

**RIBA/CIBSE CONFERENCE
TOWARDS ZERO ENERGY BUILDINGS
10 FEBRUARY 1994**

IAN RITCHIE

This short talk will range from broad issues to the particular.

I would first like to read a couple of paragraphs from (Well) Connected Architecture, a book I have written and being published next month by Academy. It is from the chapter titled: "architecture, ecology and global economics."

slide 1 earth/spaceman

Ecology and global economics are inextricably linked and reflect the exploitation of energy as the source of power politically transformed into the wielding of it. Global economic history has shown this - ask any economist. We have also seen that profit from the world economy appears to shift over time around the world as a privileged surplus (e.g. Medicis to the Japanese Corporations via the British Empire and the USA). We cannot continue to plunder/exploit from one part of our common home (planet) without it affecting negatively another part. A new (human) economic order is required where there is more ecological or holistic economic exchange as a basis for man's collective well being and survival.

A new wider and more appreciative Europe is, hopefully not simply the creation in the coming years of the largest, most powerful single economic market that the world has ever seen, with its consequent energy growth demands, but a staging post, symbolic of a desire to achieve a more integrated whole world.

Monetary economics has so far failed to find a way of dealing with social costs or with renewable resources. The present western mania (indeed more and more global) for development based on a mechanistic and materialistic viewpoint, supported by the present inadequate economic methodology has led to increased pollution, both on a global and local scale. To most economists it appears that the social and environmental costs still remain intangible. One may think that the point of economics is to help us manage the world better; however I suspect that few economists see it this way. It seems inevitable that there must be a change in the current economic way of thinking. Man developed the present model, and our actions still maintain it. A sustainable economy means a more compassionate one, in the way we relate to each other and the planet. The earth owes man nothing. The global spread of the free market economy (so far leaving aside the polar regions) sucking the earth's wealth will probably lead our present concept of progress into oblivion. Excessive borrowing from each other and our children is wrong.

Exchange through discussion and openness of information is essential for understanding, and when this engages cultural exchange a major prerequisite for creativity is in place. This in turn makes creativity more accessible and maybe more democratic in a less competitive environment. Competition has been and remains the conceptual trigger of our present economy and society. We do not believe that this is inevitable as is often argued. Collaboration, cooperation and indeed altruism are as common a natural inheritance as 'survival of the fittest'. This is a clue to redefining economic ethics, where the economy is seen not only to serve people in a material sense but to place it in a wider, more holistic context, where non-material issues are as important as material ones.

Quantum mechanics has shown that we are not observers, but participants in the world around us, and yet through our limited human perceptions, we continue to describe and prescribe as if our minds were still outside our own bodies and environment. The study of ecology has brought this into focus for us. Science has also shown us that the only certainty about certainty is uncertainty. These observations, which have undermined science's own imperious position, ought to be making us more tolerant and more ready to participate together in many more aspects of life.

Is not the art of living the ultimate art? In the end, it is not the planet which is at risk but man's place (and existence) with it. Our present concern for the planet appears to be a reflection of our selfishness. We hear and talk about the loss of the world's natural resources, plant and living organisms, both in our own country and across the planet, but more often than not in the camouflaged context of our human survival through nature's diverse resource for human welfare (medical, etc).

It is important to participate as an individual to express concerns about the wider issues which affect architecture. Like holography, in each part is the whole, but unlike the hologram, each part is important to the whole. Ideas popularized in the 60's, dematerialism (conceptual art), ecological awareness, spaceship earth - world citizen and the revolution in life-styles (sexual and religious taboos) have been slowly and discreetly absorbed and transformed by western society into more practical and vociferous views on how to begin solving world issues such as hunger, pollution, shelter and inter-cultural communications. (Some would argue that this is potentially another form of colonialism). Yet the economic model remains largely impervious to them.

In our urban environments, also spreading globally and 'home' to a larger and larger percentage of the earth's inhabitants, there is a danger that we are establishing an exaggerated and cocooned sense of our own self-sufficiency, which in turn will further alienate us from the essence of life on earth. Urban sprawl, a major world environmental issue was not even on the 1992 agenda of the World's first environmental conference in Rio de Janeiro.

Collectively man 'heads' starship earth and we should be taking a stronger view and measure our actions in terms of this responsibility to all life on it. Spaceship earth will fly on regardless of whether we are comatose or absent from the pilot's seat. The architecture we produce, and how we make our buildings is a reflection of our world view, or "how we walk on the earth". [Fluy, Herne, The Emplacement, Curragh] This is difficult for architects to assess in real terms, within a society still dominated by the science and technology culture.

Access to hard facts on energy, labour, social impact, recyclability, and the renewability of materials used in construction is very difficult. Graphs depicting comparative energy consumption of, for example, extracting raw materials or of processing them do exist. However, these 'facts', important as they are in signaling awareness, represent little in terms of the more complete picture. For example, we do not necessarily have the combined knowledge of the energy source used, their comparative polluting effects, and the effect of these processes on health of the workers in these industries and consequent social as well as economic cost, etc. It is a mistake to assume that graphs/tables such as these give a whole picture. The importance and dependence on such abstracted and limited data discredits us. It is in these sorts of areas that information needs careful examination but will ultimately one hopes, through significant development begin to give us clear data on which to make our more holistic judgments on not just materials, but the entire construction process and the way we access and use our built architecture; in fact a more whole picture of the consequences of our decisions and choices.

Another important view point is the effect (visual, psychological, physiological) of the architecture on the "user". Simply providing good air as part of a healthy built environment for humans is one important aspect of a continuing biosphere.

There can be no revolution in the industrialized regions of the world with regard to the way we extract, manufacture, distribute and consume materials - i.e. an energy revolution
Only a long campaign will eventually change our habits, of which this conference is a small but important part.

Post-war domestic energy consuming habits have become increasingly distanced from those of our parents and grandparents. They witnessed scarcity.

I recall that during school holidays, I was sent out to collect dry sheep manure from the hillsides of the Welsh valleys. This was winter fuel - (yet in an area where coal was mined and a 'free coal allowance' existed per miner's family), and this fuel, stacked like coal, was a clear visible energy meter - whose level immediately revealed consumption rates. We have since lost this visible energy meter, first to the coin operated meter and since then to the ubiquitous "invisible numeric meter" - parked beneath the stairs, or in the cupboard inside or outside on the common landing. More recently, in our present electronic age, this type of meter has had 'intelligence' added, showing money being consumed as well as energy units. I mention the meter (gas / electricity and water) because it still remains, as far as I know, the only energy performance recording device which clearly measures domestic energy consumption in a relatively 'holistic' way. That is, its measurement not only records the direct consumption of fuel, but also human behaviour within the individual physical envelope. Although we do not know how this 'energy behaviour' of the individual/family is apportioned. - some prefer opening windows every morning, some forget that they are open, some like excessive cooking or washing or ironing, (others, perhaps more energy conscious advocate the 'creased or crumpled look') and so on.

In Prime Minister Harold McMillan's 1960's "you've never had it so good" we all received images from pictures taken by men out there in space of our planet earth -the natural greenhouse of our solar system home.

In the early 70's the western industrialized nations were shocked into a new state of economy with the first world oil crisis, and the Portola Institute/Whole Earth Truck Store publication of the Energy Primer in 1974.

These "events" have remained in the minds of most of us here ever since. But as professionals in the construction of our environments, how many of us have fully integrated the essence of these into our underlying philosophy of design. Did the politic of deregulated individualism and consumerism of the 80's cloud the importance of these events? Are the politics of the 90's rediscovering them, but for different reasons - a reflection of Britain's economic situation and domestic expenditure limitations?

The second reading of the Energy Conservation Bill took place last Friday (5th Feb 1994) in the House of Commons. What is the essence of this Bill?

I quote Mr. Beith, MP for Berwick-upon-Tweed) from the record of the debate.

"With greater energy conservation, we could cut fuel bills and fuel poverty, and that is all the more important if the application of VAT to fuel goes ahead. We could reduce cold related illnesses. More than 7 million households are affected by fuel poverty, and it is estimated that 40,000 people die each winter because their homes are not adequately heated.

The domestic sector is responsible for about a quarter of carbon dioxide emissions. The country has pledged to reduce those emissions to 1990 levels by the year 2000..."

"The Bill, as a private Member's Bill, does not make large open-ended commitments to public spending. It ensures that we take an essential first step to work out what the energy efficiency of our housing stock is, both public and private, and where resources could most effectively be channeled to improve it. ...It is important to place the requirement on the local authorities. In these times of stringency, things that are not statutory obligations are the first to go under budget pressure..."

"The aim of the Bill is to enable people to keep warm in their homes affordably, by reducing the amount of energy they need to use, thereby securing reduced emission of greenhouse and other gases and conserving natural resources.

Energy conservation makes sense, whether one views it from the perspective of global warming or from that of pensioners struggling to keep warm."

When someone buys a car, whether it be new or second-hand, a key question always seems to be: how many miles to the gallon, (sorry litre) does she do? Has anyone ever heard someone ask when buying a house: how many days heating to the kilowatt does your house do? How long does your house heating last for 100 pounds? The inevitable arrival of the property energy rating on the estate agent's description will soon be more important, if not more so than the property's council tax band.

I will briefly describe some of our non-domestic architecture, illustrating building forms and aspects of energy and finish on a couple of individual retirement homes for pensioners we have also designed and built.

slides:

La Villette Bioclimatic Facades: the large conservatory

La Villette Roof: insulated light transmitting roof and collecting sunrays

Roy Square: the domestic conservatory

Herne: the long conservatory and digging in

NMMB: culture digging in - unconditioned air - linear slots

Planetarium: performance space and arch. min. surfaces +digging in

Terrasson: the experimental greenhouse - unprocessing materials

Fluy: the house as an insulated umbrella - or conservatory

Eagle Rock: energy in the wings

While our designs have often explored the structural and energy performance of certain materials to help create spatial environments, one of our current concerns, as illustrated by the experimental greenhouse, is to create architecture using material which is less and less processed by industry, while maintaining the pleasure of light in architecture. At the same time, we stay aware of research and developments in what I refer to as high technology, such as holographic films to help conduct and distribute light using far less transparent surface areas; molecular "replicating" spiders' webs, and nanotechnology (advancing in Saarbrücken and elsewhere)

At the end of the 20th century we can recognize some of the environmental building follies of this century, such as air-conditioning. We can also see the crudeness of our industrial manipulation of the earth's resources into pretty basic building materials. Looking ahead, I can see much cause for optimism. Trees are not crude - but extremely far-out high-tech!

slide : trees

Trees are exceptional habitats and examples that we can learn from. They capture light, make energy, grow by processing CO₂ and water, support and are a home to other life forms, and they don't make a human audible sound except when the wind blows; they do not appear to waste heat or energy or waste anything else for that matter and are natural pollutant processors, they provide shade and they look great. They keep us alive.

If there are appropriate architectural forms, they are to be found both in nature as well as in our 'cybernetic imaginings'.

But we need to understand nature's compositions and mechanisms at the molecular level, not simply appropriate their forms for visual delight, if we are to develop better constructed buildings and environments for humans.

The need to understand nature's systems and processes better and to work with rather than against nature has never been more relevant than today.

I would like to conclude by quoting an exchange from the second reading of the Energy Conservation Bill.

(Mr Patrick Thompson) "...Concepts such as wind power, wave power, hot rocks and fuel cells are exciting, but, as my noble Friend said, the truth about energy efficiency is that it is boring, as it really only concerns property insulation and design."

(Mr. Brandreth) "I disagree with my honorable Friend about energy efficiency being boring. I find that when I talk to people in my constituency about cost savings, they recognize that it is a case of enlightened self-interest and that they can help save the world, while improving the quality of their home life and enhancing their bank balance. Far from being boring, it is exciting."

END