, knows intuitively. Window manufacturers are making a huge song-and-dance out of the fact that their latest high-tech products, some of which are being used in airports, can actually be opened. Even where windows remain sealed, letting in daylight is now a requirement in airport design.

Perceptual confusion is a harder design nit to crack. Countless modern writers, from Karl Marx, to Baudelaire, to Richard Sennett, have written about the alienation we feel in modern spaces. Urban anxiety is part of our culture. Psychologists who study the phenomenon have discovered the importance of what they call "situated understanding" – a phrase of Hubert Dreyfus – the fact

that having a clear mental picture of an artificial environment contributes to one's mental health.

When it comes to giving us a clear mental picture of our environment, the design of airports has not excelled itself in recent years. In most of them one is situated in a box, and it feels like it. The first airports were shacks on the edge of bumpy fields, but during aviation's glamorous period, airports acquired the status of modern cathedrals. Eero Saarinen's TWA terminal, in New York, had a particularly strong impact on the public imagination; it became for many critics a symbol of modernity. But, as Reyner Banham recalls, the TWA terminal was obsolete before it even opened. It was designed for fleets of propeller-driven Lockheed Constellations, but by the time it opened the first jets, the Comets and Boeing 707s, were in use, and the building had to be encrusted with jet-blast deflectors. Today, Saarinen's masterpiece at JFK has all but disappeared from sight. You glimpse it every now and again, cowering between lumpish great buildings like a lost child in Times Square.

Airport planners, swimming in a sea that keeps on rising, can't really help but think in terms of boxes. Boxes contain lots of space; they can be packed together; and they stack up nicely, like Lego, when you need to expand. The result is usually functional, bland, and forgettable. Creative architectural solutions do not necessarily improve the travel experience. Roissy Charles de Gaulle in Paris, for example, is a design monument to system complexity and flows – and is a nightmare to use. I must have been to Roissy 40 times over the years, and it's nice, as you glide down its capillary-like tunnels into the featureless aorta of the main building, to imagine oneself in a Jacques Tati movie – or in one of those exhibits in a zoo where ants crawl up and down transparent tubes from one nest to another. But when it comes to getting out of the place I still have to think twice, ask at Information, and wander around, just to find the railway shuttle bus. The experience is typical of any building which serves the system, rather than the system's users.

Architecture lacks a pleasing language for flow-based contexts of this kind where large numbers of people, as well as data, are passing through. Bernard Tschumi put his finger on the problem when he wrote: "three thousand years of architectural ideology have tried to assert that architecture is about stability, solidity, and foundation – when it is the very opposite. Like modern scientific

knowledge, buildings are constantly on the verge of change." ⁸Another student of the architectural design process, Donald Schon, concluded that design is now increasingly taking place "beyond the stable state". ⁹ For his part Rem Koolhaas finds that architects are confronted by an arbitrary sequence of demands – "parameters they did not establish, in countries they hardly know, about issues they are only dimly aware of. More and more substance is grafted on starving roots". The trouble is that although Koolhaas the critic understands the problem, Koolhaas the architect can't do much about it. His mammoth design for Euro-Lille, in France, celebrates space, change and movement – but does virtually nothing to give passers-through a cognitive sense of place. You feel like one of those tiny humanoid figures architects use to decorate their models – sleek, but blind.

Some airports at least try to make their spaces interesting. Schiphol, for example, installed a large Jenny Holzer artwork in one particularly vapid void. Cryptic words and phrases flow up and down the 20 metre-high stack of digital displays, all day long. Holtzer presumably spent a lot of her life staring at departure boards, but her large, strong, clearly-conceived, and well-executed art intervention is pitiful in the context of Schiphol as a whole. Phenomenologically, it is inert. It is powerless to communicate amidst the not-so-silent roar of people, movement and information that pervades the rest of the airport where ten thousand other signs and screens battle for your attention. Their role is to control and optimise flow, to induce your movement in a particular direction at a particular time. They are the graphic design equivalent, for humans, of the metal strips on the floor that robots follow blindly around automated factories. And they can work. When I arrive back at Schiphol the design quality of the banks of video information screens, and those large yellow signs, is a reassuring pleasure. If one is going to be processed by a system, better to be processed by an elegant, even beautiful system, than by a bad one. But even Schiphol's signs are losing their perceptual grip as the space around them expands remorselessly. A sign pointing to "D" meant a lot when Pier D was a corridor, as it was ten years ago. Today, Pier D is continuously gaining width and height; it now feels more like a piazza than a tunnel. "D" has become a place rather than a direction. Paul Mijksenaar, designer of Schiphol's signage system, describes his work as wayfinding design, not sign design. As Schiphol's space bloats, and the flows of people swell, Mijksenaar is keen to increase the number of human guides in airports.

Most architecture and design in the space of flows is a response to system requirements; they rarely direct its development. Like King Canute facing the tide, they lack the influence and tools to improve our experience of airport space. Some operators do try to make their facilities cleaner, easier to use, and mildly more humane. Sometimes they even hang art on walls, or put sculptures in the concourses. But apart from the fact that most concourses are semiotically stronger than most art, this is not really the point. The fundamental logic of airports – their basic operating software – is to process passengers, not to enlighten us.

Airports are more complicated in many ways than the cities they serve, but they are speed-friendly and, in principle at least, everything is integrated. Airport terminals are the most media-saturated places on earth. In combination with thousands of people moving constantly from one transport system to another – passengers from a hundred different countries who are tired, stressed, and befuddled by hours in the air. Airports are a stupendous planning and information design challenge. At Schiphol the sheer design quality of the banks of video information screens, and its large yellow signs, has a calming effect. If one is going to be processed by a system, better to be processed by an elegant, even beautiful system, than by a bad one.

The design of multi-modal, multi-functional, multi-temporal transport intersections is particularly advanced in the Netherlands. A research centre at the University of Utrecht studies the behaviour of visitors to urban nodes and network cities from a time-spatial perspective, and uses state-of-the-art geo-information data sources and other research tools, in the search for ways to improve *accessibility and place quality*. Ben van Berkel and Caroline Bos, principals of UN Studio, have particular expertise in the design of transport interchanges. These projects have become epicentres of extraordinarily complex spatial and building design processes.

Increasingly, in the design of these complex places, high-tech simulations and physical structure influence each other. "The diagramme functions for us as a sort of mediator in between the object and the subject", van Berkel explains. UN Studio sees diagrams for what they call the "the proportioning" of information – representing visually, and where possible in real-time, variable phenomena for a specific location such as climate, budget, construction processes, orientation, and activities. "The aim is to have a generative, proliferating, unfolding effect on the project... not only during its development in the studio, but also afterward, in its

public use", explains Caroline Bos. Van Berkel and Bos describe as "deep planning" the process by which they scan a site for its flow structure. "These scans reveal its real problems and potentials" says van Berkel; "the flows of the physical movements of people and goods reveal the relations between duration and territorial use". The typical product of deep planning is a situation-specific, dynamic, organizational structural plan, using scenarios, diagrams, parameters, formulas and themes, that encompasses the mapping of political, managerial, planning, community and private relations.

A project like Arnhem Central exemplifies this convoluted type of public construction. In this high density project, a multitude of activities are concentrated on a 40,000 m² site: transfer hall, underground car park for 1,000 cars and 5,000 bicycles, tunnel, shops, offices. Six different transport systems converge on the station area. Every weekday 55,000 travellers move through the location as they transfer from one system to another. Movement studies are the cornerstone of UN Studio' design proposals. The analysis of the types of movement on location includes the directions of the various trajectories, their prominence in relation to other forms of transportation on the site, duration, links to different programmes, and interconnections.

Looking outside architecture for inspirational images and diagrams, van Berkel and Bos lighted on the paintings of Francis Bacon who, they discovered, called his paintings diagrammes of the human figure. "Diagrams are kind of map" says van Berkel. They may look abstract, as does a Bacon painting, but they always point at something. Diagrams are maps that point at organization – which can be the organization of space, or time, or movement, or any abstract but no less real phenomena". Diagrammes are also a way to involve clients in the design process, and to modify the way a building is used through time. Designing these perpetual motion environments means combining physical circulation with experiences people may have along the way. It's not enough to design for pure movement: you have to build-in spaces, activities and intersections where people will leave the flow.

Pure movement can be bad for business. Jan Benthem, who with his partner Mels Crouwel is the master architect of Schiphol Airport, recalls the time when the commercial people insisted an area of seating be removed to make way for yet another row of shops. The result was the opposite of that intended: revenues per

square metre in the new shops, and in existing ones next to them, actually decreased. It transpired that the re-design had created a kind of canyon through which passengers rushed like white water in the Rocky Mountains – too fast to stop, and shop. The seats were put back.

UN Studio also pay attention to what they call “kaleidoscope moments” – the turns in flows where movement is tighter or more compact, or where you cross over other flows. “Obstacles to flow can be functional and add value, too” says van Berkel. They work closely with infrastructure and traffic managers who usually have deep expertise about the possibilities, but also limits, in reconfiguring the flows of large numbers of people. For their project to develop a pier in Genoa, Italy, UN Studio transformed a 23,000 m² harbour pier into a three-dimensional piazza. Four main clusters each address a different theme: entertainment, well-being, technology, and commercial experience. The design uses time-based planning represented diagrammatically as a circle of experience. Programmes in the piazza are organised around clockwise activities clustered on the basis of views, time of day, and time of year. Coffee can be taken in the morning sun with a view towards the sea; midday shopping offers shadow; evenings are spent watching the sunset.

Tramjatra

Perpetual motion does not have to mean perpetual acceleration. Michael Douglas, an Australian designer, believes tramways are a great way to move lightly in a rich context. "Tramways curiously run against the grain of industrial logic" he says. "Travelling back & forth, day in and day out, tramways help us encounter and learn about small things of value whilst participating in the larger choreography of a city's metabolism". Many tram systems were eliminated from cities during years of car-oriented urban planning since the 1950's, but they are now coming back. Douglas, in a project called Tramjatra, based in Melbourne and Kolkota (Calcutta), celebrates their cultural, as well as functional, value. "In our enthusiasm for electronic technologies, it's too easy to neglect the value of networks like tramways which already exist" he says. "Tramways facilitate a way of knowing that is embedded in the dynamic time & place of its situation. We need to pursue design practices which weave themselves through the social fabric without damaging it". ¹⁰Some transport planners, too, now regard Kolkota as a paragon of cities because such a high proportion of its citizens people walk to and from

work there. It's a great test bed for the study of pedestrian flow and human behavioural factors. For John Whitelegg, Calcutta is still very much the weather vane or 'canary in the cage' of world transport. It is one of the finest examples in the world of an accessible city. All of the recent rhetoric about creating livable cities or sustainable cities in Europe and North America is nothing compared to the reality of Calcutta which can provide thousands of everyday destinations for its 14 million citizens within walking and rickshaw distances that can be covered in less than half an hour.¹¹

Diversity

Goethe described architecture as frozen music, and for thousands of years, most buildings and products were designed for a single purpose. But our task is becoming more complicated as the necessity to foster innovation moves up the agenda. Spaces designed for a single function – be it movement, sport, entertainment, culture or “work” – are unlikely to foster innovation. Innovation thrives in conditions of diversity, not efficiency. This is why old-style cities remain unmatched as sites of creativity: diverse peoples and cultures are crammed into them in a most un-designed manner.

Mono-functional zones, gated communities, and themed districts, all exclude the opportunity for surprise encounters and combinations – the urban equivalent of the mutation and adaptation that determines evolutionary success in nature. This is why corporate research laboratories are often so bad at innovation. They are conceived and designed as gated communities, isolated physically and experientially from the messy real world. Dark reflective glass often intimidates the visitor on arrival; as often as not, you have to sign a Non Disclosure Agreement (NDA) before being let in the door. I was once late arriving to give a talk at an IBM campus because guards with ferocious dogs would not let me in. The theme of my talk was “transparency in design”).

The people in charge of these spaces – property and facilities managers – tend to focus on the physical workplace more than the social interactions that it contains. They think about the workplace as a machine, not as a context. As a result, they tend to be hopelessly distracted by technology. The concept of “hybrid space” is the latest diversion. Pervasive computing will soon begin to “melt” traditional buildings, the story goes, as furniture and equipment are embedded

with microprocessors, sensors, and actuators, and form communication links among themselves. Research teams in Germany's Fraunhofer Institute are developing "roomware" – computer-augmented spaces in which doors, walls, tables and chairs contain integrated information and communication technology. "The world around us is the interface to information, and for the cooperation of people" says project leader Norbert Streitz; "this requires an integrated design of real and virtual worlds, thus augmenting reality".¹² Displays embedded in the environment provide "place-relevant information", as do interactive electronic walls, interactive tables, and computer-enhanced chairs. Streitz argues that that these technologies will turn everyday places into "cooperative buildings, social marketplaces of ideas and information that will be our workspaces of the future".¹³

Well, maybe, and maybe not. The link between cooperation and technology remains at best unproven. The traditional office of the future, of the kind one sees on the Roomware website, is always bright and high tech and filled with zippy young professionals using computers. But my own experience is that high-tech, high design spaces can hinder, rather than help, innovation.

When new multimedia technologies and internet first appeared, there was excited talk of 'parallel worlds' and escape into a 'virtual reality'. Now the fuss has died down and we are still here- in the same old bodies, on the same old planet. Things are changing as information and communication systems permeate more and more of our everyday lives. But these are changes of degree, not qualitative ones. Information technology is added to reality, it is not an alternative. A recurrent theme found in pervasive computing is 'space as interface' – the notion that there are much broader ways of interacting with information and networks of information than through computers and devices. Physical places, and products for people to use in their everyday lives, are overlaid with information and networks of information – a mixture of hardware and software. Roger Coleman, co-ordinator of the European Design for Ageing Network, draws a parallel with architecture: "we know that the way you design buildings affects the relationships people have within them. The way they relate to each other, and the shape of physical space, affects the shape of relationships. Information has the same kind of potential in reverse: it opens up a new dimension of design, the aesthetics of relationships". Relationships mediated by the things we design are really quite different; we knew that from our history of using telephones – but the internet

adds another, rather strange, dimension that we are only beginning to understand.

In May 1993 I arrived in Amsterdam to start work at the Netherlands Design Institute, where I had been appointed its first director. Builders were already on site at the Fodor Museum, on Keizersgracht, which was to be our home – so I cannot claim to have been involved in the project from the very beginning. But when I first met the architects, Jan Benthem and Mels Crouwel, the roof was off, the foundations were laid bare, and most of the internal space and infrastructure had still to be designed. A full year remained before we were due to open. Following that rather alarming first site visit, I had six years of on-the-job training in the design, commissioning and use of a new building. During that period, we designed and built a new knowledge-based organisation, too – also from scratch – a 'think-and-do tank' whose objective was to re-frame the way we perceive and use design. During those years the building and the organisation interacted in powerful ways – most of them positive, some negative. Our building was frequently criticised for being too stiff. It isolated us from the real world, and from each other. It was beautiful, and a pleasure to be in – but, because of the way the circulation worked, we seldom bumped into each other, or visitors. When we resolved to try and loosen the building up, we discovered that it was not an easy space to change. We considered a dozen ways to make our space smarter: video art installations; interaction design tricks with screens and doorbells; dynamic information screens; flashing lights; sound sculptures; kinetic art. You name it, we considered it. In the end, the single most important change we made was to move two "front of house" people from one end of the building to near the entrance.

Traditional office design deals with many different, interrelated elements, including spatial layout, lighting, furniture specification, material finishes, technology services and catering provision. But it does not deal with the subtleties of social interaction. Neither are space or thing design much use when the needs of the organisation conflict with those of the individual. Traditionally, office managers have been in charge, and employees have had little say over their environment – but it's questionable, at best, whether this delivers innovative workplaces.

These issues were highlighted by the year I spent helping the Museum of Modern Art in New York develop a show called *Workspheres* about the future of the workplace. As a public event, *Workspheres* was an immediate a smash hit, "off the

charts" in the words of one expert on of what's in, and hot, in that febrile town. There were more people at the press preview than attend the public openings of big art shows. The private view itself was simply packed – a heaving, black-clad throng containing everyone who was anyone in architecture and design. The New York Times said that *Workspheres* "falls just short of greatness; modernity is back at the Modern". Unexpectedly, the hype and acclaim depressed me. This smash-hit show told more or less the opposite story about the future of workplace design to the one that really matters. It was full of objects for isolated and inward-gazing individuals – desks, chairs, lights, pens, personal digital organisers (PDAs), laptops. *Workspheres* contained a glittering collection of products – but the story it told was all about gadgets and tools. Little was said about the future content of our work – its purpose, and meaning, how we would do it, where we would work, and when. If gadget-filled *Workspheres* was the new modernity, as the New York Times declared, it was an dispiriting prospect.

Workspheres came when hard questions were being asked about all the physical assets owned by business. In the extreme view, ownership of any kind of asset other than information is a liability. For Bill Mayon-White, a professor at the London School of Economics, the physical assets owned by most corporate giants represent "an albatross hanging around their necks". You gain flexibility by *not* owning physical assets, by concentrating on ownership of intellectual property and moving that around. A big part of the impetus to such thinking came from the Spanish economist Manuel Castells, who wrote evocatively about the networked economy as a "space of flows". We were beginning to understand that innovation is a *social* process that involves complex interactions between individuals, communities of practice, and customers. Fostering these complex interactions – designing the *context* of innovation and learning – brings so called soft aspects of workplace design to the fore: the constantly changing flows of people and ideas that characterise a dynamic learning organisation, and the quality of interactions with other people and communities and customers. The keyword here is *minds* in the in the plural – and in particular the innovative capabilities of *groups*. Learning happens best when people participate in different communities of practice.

The best collaboration environments provide the opportunity to meet, share ideas, discuss, and learn from each other's experiences. Seen in this way, anyone who plays a role in shaping a learning or performance environment – whether they are by training a researcher, a teacher, a multimedia specialist, a programmer, or an

industrial designer – is a designer. Design must allow the user the shape her experience. "Design doesn't end with the opening", says Bradburne, "it begins with the opening". Design does not take place in a situation, it is the situation. As planners, designers and citizens, the trend is towards spaces, places, and communities in which complex experiences and processes combine in new geographies of learning and experience – while also exploiting the dynamic potential of networked collaboration.

Gadgets, furniture, and high-design buildings, are of modest value, at best, in this context. Learning, at all levels, relies ultimately on personal interaction and, in particular, on a range of implicit and peripheral forms of communication. Technology is still very far from being able to handle these liminal communications efficiently. Buildings can – especially if they don't try too hard. "Connections between people can be multiplied by information and communication technologies" says Geoff Mulgan, "but understanding, relationships and trust still depend hugely on space and place".¹⁴

Fostering complex interactions – the constantly changing flows of people and ideas that characterise a dynamic organisation – means designing the context of innovation and learning in a new way. Anything that impedes the free flow of interactions between individuals hinders innovation. For Nobel Laureate Murray Gell Mann, innovation is an 'emergent phenomenon' that happens when a person or organisation fosters interaction between different kinds of people, and disparate forms of knowledge. Re-framed in this way, the task of design is to a new set of questions: what should be plumbed into a particular context? what questions will be addressed? what kinds of people need to be accommodated? what experiential qualities should they have? how should this space influence their behaviour ?

Combining traditional research techniques with new design and user-driven methods, designers are learning now how to map the way communications flowed in different kinds of communities. These 'maps' do not just focus on so-called 'purposive' communication – letters to the bank, calling a taxi, a project meeting – but also embrace all kinds of social and cultural communications – the many ways people build relationships, articulate their needs and fears, and interact informally with friends, family, carers, officials and so on. The dynamic of such projects is to focus on the people themselves, their needs, their habits, their frustrations, their

daily life. Knowledge management is the new imperative – driven by the shift away from a world of goods and services towards one of information and relationships. The keyword here is minds in the plural – and in particular the capabilities of groups. Traditional workplace design emphasised the individual worker; space and equipment for teams has more recently been given attention. Workplace design that fosters continuously changing and complex knowledge relationships and flows is the new priority.

The range of disciplines with an impact on workplace design is widening. Psychologists, for example, describe as 'catatonic space' an environment, such as an airport, that is so devoid of the contextual clues (daylight, heat, wind etc) that we fail to make sense of where (and when) we are. We have known for some time that buildings can be physically sick; now we are discovering that spaces can be emotionally dysfunctional, too, and will need the help of shrinks. The Walt Disney Company employs "imagineers" to ensure that its supremely artificial environments do not become catatonic. We are beginning to see something similar emerge in the offices of knowledge-based companies 'Office clowns', 'animateurs', 'show business impresarios' and other jobs whose role is to generally 'liven the place up'.

Meaning

I learned this lesson a few years back when I arrived in New York to meet my daughter Kate for a vacation. She seemed her normal sunny self but, as we chatted in the lobby of her mother's hotel, we noticed a lump behind her ear. It did not hurt, Kate said, but we resolved to see a doctor just to check. It was a weekend, there was no house doctor on call, so we were advised to go to the emergency room of St Vincent's Hospital a few blocks away. A gothic scene awaited us. There were armed guards on the door. Drunks and junkies lolled on the benches of the waiting room. A half-naked lunatic was running around. And most of the staff in the large gloomy space wore bright pink face masks. Kate, who was six at the time, watched this all with great interest. Her parents were petrified.

We were seen rather promptly by a nurse, and then by a doctor who took one look at Kate's bump and said she had to be admitted. Within an hour she was in a children's ward on an intravenous feed of antibiotics. She had mastoiditis, an infection of the bone behind the ear. So began 17 days of hell. Increasingly

stronger drugs, and then combinations of them, did not work. Kate's temperature soared into the 100s and stayed there. The mastoiditis begat bacterial meningitis. It looked – and was – very bad indeed.

And the doctors were unsure what to do. Quite soon, two different teams had become involved, paediatrics and surgery. The paediatricians wanted to stick with the drugs; the surgeons said drugs would never do it, and wanted to operate. The doctors examined Kate a lot. They would look at her charts. Someone would lay a hand gently on her head. In her room, they were gentle and respectful, but out in the corridor, and back in the staff room, they would argue, constantly. They would pore over crumpled printouts from online research someone had done earlier. They would look at the endless test results. Boy, did they argue. For us, as parents, these arguments added to our terror. In Britain, senior hospital doctors, and especially the god-like consultants, barely speak to parents, let alone share their doubts with them. At St. Vincent's, we were involved in every twist and turn of their perplexity and worry. In the event, the drugs never worked, Kate got weaker, and the decision was made to operate. It took eight hours – a team of twelve around a hole in Kate's head that was less than two inches wide. But it worked, they saved her life, and I had had a crash course on collaboration, knowledge work, and the body that I do not recommend to anyone else.

So what did I learn? The first thing Kate's story taught me was that the flesh and blood of the doctors and nurses is just as important as Kate's flesh and blood. In the formal language of work and knowledge design, actionable medical knowledge is embodied. Having formal knowledge in your head is not the same as having it in your finger tips. Doctoring is a physical and fleshy thing. We therefore need to design work situations that enhances tacit and embodied knowledge, rather than pretending that they do not exist, or do not matter. The other thing I learned at Saint Vincent's is this: the meaning of a task plays a critical role in the way it gets done. Otherwise stated: matters of life and death foster great collaboration.

Antoine Saint Exupery put this simple point more memorably. "Don't teach men how to build a boat. Teach them to yearn for the wide and open sea."

Embodiment

Embodiment is a big problem for the 'information society' as a project. Maybe that's why we don't talk about it very much. But we can no longer evade an inconvenient fact: most of what we perceive and experience in the world comes

not from conscious observation, but from a continuous process of unconscious scanning. As Tor Norretranders explains, in his book, 'The User Illusion': "Subliminal perception, perception that occurs without conscious awareness, is not an anomaly, but the norm. Most of what we experience we can never tell each other about – with or without information technology – because we are not even aware of it." As organisms active in the world, we process perhaps 14 billion bits of information per second. But the bandwidth of consciousness is only about eighteen bits. This means we have conscious access to about a millionth of the information we daily use to survive.

The 'information society' is based on that teeny little one-millionth of data that we know consciously. For the philosopher John Gray, the upshot of neuroscientific research like this is that, "We are not embrained phantoms, encased in mortal flesh. We filter and select from the massive flows of input from our senses are so that our lives can flow more easily. "Cybernauts seek to make the thin trickle of consciousness – our shallowest sensation – everlasting," says Gray. "But being embodied is our nature as earth-born creatures." John Christopher Jones has also warned about the dangers that come with the disproportionate attention we pay to digital communication. "Computers are so good at the manipulation of symbols – a thousand times better than robots are, even today, at the manipulation of objects – that we are all under pressure to reduce all human knowledge and experience to symbolic form."

Remember Robert Reich? In his best-seller, 'The Work Of Nations', Reich predicted that we would all become "symbolic analysts". The concept was so successful that Reich ended up as Bill Clinton's first Secretary of Labour. I accept that 'computer-supported collaborative work', is a symptom, not the cause, of our tendency to undervalue the knowledge, and experience, that we human beings have by virtue of having bodies. Besides, the design lesson I draw from the importance of embodiment is not that face-to-face is the only communication that counts. That would be dumb. Low bandwidth can deliver high-value communication. The telephone, after all, changed everything – much of it for the better. But, as designers, we must nonetheless guard against those who promote virtuality – and the myth of disembodied communities – for the wrong reasons.

Out there, in the real world of budget-making and vote-getting, the promise of disembodiment, of virtuality, is attractive for simple reasons. People think it will save money. Automated, disembodied communications are attractive for the same

reasons that e-learning is attractive. Organizations without organizers are like educational establishments without teachers. They save a ton of money. Only, they don't work – or at least, not optimally. Human beings are social creatures. Our networks and communities need the time, energy, presence, and participation of real people, to flourish. That's why I talk about thermodynamics. Human systems need inputs of human energy to do well. Everything else – the internet, agents, wireless, knowledge-mining – is contingent. They're support, not the thing itself. So, when designing systems, services, infrastructures – and work itself – we should ask whether our design actions will enable or disable human agency. Embodiment is a killer app. Whatever it is that we design, it's better if we design people in, not out.

Situations

Biologists describe as 'choronomic' the influence on a process of its geographic or regional environment. Choronomy adds value. So how are we to improve the situations in which our all-important people-to-people interactions take place? What kinds of knowledge do we need to bring to bear to do that? Designers and architects should be able to help here. After all, they've been designing spaces and places for thousands of years. Unfortunately, the mainstream of architecture – including most of the big-name designers – has lost the plot. They're designing spaces as spectacles, not spaces that foster interaction and encounter. Concert and exhibition halls, tourist resorts, sport stadiums, shopping malls and cafes, all are designed as places for us to buy things, not for social interaction. Raoul Vaneigem complained about this back in 1957, when he founded The Situationist International. "The whole of life presents itself as an immense accumulation of spectacles," said the Situationist Manifesto. "All that was once lived, has become mere representation". More recently, the Spanish economist Manuel Castells wrote about the networked economy as the "space of flows" – a brilliant metaphor that helps us understand one way in which our world is becoming a hybrid of real and virtual space. Unfortunately, the 'flows' metaphor has prompted architects to design squidgy and undulating buildings which are interesting (on first sight) to look at – but rarely foster better interaction. Often, they do the opposite.

Space. ("In the bubble." J.A. Thackara. Amsterdam 27 Feb 2004)

1 Ivan Illich, 1074, Energy and Equity

2 <http://www.naibooksellers.nl>

3 Luuk Boelens, Wandering in search of the genius fluvii: the 5th report on spatial planning Archis, 1/2001

4 Whitelegg

5 Sennet

6 David Winnicott

7 Hawthorn Study

8 Bernard Tschumi, 199x, Architecture and Disjunction.

9 Donald Schon, 1971, The Reflective Practitioner.

10 http://museum.doorsofperception.com/doors/revamped_frameset.php?doorid=4

11 <http://www.ecoplan.org/wtpp/general/vol7-1.htm>

12 <http://www.ipsi.fraunhofer.de/ambiente/english/projekte/projekte/roomware.html>

13 <http://www.ambient-agoras.org/>

14 Connexity