

# ARCHITECTURE OF THE 21<sup>ST</sup> CENTURY

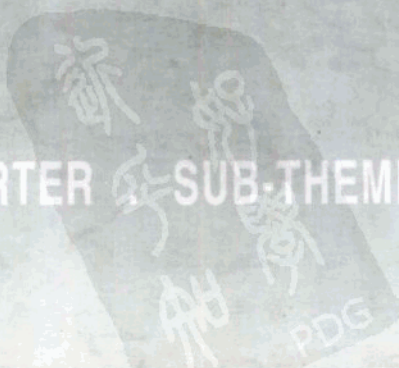
面向二十一世纪的建筑学

XX UIA CONGRESS

BEIJING 1999



BEIJING CHARTER & SUB-THEME REPORTS



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BEIJING CHARTER • SUB-THEME REPORTS

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## FORWARD

The "Beijing Charter (draft)", and the twelve Sub-theme Reports comprise this volume of the Academic Treatises of the XXth UIA congress.

The "Beijing Charter" was drafted and written by Professor Wu Liangyong of Tsinghua University, Chairman of the Scientific Committee. Manifold efforts were made to consult all sides on the solicitation of opinions on the Beijing Charter. Review and meetings were held for the revision of the draft, which was repeatedly examined, discussed and amended by the scientific committee and by experts both from China and from Abroad. This draft was passed in principle by the UIA Council in February 1999. In the case of adoption of the Beijing charter by the XXth UIA Congress, it will be written into the annals of history as an official document of the UIA, acting as a Guiding influence on the development of architecture in the 21<sup>st</sup> Century.

The theme of the Congress "Architecture in the 21<sup>st</sup> Century" is further developed through the twelve reports on the six sub-themes of the Congress, each sub-theme being expounded and delivered separately by a Chinese and an International Sub-theme Reporter. The six reporters from China are representatives from the Schools Architecture of one of the following institutions: Tsinghua University (Architecture and Environment), Tianjin University (Architecture and Culture), Chongqing Jianzhu University (Architecture and Technology), Tongji University (Architecture and Urbanism), Southeast University (Architecture Education and Yong Architects), and the Architectural Society of China (Mr. Zhang Qinnan on Architecture and Professionalism). The organization of the drafting writing of these six sub-theme reports started from July, 1997. The reports were discussed on the Scientific Committee held successively in Changsha (October 1997), Beijing (April 1998), Beijing (October 1998) a Full Session of the Scientific Committee with the international committee members participating, and again in Beijing (April 1999). The authors of the other sub-theme reports were also presented and discussed at the 1998 October Full Session Meeting and Completed in April 1999.

The Editorial Board  
April 20, 1999

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## **UIA BEIJING CHARTER (DRAFT)**

**Presented to the XXth Congress of the UIA, Beijing, 23-26 June 1999  
Professor Wu Liangyong**

On the eve of the New Millennium, we architects from all nations of the world gather in Beijing, an ancient capital of the Orient, for the 20th Congress which celebrates the year of Jubilee for the Union of International Architects.

The present is born of the past, and yet the future rests with the present. We are here to reflect on the past, to account for the present, and ultimately to formulate a conscious plan of action for a better and liveable human habitat of the 21st Century.

The world's geographical distances has shrunk, although the regional disparities are growing. Yet the age has endowed all of us with a common mission. It requires us to come to terms with the present, face the challenges, develop a holistic thinking and co-ordinate our efforts.

### **1 COMING TO TERMS WITH OUR CENTURIES**

#### **1.1 The 20th Century: unparalleled construction and destruction**

The 20th Century has seen unprecedented magnificence and progress, and also incomparable calamity and confusion.

The 20th Century has enriched the history of architecture in its unique manner: architects have played an admirable role in the reconstruction that followed the two world wars; technical and artistic innovations on a massive scale have introduced fine examples of design to the populous like never before.

But, this is not to deny that much of the built environment is still in a deeply unsatisfactory state. The very survival of the humankind is under threat amidst squanders of the world's natural and the cultural heritage. In the affluent regions, redevelopment was often to become destruction by construction; in the poorer areas, pauperised masses are struggling to build their own cities of tomorrow.

Over the past Century, the world has turned into a very different place. Yet one thing remains the same: we architects are again at a cross road as a world profession.

#### **1.2 The 21st century: a turning point**

The diversity and complexity of the world has created much confusion; yet it is but part of the eternal process of change. The present century has seen remarkable reform and development in politics, economics, technology, and society, and the resurgence of human ideas. In the coming century, the pace of transformation is expected to accelerate, though its direction may be even harder to tell.

In the coming century, the coexistence of globalization and pluralism will bring to a head the conflicts and the contradictions that characterise our age. On the one hand, modern means of communications have brought into close contact diverse cultures and traditions; global integration of production, finance and technology continues to dominate decision making. On the other hand, the gap between the rich and the poor are widening at an alarming rate; Regional strife and financial uncertainties cast a sinister shadow upon the human habitat.

Whilst we should not take on tasks outside our professional remit, it would both irresponsible and foolish to ignore the torrent of social and cultural change that are redefining the scope of the architectural profession. A conscious reconsideration of the role of 21st Century Architecture calls for our enthusiasm, strength and courage.

### **2 THE CHALLENGES THAT WE FACE**

#### **2.1 Interwoven questions**

##### **Nature's revenge**

The Industrial Revolution unleashed tremendous

human power, yet many a triumph over nature was achieved at a harrowing cost. The past Century has seen population explosion, encroachment of farm land and deterioration of water, air and land resources. Environmental crises impinge on the very existence of the humankind.

We do not know enough about the ecosystem, yet ecological disasters have revealed its fragile confines. From a historical point of view, we do not own the world that we live in: we simply have it on loan from our children. In what state shall we hand over town and country to our children? In what way can an architect contribute to the future of human civilisation through planning and design?

### **Overwhelming urbanisation**

To better their lives, people congregate in the city, where science, technology and culture brought about productivity that had never been foreseen. The 20th Century has seen the brightest lights so far of metropolitan life. Nevertheless, the Century ahead is the true urban era, as for the first time in history, urban dwellers will outnumber those live in traditional rural ways.

Yet, hardly had the slums been demolished, when the cities saw the resurgence of the underclass. Segregation of the rich and the poor, congestion of traffic and land use, and persistence of noise and emissions have worsened in cities large and small. Can our cities survive? We build the cities; yet why do we feel so powerless when we attempt to make any change? In what way can we shape the urban habitat, as it shapes us at the same time? Will the traditional concepts survive in the cities of the next Century?

### **Technology as a double-edged sword**

In the past century modern technology increased productivity to a degree never before experienced. New materials, new structures and new equipment have provided unique opportunities for the designers of the 20th Century. Modern means of communications have brought the diverse cultures in close contact.

Technology has lead the mankind to a new cross road, yet we are still in the process of harnessing its power and potential. Technology modifies the traditional relationships between man and nature, and thus constantly challenges the existing norms of life styles and values. In what way can the humankind

derive benefits from technology, whilst avoiding harm which it is shown capable of?

### **Genius loci in default**

The culture of architecture comes from a local accumulation of history. It manifests itself among the built forms and in day to day living, exerting a voiceless influence on the experience and behaviour of the inhabitants. In a sense, it is the soul of our cities, towns and villages.

However, globalization of technology has made people more and more separable from their land. Standardised commercial production interrupts the evolution of local built forms. Traditional design techniques are confronted. Local identities fade away. What contribution can an architect make to bring back the soul of cities and towns which characterised them during the past centuries?

## **2.2 A common theme, a common future**

The challenges we face are multifaceted and overwhelming. They are in fact embodiment of complex social, political, economic and cultural processes at levels local and global. Our discussion must not stop at the mere manifestations of such processes. Rather, an effective solution only comes from a thorough understanding of the dialectic nature of the forces which are shaping our built environment today.

The search for effective solutions at a global level is supported by our common aspirations for a sustainable future on this Planet. Our world is an interdependent world. The future prospect of one nation to a large extent rest on the future of other nations. By the same token, the future of Architecture depends on an understanding and assimilation of the achievements of other disciplines and professions. It is this common theme that will bring us together to lay out a common future in the 21st Century.

## **3 TOWARDS AN INTEGRAL ARCHITECTURE**

During the past 50 years, the architects of the world met to debate over a large number of issues. These debates have much furthered our understanding in all branches of Architecture. It is therefore

appropriate to review the progress so far and redefine the limits, the contents, and the organisation of our discipline and profession.

### **3.1 The theoretical premises**

Over the centuries the role of an architect is constantly modified to suit the needs and requirements of its time. Where traditional methods are shown to be inadequate, new approaches are developed to take their place. Yet without exception, each redefinition pushes the boundary of Architecture outwards for a wider coverage, as well as inwards for higher degrees of specialisation in the component parts. The 20th Century is perhaps the most exemplary in this regard.

A wider coverage of its contents and finer degrees of specialisation have empowered the 20th Century architect with unprecedented professional opportunities and potential, yet at a personal level, an expanding profession with growing specialisation can seem elephantine. In a sense, the architects' Babel Tower appears to have fallen: it is increasingly difficult for one architect to grasp the expertise of a fellow colleague; although the body of knowledge has grown collectively, the outlook of any single designer tends to become paradoxically narrow and fragmented. The specialist expertise is brought together through financial ties and managerial skills, rather than a coherent intellectual framework. As a result, the role of an architect continues to be marginalised in the decision making over the human habitat today.

From the point of view of an architect, his or her ability to propose creative design solutions depends critically on the intellectual and professional spheres he or she commands. Narrow and fragmented individual outlooks cannot be made to work, however wonderfully the individual designers are managed externally. Nevertheless, any given person cannot and should not attempt to master the whole body of knowledge of our profession. Quo vadis?

Classical Chinese philosophers were particularly at pains to pinpoint the differences between methodology (alternatively translated as Dao or Tao) which concerns with an intellectual framework, and methods (fa) which deals with specific techniques. It is useful to draw on their wisdom on this matter. Whatever professional talents, expertise, or

preferences an architect may have, these techniques can only realise their true value when guided by a larger, intellectual perspective. An architect may work in a specialised area by choice or chance, yet he or she must not lose sight of the larger whole of the profession, and the vast sphere of knowledge which is potentially at disposal.

Past and contemporary Masters have shown how their understanding of the Dao of architecture have helped them to achieve magnificent heights in design and planning. However if such understanding could be regarded as some luxury enjoyed by the Masters in the past, it will increasingly become goods of necessity for all architects in the age of information explosion. In the rapidly expanding professional universe, an intellectual orientation is paramount that organises the body of knowledge and expertise and relates Architecture to the wider processes that give shape to the built environment.

So what does this methodology contain?

### **3.2 A fusion of architecture, landscape architecture and city planning**

The professional identity of an architect in the wider world is focused on the built forms that are ultimately created.

Basically, the general theory of architecture is an integration of architecture, landscape and urban planning with the core of city design. However, the increasing scale and scope of modern development provide architects with great opportunities to deal with architecture, landscape and urban planning as a whole. This tripartite composition enables the designer to search for solutions within a wider sphere.

### **3.3 Architecture as a process for the human habitat**

Metabolism is one of the fundamental rules of the development of human settlement. Architecture is the discipline that deals with human settlement, so it should regard the physical objectives of construction as a system of circulation. The life cycle of buildings should be regarded as a fundamental factor of design.

The life cycle of buildings not only includes the construction and running phases, but also includes processes aiming at lower resource costs, less



pollution and grey energy consumption, recycling as much as possible, and reformation of environments.

On the aspect of urban settlement, factors such as planning, architectural design, historical preservation, adapted reuse of old buildings, urban rehabilitation, city renewal and reconstruction, utilisation of underground facilities, etc., should be integrated into a dynamic circulation systems. This is a system for better architecture under the modern space-times of architecture. It is also a exemplification of the sustainable approach in urban planning and architecture design.

### 3.4 Multiple technology rooted in the indigenous cultures

To utilise technological innovation to its full extent is one of our basic task in the coming century.

Firstly, in the 21st century, various presentation of technology will co-exist, based on the fact that there are regional contrasts and unbalance in the development of technology.

Theoretically, it is necessary to adopt new technology from foreign sources, and integrated it with local conditions, to improve the local technological standards. If architects themselves can realise the ecological challenges mankind is facing, and adopt advanced technology creatively, then the buildings they design are ought to be sustainable and healthy.

Because of technological complexity, low-tech, light-tech and high-tech are different in scale and level. For each project, the choice of technological approach should be made according to its own conditions. In another word, for the progress of every building project, different forms of technology should be integrated, utilised and improved.

As for the utilisation of technology, considerations on humanistic, ecological, economic and regionalism aspects should be integrated. Different levels of innovation should be carried out in order to improve the level of architectural creativity. Many theoretical and practical examples are available today. And it's obvious that much more progress would in the next century.

Secondly, today's includes both science and technology. The development of technology must be

related to human factors. As Alvar Aalto said, "the preservation of difference should also be strengthened. The development of architecture should be rooted in the regional background, and take the local conditions as its starting point in the searching of better solutions. Basing upon this, foreign ideas can be integrated into our owns. This would finally lead to a human society of both integrity and variety.

### 3.5 Architecture of harmony instead of monotony

Architecture is by definition a regional product: buildings serve, and derive their significance from local contacts. Regional architecture is yet by no means a mere product of a region's past. Rather, it is derived from the concerns for its future. The significance of our profession lies in the creative designs that bridge the past and the future. We use our professional knowledge to guide an informed choice amongst the options that increasing open to the local communities. "The sharing of experiences among various countries and geographical regions must never be seen as a simple transfer already made solutions, but as a means of stimulating local imaginations".

The localisation of modern architecture, and the modernisation of local architecture is a common approach to be shared by all in the progress toward architecture proliferation.

### 3.6 Art for the sake of the built environment

After the industrial revolution, the urbanisation of increasing speed has resulted in the dramatic changes in urban structure and architecture forms. The physical environment is lead to anarchy. We should try to find orders out of the anarchy, to find beauty and harmony out of the chaos.

To consider the relationship between architecture and its environments with the traditional design methods is far from adequate. We have to look at architecture from a massive and urban view. Architectural thoughts should shift from single buildings to building complexes, to urban and rural regional planning. The holistic relationship with nature is another important factor that should be considered.

In the histories of all cultures, architecture became the ultimate manifestation of inseparable parts in fine arts, such as sculpture, painting,

craftsmanship, etc., should be one of our goals.

### **3.7 Architecture for all**

In many traditional societies, the architect played the part of master co-ordinator of all trades that built in town and country. Yet today, by large majority, the architect is perceived as a style freak, irrelevant to real decision making. It is appropriate to view architecture in its full socio-political context, rather than in the narrow techno-aesthetic sense of the term. Only in this way, can architects "participate at all levels of decision making as professionals"

As a social server, architects should expand their profession services and visions. They should take an active part in social reform with basic understanding of the society and respect to the people. It is an architect's destiny to make everyone his home, to provide shelter for the poor and the homeless. The freedom of architectural design is by no means an excuse of ignorance of social responsibilities.

Architecture is a science that serves the people. A society-wide understanding and participation of architecture would be very helpful to make better environments. Not only the end users should participate in the design process, but also the decision makers, supports and policies from governments would be especially effective.

The cultural and architectural education of a decision maker is a determining factor for the quality of a building project. In this sense, the understanding of architecture should be emphasised in every society.

### **3.8 Learning architecture**

The progress of future architecture lies in the progress of architectural education, that results in the growth of the new generation of architects. Architects and architecture students must have a responsible professional spirit and a comprehension of environmental ethics. They shall work for the benefit of the society as a whole, try to carry out strategies that contributes to the overall quality of human settlements.

Architectural education must expand its concerns. An open system of knowledge should be set up. It is the goal of architectural education to make a student able to learn, to research, to express

and to organise. Each architectural student should be educated to be open-minded, to utilise new technological advances, and to create on the base of professional knowledge.

Architectural education is a life-long task. The education of environmental awareness should start at kindergartens, and continue in middle schools, professional schools and adult educational facilities.

### **3.9 Towards an integral architecture**

It is necessary to reemphasis words from Gropius half century later now, " My idea of the architect as a co-ordinator, whose business is to unify various formal, technical, social and economic problems that arise in connection with buildings ...I believe that new architecture is to dominate a far more comprehensive sphere than building means today. And from the investigation of the details, we shall advance towards an ever-wider and profounder conception of design as one great cognate whole."

The development of architecture asks for both analysis and integration. But now, integration should be focused on. The introduction of General Theory of architecture does not demand architects to be professionals with all abilities (which is impossible), but require them to have better professional knowledge, better philosophical way of thinking, in order to be better problem solvers and theory developers.

We are facing a world full of contradictions. The contrasts between globalization and localisation, internationalism and nationalism, universality and particularity, flexibility and stability, etc., are forever increasing. The future development of architecture needs our understanding and processing of these contradictions. Any contemporary building project can be regarded as a collection of the contradictions above. Any architect is to deal with these contradictions professionally, to decide between freedom and rules, art and science, traditional and modern, heritage and innovation, technology and place, assimilation and diversity, etc. The General Theory of architecture is a dialectical process of these contradictions.

## **4 ALL PATHWAYS FOR A COMMON DESTINY**

The objective world is a interwoven complex of change and variety. It is neither possible, nor desirable to search for identical technical solutions. For centuries, holistic thinking has been the corner stone of the Eastern Philosophies. Today it is becoming a common heritage and blessing of the global village: "For all the means in the world there is but one end, for all the concerns there is but one destiny." Our concerns may lead us to the following conclusions:

Firstly, searching the point of integration in the world of interwoven complex.

Many ancient Chinese philosophical and artistic sayings emphasised the importance of integration and holistic thinking.

20th century architecture have celebrated its triumphs and miracles, but these are mere fragments of history.

To lead the architecture of new era to a common destiny, we should try to find out those fragments in history that did make unique contributions, that made milestones in human civilisation. With the integration of those fragments, and the returning to our basic concerns, we may find the spirit of new architecture, the doctrine of new era, and the opportunity of new creations for the 21st century.

Secondly, different ways leads to common destination.

Given the regional contrasts, every nation should have its own particular way of development. Only with these 'different ways', can the human civilisation continue in a sustainable manner.

As the old western saying, 'every road leads to Rome'. There maybe no common roads, but there is a common future. The future that when all mankind lives in his blessed environment.

Therefore, an architect should devote his life in the pursuance of humanism, quality, capability and creativity. It is his responsibility to build up a better environment with the limited natural resources on this planet.

At the turning of the century, we have grasped the theme of new era, and have found out the basic contradictions, and are reaching for the concurrence

of our agenda. It should be seen that the beginning of new century is only a spot in the continuous thread of civilisation. The research we are doing today is just a beginning of co-ordination of mankind for our common goal, a beginning that are supposed to make changes.

We look forward with caution and optimism, to the historic duty of building the 21st century human habitat. Yet, we are set for a new exploration for common theme and methodology. From this stand point, we look forward to the future and to the mission that will reshape the future.

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## EQUILIBRIUM Architecture and the Environment

By Nicholas Grimshaw,

I'd like to start by saying that, as we approach the end of the second millennium we seem, at last, to be beginning to treat our globe with the respect it deserves. The two recent conferences on the global environment in Rio, and also the one at Kobe, dealt with a large number of environmental issues on an international scale. I'd like to feel we are entering the third millennium with a much greater degree of global responsibility. The question I would like to address in this lecture is the role that we, as architects, can play in this.

I believe we can play an important role, and this lecture contains some of my own thoughts on aspects of global responsibility which are part of this practice's philosophy for the future. The environmental issues I will be talking about are positive ones, but it is interesting that positive examples or images of environmental issues have proved fairly difficult to find. We are used to being bludgeoned with negative images such as these of burning oil wells and a landscape destroyed by mining. I would now like to leave those two slides and move on to more positive issues.

Talking of positive issues, I would like first to mention the additional screen over my head, which I can't see whilst lecturing. On this screen you will see a series of pictures of myself on my three-kilometre walk to work through Regent's Park. There are eighty slides here which run in parallel with the main slide show. The point of showing this walk is that I have calculated that if I did the same journey by car, I would need to plant 300 good-sized trees to counteract the pollution caused. I therefore feel that I am making my one small contribution to helping the global environment every day!

Having now moved on to positive issues, I would like to outline the themes I intend to cover in this lecture. The first is the important issue of the mapping and management of buildings and the environment – the more we know, the greater chance we have of doing something effective with design. The second issue is flexibility – the more flexible our buildings are, the more they can respond to change and the more we can get out of them in the long-term. My third theme is communications – the more effectively we can communicate with each other, the less we need to move

around, which has wide implications for the development of cities and, indeed, whole countries. The fourth issue is the city-dweller's relationship with nature – how can we enjoy the wonders of the natural world without also destroying it? The fifth point is the decline of manufacturing (which has been the very basis of the developed world), and the emergence of knowledge-based industries, such as design. My sixth and final theme touches upon one of the most compelling issues of the age – how the so-called developed nations can share their resources and expertise with underdeveloped nations. In my view, this has to be the route to a more peaceful world.

And so to my first issue, the **mapping and managing of buildings and our environment**...

The pollution of rivers in Europe has been a very big issue for some time, and the result is that rivers are now being cleaned up. In the higher reaches of the Thames, for instance, it is now possible to catch fish. Considerable progress is being made by international treaties introduced to clean up the rivers of Europe. These examples of environmental mapping and management are a great step forward.

Forests are now being managed. The introduction of practices such as replanting, checking growth and the clearing of crowded trees mean that it is no longer a crime for architects to specify hardwood in their buildings. Aluminium is being recycled using only 20% of the energy needed for its original smelting. I've read that by the year 2020 there may no longer be a need to mine aluminium, because there will be enough circulating in the world to be continuously recycled. I find that a very interesting thought.

Car tyres are being recycled for various purposes – to provide heat and even as components of a basic form of shelter. Many metals are now being compressed and kept for recycling. Nylon clothing is being recycled to make tennis balls.

Air pollution is beginning to be tackled – the car industry, including huge companies like Honda, is researching the use of solar cells to power their vehicles. I particularly like the message conveyed by this image of camels carrying solar cells to a remote village.

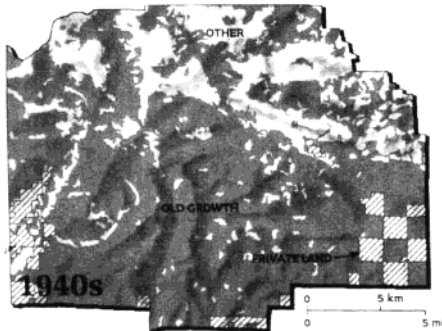


Fig.1 Mapping of forest in an area of west coast USA, 1940

Nowadays nearly 80% of our newspapers are made from recycled paper. An interesting issue here is the effect of the compact disk on information storage. Vast amounts of paper are now being saved. In this slide we see Bill Gates demonstrating the enormous amount of paper needed to reproduce the information that can be contained in a single compact disk. The tree trunks shown being floated down a river in this picture will all be made into paper and used for printed information, but that same amount of information would probably fit into disks that could be contained in one small briefcase. These examples illustrate the scale of tree destruction that has been necessary to produce the paper that we are beginning *not* to use.

This kind of monitoring and analysis of what's going on in the environment is extremely important. I have cited only a few small examples, but the important thing is that global awareness is increasing exponentially due to present-day communications. So the sort of mapping that you can see in this image of one small area of America is now taking place globally. This means that we know what's happening in the world, and therefore we can take responsibility for it, and we can change it.

How does architecture fit in to this? I believe we can build more thoughtfully. In the UK we have a system called BREEAM – the Building Research Establishment Environmental Assessment Method – which gives an overall green rating to a building. We used this system for the first time on the RAC building and, working from scratch with a resource consultant, we managed to achieve a rating of 8 out of 10 in the assessment. Next time I hope we can do even better. Factors which were taken into account in the rating were the materials we used in construction, the energy consumption of the completed building, and the recycling capacity of the materials used. At RAC the

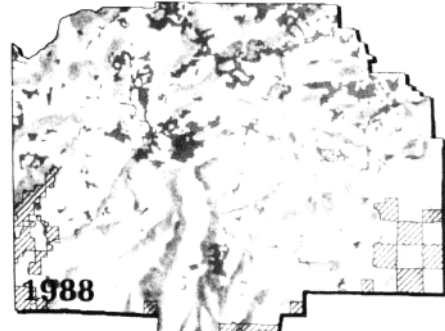


Fig.2 Mapping of forest in the same area, 1988

shape of the building is also about as compact as you can get, which increased the rating.

The shading system on the outside of the building was applied to protect working conditions within the building, to prevent solar gain and heat build-up. At the same time the ability to see out across the countryside was considered very important as most of the employees in this building were working at computer screens all day. The other thing we pioneered in this building – if you can call it pioneering – was the non-use of lifts.

At RAC there are 500 people working very happily in a building of three floors, entered at the middle floor so you only have to go up or down one flight of stairs to get where you want to be. All the movement in the building takes place in the atrium – people meet all the time and it creates a very good atmosphere. There *are* lifts in the building, but these are for the use of disabled people and for the occasional shifting of stationery and so on up and down the building. At first people were shocked by this staircase idea, but it is now a fact of life that you move around the building on foot.

I now turn to my second theme – **flexibility, and making buildings with built-in capacity for future change.** In my view the bones of a building should always be clear and well articulated. This is an early model of Ludwig Erhard Haus which contains the Berlin stock exchange. It looks almost like a contoured hillside. Our proposal occupied the whole of the site, and I think one of the reasons we won the competition in the first place was because we kept the building height low. A primary design issue was being able to keep the ground floor area clear for the stock exchange and the conference centre. All columns were omitted, and the floors are hung from prefabricated steel arches. I think that this is a skeleton which will last for a long



Fig.3 Construction of Ludwig Erhard Haus, 'the armadillo', in Berlin, 1997 (kmGP)

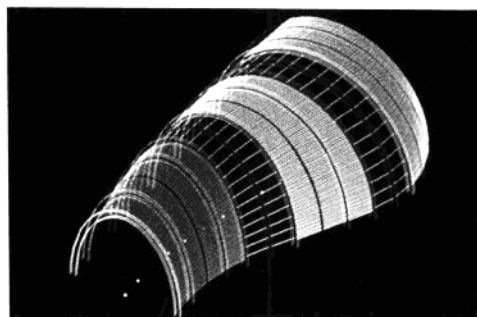


Fig.4 computer-generated image showing relationship of structure and skin in Ludwig Erhard Haus, Berlin (kmGP)

time. I think a building with good bones will always last a long time, and can be added to.

I like the idea of a building shedding its skin, rather as a lobster sheds its carapace. This digital drawing shows the skin of Ludwig Erhard Haus and the alternate bands of cladding and glazing. It really is just like an animal skin. The way a Weaverbird rebuilds the same nest every year is also a process of recycling. I like the strong visual connection between the bird's nest and the construction of this linear accelerator – it makes a nice analogy between nature and technology.

A particular issue in the design of Ludwig Erhard Haus in Berlin was flexibility at ground level. I feel all buildings in cities could benefit from this kind of flexible approach, because it is the ground floor spaces of a building that are most likely to need to change. People flow in and out at this level and, by hanging the floors from the prefabricated arches, the ground floor is left completely free for the conference centre and stock exchange (which changed in size four times during the design process and will probably change again). Just for amusement I speculated on what would happen if the stock exchange moved out. I realised that an ice rink could be incorporated at ground level, which would be a nice thing to find when coming in off the street. Although I'm not quite sure what my clients would think about that idea!

When we designed the Herman Miller building at Bath, we made the skin completely flexible. The glass, the cladding panels, the doors and even the courtyard spaces could be moved around on the outside of the building. The building is now 20 years old and has gone through many changes. Interestingly, the planners have been unable to work out how to treat this building because it is continuously changing its skin. Everybody likes it, and indeed it won one of the first Civic Trust Awards for a contemporary building and several other architectural awards. However, people don't quite

know how to deal with a building that is constantly evolving.

When doing the second Herman Miller building in Chippenham, we used aluminium panels which are more ecologically sound because they can be recycled. Once again the whole idea was that the panels and doors could be moved, and further areas of glazing could be incorporated. When we began the project this building was to be used purely as a warehouse. Now it has changed in use to also accommodate a considerable amount of manufacturing and offices.

For the Igus plastics factory in Cologne, Germany, we further developed the idea of the moveable panel. The panels here are simply attached with tabs and they can be replaced with windows, even by the workforce inside the building. In this picture the happy client and his architect can be seen leaning through one of the panels during construction, and the clients remain extremely happy with the building. This diagram shows the growth pattern that the building has gone through during its life. The client started with a relatively small square courtyard building.

I want to stress the idea that flexibility is important in buildings, but that this does not mean that they can't be beautiful, and that they can't be well-designed and well co-ordinated.

I don't think there has been a strong tradition of flexible and elegant building in England. It has been said many times that we live in a nation of lean-to buildings. At the heart of every industrial plant you almost always find a nineteenth-century brick building which has been added to with lean-tos over the years. It is very seldom that anyone in this country starts off, even now, with a masterplan for growth and change within their buildings.

I don't think it's going to be very long before buildings really can change their skin – its colour and

even its texture – in the same way that a chameleon can, or a chevron butterfly fish which changes its colour between day and night.

The adaptable skin is a fascinating path to pursue. We continued to develop this idea with our competition entry for the extension to the Victoria and Albert Museum. Our idea was for a building which acted to orientate people, and enable them to find their way around the seven miles of existing corridors at the V & A. We wanted to make a building which could demonstrate what was happening inside by means of projections on the outer skin. The various museum departments would each take over the facade for a set period and would be able to display their own objects through either directed lighting or using back projection on different kinds of glass. We wanted to create a building skin like a living, changing shop window which would demonstrate what was going on in the museum – a dynamic facade. Unfortunately it was not to be, and the competition was won by what I would say is basically an old-fashioned monument-type building.

I think that the idea of a building shedding its skin to reveal a completely new surface underneath is an appealing one. Another aspect of flexibility is change of use, or the evolution of use in buildings. In London generally there has been a considerable amount of adaptation of existing office buildings recently, like the conversion into apartments of the well-known 60s office building, Castrol House in Euston Road. This is a development which many people thought would never happen. It is not an issue relevant only to cities either – there are some very fine redundant buildings in the countryside which, with thought and care, could be successfully reused.

My third topic is **communications** which, in my view, are going to affect buildings in a major way. For instance, we hear a great deal now about people working from home. When I tried to find images of people working from home for this lecture I found it incredibly difficult, either because people don't want to disclose the untidiness of their home workstation, or because they are in some other way ashamed of their home/office. It is a fascinating issue that well organised home-work places don't yet seem to have materialised.

One of the fascinating developments in telecommunications is in countries which hadn't previously installed telephone posts and wires throughout, and which have now actually opted not to have a wire network in their country at all. Instead they have gone straight to a mobile telephone system with aerials placed at strategic intervals throughout the country. This, of course, saves thousands of miles of telephone wire and poles and all the other waste that goes with it.



Fig.5 Communications satellite



Fig.6 Communication without a wire network

If the idea of home working takes root, the notion of the city as primarily a place of work will change dramatically. The role of the city will evolve, perhaps into that of a cultural exchange. In Berlin a few years ago there was a marvellous event in which the artist Christo wrapped up the entire Reichstag building from top to bottom. It was one of the biggest events in the city for many years. Other examples of such events are the *Palio* in Siena, or the great festivals of Japan – events people visit to exchange cultural experiences.

Developments in telecommunications have implications for urbanisation at a very large scale. It is possible that countries that have already undergone extensive urbanisation with chaotic results may encourage countries that are still developing to rethink, and to remain decentralised. I think this is the basis of a very interesting debate between developing and developed countries.

However, I don't ultimately believe that people will turn their backs on cities. I think it is more likely that there will be a mass demand for improvement in the quality of life in cities. I would like to talk a little about city life, and think about how it could be improved. In

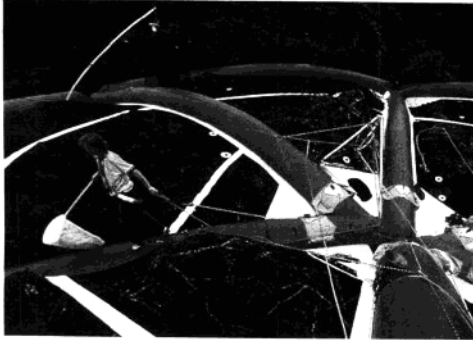


Fig.7 An inflatable structure like a spider's web creates a platform from which scientists can research forest canopies

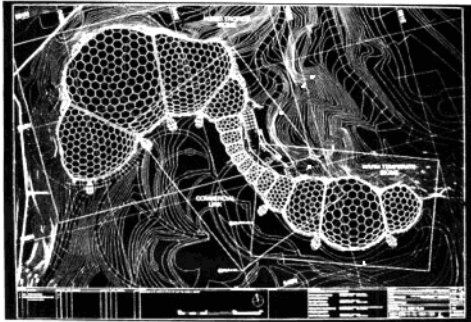


Fig.8 Site plan of The Eden Project showing the location of the geodesic biomes within the reclaimed quarry pit

London, for instance, it is noticeable that there are now more street cafe. In Paris there has long been a tradition of open-air cafe, and an interesting intermediary type of space, spanning between the outdoors and the indoors, has evolved. This is something I believe has great potential in our climate, and something which could be extremely beneficial to street life in general. I believe that one of the repercussions of increased environmental awareness is that, right down to the small scale, people

are scrutinising the quality of their lives much more closely.

Improved public transport is increasingly a key issue for governments, and it is one of my hopes that public transport will be given higher priority in England. In mainland Europe the introduction of tram systems is now widespread. Even in Manchester, here in the UK, tram systems are now in use. To get people out of their cars there has to be an alternative public transport option of similar quality. If this can be provided, then we have a chance of reducing the amount of traffic on the roads and therefore greatly improving air quality, which is one of the main health issues affecting people in cities.

I now turn to my fourth issue – **the relationship of people in cities with nature**. I think city dwellers increasingly yearn for what might be called the 'natural' environment. I would like to discuss this issue of the desire to get away from urban life because I think it is something we are going to see more and more of in the next millennium. People are increasingly looking for a new dimension in their lives – whether it is escape to mountains, to forests or jungle, to the sea, or even under the sea.

I have no doubt that one of the central dilemmas of the next millennium will be how we can enjoy the wonders of the natural world without at the same time destroying it. This image of the detritus left behind by a mountaineering expedition is poignant because that expedition was all about seeking out an unspoiled landscape. One solution is to simulate, as in this completely artificial beach which has been constructed in Japan. Whereas in Europe the concept of an artificial beach might not immediately appeal, in Japan this project is a roaring success.

This brings me to the Eden Project. The image of the artificial beach in Japan gives some indication of the scale we are working at here – the aim is to rework an entire valley that has been scarred by clay mining, to landscape it, and to enclose part of this landscape with the lightest of possible structures. In many ways we will create a lost world.

The issue is how you can explain different kinds of plant life and climate so that people can experience these things without necessarily travelling half way across the world. It is, in fact, a way of experiencing the natural world without despoiling it. There are, however, good and bad ways of doing this. Eden will not be some kind of leisure or theme park. It is a serious research project into the re-classification of plants as a result of discoveries in botanical genetics, and that is the direction in which everyone involved in the project wants to steer it. Obviously, we also hope people will enjoy the architecture – the geometry and the detailing of this structure.



We are investigating various non-invasive ways of viewing nature. We have investigated tree bridges, and we hope to work something of that approach into Eden. This image shows a fascinating experiment, which has also inspired us, in which an inflatable structure like a spider's web is lowered on to the roof of the rain forest to provide a platform from which scientists can research, take samples and examine flora and fauna. The highest priority is that we should not destroy the landscape we have learned to love.

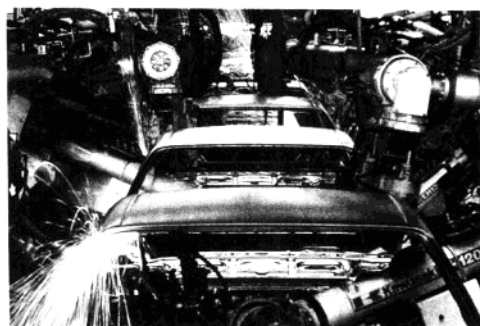
The fifth issue I would like to touch on briefly is the issue of the **decline of the manufacturing sector in the developed world and the emergence of knowledge-based industries**. I believe this has the potential to be a positive development. If we are forward-looking, rather than simply mourning the loss of our nineteenth-century heritage, we can all gain from this shift. Talking about the UK alone, the design, leisure, computer software, banking, tourist, fashion, film and television, and magazine and newspaper industries are huge employers of people and generate large amounts of income from abroad. Knowledge-based industry is here to stay, and needs to be considered as part of the economic base of all countries in the next century.

I now come to my final theme – **the relationship between the so-called developed world and the undeveloped world**. I have discussed the city in terms of enjoyment, and happiness, and as a place to come to for great cultural events – opera or ice skating and marvellous celebrations. The city is not only a place people have to work in. I've also talked about the lessons that the developed world has learned, and about how we might share this knowledge with the developing world. Do we, having experienced sometimes catastrophic urbanisation, encourage developing countries to retain their rural idylls, and say it's not all brilliant, this piling into cities. Why don't you retain your natural environment? Is it patronising to say enjoy yourselves, continue building beautiful huts? Is it just about maintaining things so that the *National Geographic* can go and photograph them for the rest of us to enjoy?

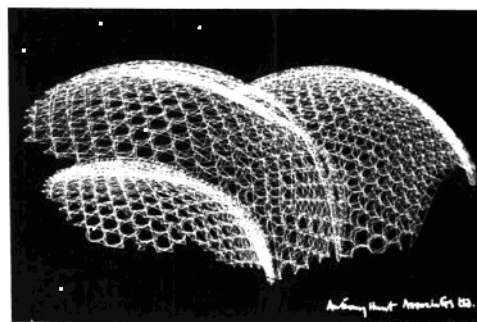
The problem is persuading developing countries to retain their forests as they strive to match Western levels of development. The tricky part is how we, the developed world, can get that message across when, after all, we cut down our forests to make fields so that we could cultivate crops and graze cattle. We need a considerably more sophisticated argument than simply 'don't do it'.

But there are things we can do to make our intervention in the affairs of the developing world useful. It is no longer necessary for the wealth of a

country such as the UK to rest on manufacturing industry. There is much work for consultants on projects in the developing world such as bridge building,



**Fig.9** Cars made by robots – an example of an industry in decline in the developed world



**Fig 10** Structural study of the geodesic biomes of The Eden Project showing potential levels of deflection – an example of knowledge-based work (© Anthony Hunt Associates)

irrigation schemes, solar projects or dam building. Schemes such as these produce marvellous benefits for developing countries and, in exchange, income for the developed countries. I think there will be an increase in this type of work.

I don't know if it is widely known that we were trying to get this idea of the use of specialist knowledge across in our Seville Pavilion. The building itself was an exercise in energy conservation and won an award for the smallest energy consumption of all the 106 pavilions in Seville. One of our proposals for recycling the building, which unfortunately wasn't taken up by the