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Environmentally Sustainable Design In Ireland

The Work of Paul Leech and Gaia Associates

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Introduction

Introduction

> Your Conscience is the measure of the
> honesty of your selfishness.
> Listen to it carefully (Bach,1977, p.104).

The 'Green' design and architecture movement is an extremely difficult and varied area to cover, since it does not have a specific beginning or ending in time. It is only in its infancy and as yet the human race is only vaguely aware of a need to save itself from serious environmental catastrophe. If we were to ask ourselves how conscious we are of what we are doing on this earth it would be extremely difficult to measure. Richard Bach's words are significant in that he asks us to measure our conscience on the basis of our selfishness. Any species that is set, blindly or not so blindly, to squander its inheritance for the sake of a comfortable and self gratifying life, is capable of not having any sort of conscience.

A conscience is only of use if one is prepared to act upon it and, in the case of 'Green' issues, this acting on our conscience is paramount. The facts on how we are raping the natural environment are all there for us to see and yet we still manage to ignore, or choose to ignore them.

Environmentally sustainable design has been almost unheard of in Ireland until recently. The recent 'Green Building' in Temple bar is almost unique in that it managed to draw a great deal of public interest by being a pioneering project in Dublin City Centre. This, in essence, heightened the awareness of the public however there is one architect in particular who has pioneered Irish 'Green" Architecture. Paul Leech has worked on a number of building designs which in a sense are a progression to the type of building that the Temple Bar project signifies. Two buildings in particular provide examples of early attempts at developing a 'Green' ideal and aesthetic. These are the private Coughlan residence in Kentstown Co.Meath and the Navan Credit Union building. These are both the work of Leech who worked in Co. Meath earlier in his career and has

now worked all over the country and abroad. In assessing these buildings and the ideas embodied in them, it may be possible to see if the trend in Ireland or indeed the world will move towards a more sustainable form of design.

'Green' design and architecture have an extremely valid role to play in any move towards developing a more sustainable lifestyle, since they are professions which contribute greatly to the environmental difficulties. The perceived need for us to consume vast amounts of natural resources is directly related to the fact that we are overly materialistic. Architects and designers have traditionally used their problem solving training to provide for and fuel this materialism, and are used as a marketing tool to convince people that this blind consumerism is sound logic. At what stage do we, as designers, take responsibility for our professions and start to direct them in a moral and logical way? The immediate answer to this must, in all cases be now. If any architect or designer has even the slightest interest in how the human race continues to live, then the development of an environmentally sustainable practice is essential.

It is important that we understand the reasons behind the development of any new movement and the 'Green' design movement does tend to stem out of a more general environmentalist movement. The goals are more specific and tangible within the design movement and the development of sustainable and environmentally responsible practices are possible on a personal level. The goals of the worldwide movement are extremely wide This is one of the difficulties surrounding the worldwide environmental movement. Its goals are both global and local, personal and social and so it is often difficult for the individual to find their place and task. One action that will be the most important in future years is for the individual to change his or her lifestyle to a more sustainable one. This does not just mean, as in Ireland, that we buy the 'Green' option in the supermarket and send our bottles out to recycling bins to keep our conscience clear. It is important that we re-assess our whole lifestyle. That is not to say that 'Green'

consumerism is negative but more that it is a necessary link in a whole 'Green' consciousness.

The challenge for the architect or designer is to provide buildings and products which are sensitive and appropriate for this change in values. It does seem that this change will happen-whether it happens soon enough is debatable. The basic challenges of lessening energy consumption, and using materials which are renewable and sustainable are more important then they ever were in the past. These challenges are almost simplistic when one looks at them in comparison to other challenges which Irish architects and designers have faced in the past when a goal is to be reached.

In looking at the work of Paul Leech it is possible to see some of the more basic solutions to the environmental problems faced by architects. It is also possible to see a way of developing a 'Greener' architecture. Above all it is possible to see that developing an environmentally sustainable form of design does not have to be that 'quirky', 'semi hippie', idealistic form of design that we all expect it to be. The answers are in fact more simple and attainable.

Chapter 1

The Foundations of the 'Green Design' Movement.

No discussion on the 'Green' design movement would be complete without outlining the foundation on which it has evolved. While the 'Green' movement as a whole is beyond the scope of this subject, it is probably worthwhile to look at the basics of 'Green design' history. The movement is a global one but it is possible to section it off into a number of different time periods.

Pre Industrial Revolution

'Green' design and architecture are not, strictly speaking, new movements within their respective fields. They are more like factors of design that have always existed but become more or less accentuated depending on the social and economic situation of the times. If one is to go back in time to when our species first 'came down out of the trees' about 50-100,000 years ago, we can say that the Neanderthals were the closest to a totally sustainable system. They had the least impact upon their environment and their numbers were sufficiently small to allow the natural environment to recover fully from their activities. This is perhaps a simplistic and obvious example but it sets the scene for a species that has become different to all others in the animal kingdom. The Neanderthals were essentially the first designers and with that the original 'Green designers'.

All men are designers. All that we do , almost all of the time, is design ,for design is basic to all human activity

(Papanek, 1984, p3).

Does this mean that we should revert to some sort of primitive culture to save the planet? Of course not, but we can learn from their simplicity and their ability to live in some sort of harmony with their environment. It would be extremely naive for us to think that, with all the advances man has made, we could go back to a lifestyle such as that of the Neanderthals. The fact is, however, that we can and should be able to redevelop a connection with our environment. The idea that one can communicate with the natural environment on a

basic feeling level is something that Paul Leech uses when assessing a site prior to the design conception. This is using an important skill that has perhaps become dormant since the pre-industrial revolution days when man was, without a doubt, more in contact with his environment.

Post Industrial Revolution.

The prehistoric periods of the Stone Age, Bronze Age and Iron Age were significant in their own ways but it was not really until the Industrial revolution that, we see a change, from a 'Green' point of view. It is here that we start to see man make the dramatic change from being in contact with his natural environment to being ignorant of it. Up until this point man essentially lived off the land and knew the earth as well as he knew his own family but it is a skill and instinct that he soon loost.

The change from a predominantly rural, agricultural lifestyle in Britain and mainland Europe to a centralised industrially based one brought on the difficulties of mass accommodation, food supply, hygiene, transport and many other aspects we take for granted in the present day. The opportunity arose to build up market economies which no longer related to the needs, but rather the wants, of a previously self sufficient peoples. Until this time people could see where their food and shelter came from, they could understand and repair the limited technology that was part of their lives. A horse drawn plough or a forge made door latch was the limit of their technology and this was made and repaired locally. Everything remained more or less within their understanding.

As the factories and coal mines of the mid 1800s sprang up around England, so to did new machines, steam engines, mechanical weaving looms, giant spinning machines and such like. They were for the most part new and exciting breakthroughs in technology which meant that cloth, coal, and many other consumer items could be produced 'en masse'. The fact that the worker population lived in squalor and appaling industrial conditions meant little at the time and it also marked the first stage in man moving totally out of his natural environment. The worker ceased to see the effects of his

work because he became purely another link in a huge chain of mass production. The fact was that speed and quantity of production became the main goals of society in the interest of producing wealth and, unfortunately, along with this went the impossibility of one mind to see where the whole task was being directed. Technology could develop freely without anybody pointing a finger at the imbalance between it and the natural world.

Perhaps one of the first verbalisations of 'Green consciousness' as we know it today came from William Morris in 1868 in his poetic work 'The Earthly Paradise'.

> Forget six counties overhung with smoke
> Forget the snorting steam and piston stroke
> Forget the spreading of the hideous town.
>
> (Vale, 1991, p.18).

He is, of course, commenting on the rapid spread of cities and the untethered growth of industry. Morris's views on a return to craft based art and design are well known amongst the designers of today but unfortunately his contemporaries of the time did not share his views. They saw pollution as an unfortunate side effect of wealth creation. Their response to this pollution was to move upwind of the smoke stacks or to retreat to their country residences and wallow in the wealth which they earned from their industries.

1970s -'The beginning of the the Storm'

The form of expansion and development of the industrial revolution still goes on today. It has never really slowed down except for a few minor breaks, such as to build smoke stacks higher and to direct sanitation into primary treatment plants. .These breaks are really only brought on by the discomfort of the general public at the time but, in essence, they only push the problems away since these measures certainly do not eliminate them. The 1970s were the next major step in the environmentalist calendar. It was then that a number of events started to make people think about what they were all doing with regard to the environment.

In 1972 there was a brief increase in environmental awareness at a political level, following the United Nations conference on the environment held in Stockholm. Corresponding with this was the petrol and oil crisis of the mid 1970s. The embargo which was enforced by OPEC signified, to the consumer, that for the first time ever the world could run out of one of its major resources. Perhaps some of the most significant documentation to come out of this 1972 conference was an unofficial report entitled"Only One Earth" compiled by Barbarah Ward and Rene Dubos. They collected information on the environment from over 150 experts around the world. The Report was commissioned by the then Secretary General Maurice F. Strong at the time said "Human activity is having profound effects upon the environment" (Dubois &Ward, 1972, p10).

This was really the starting point for an environmental consciousness at a political level. Through this document it becomes apparent that topics such as global warming, over population , pollution of the air, water and earth and our other concerns of the 80s were plainly obvious to all in positions of power, from as early as 1962. These were not just concerned banterings of a few environmental theologians but more the conclusive hard fact of respected scientists and industrialists. It is extremely difficult to comprehend why the facts and forceful warnings, which are found in this document, are left practically unheeded by national and international governments.. All of this cautioning happened on a political scale but one has to realise that politicians merely followed what was the will of the general public. The general public, of the First World, were caught up in blind mass consumerism and of the Developing countries,were rushing to develope and industrialise.

The Report for the U.N. conference identifies the realm of the designer and architect as follows.

The most urgent economic problems raised by the environmental issue, by the effect of high demand, consumer pressure, resource use and the particular problems of dealing with the increase concentration of people in the heavily built up areas.

(Dubois &Ward, 1972p.148).

If these were the most urgent issues that needed dealing with in the 1970s then surley, 10 years on, the issues have reached a critical stage.

There are a number of interesting examples provided by Victor Papanek of architectural and product designs which grew out of this period of time. Perhaps the most visually striking of these is "Drop city" built between 1965 and 1981 by a commune of young people near Trinidad in Colorado, U.S.A. These forms or 'Zomes' were the brainchild of the designer mathematician Steve Bayer. The buildings are constructed from polyhedras and polygons which are made of triangular pieces of steel cut from the roofs of old cars. While the buildings are not totally practical and have serious problems with regard to leaking, rust and insulation they are an interesting exercise in design from a recycling point of view. This is just one example that Papanek uses and to delve into more would merely be regurgitating previous analysis. The limited consciousness that was developed during the 70s was not formally taken on by the design world since they were still totally engrossed in the traditional consumerist driven design process that continues today. The architectural world on the other hand was too concerned with providing large scale housing to the majority, and other more immediate problems, to consider the overall consequences of their actions. Gradually it started to sink in that these consumerist ideals were not the only code worth living by and that they were not infallible. As we moved into the 80s and early 90s we saw a marked change and a development of ideals from an environmentally sustainable point of view.

Chapter 2

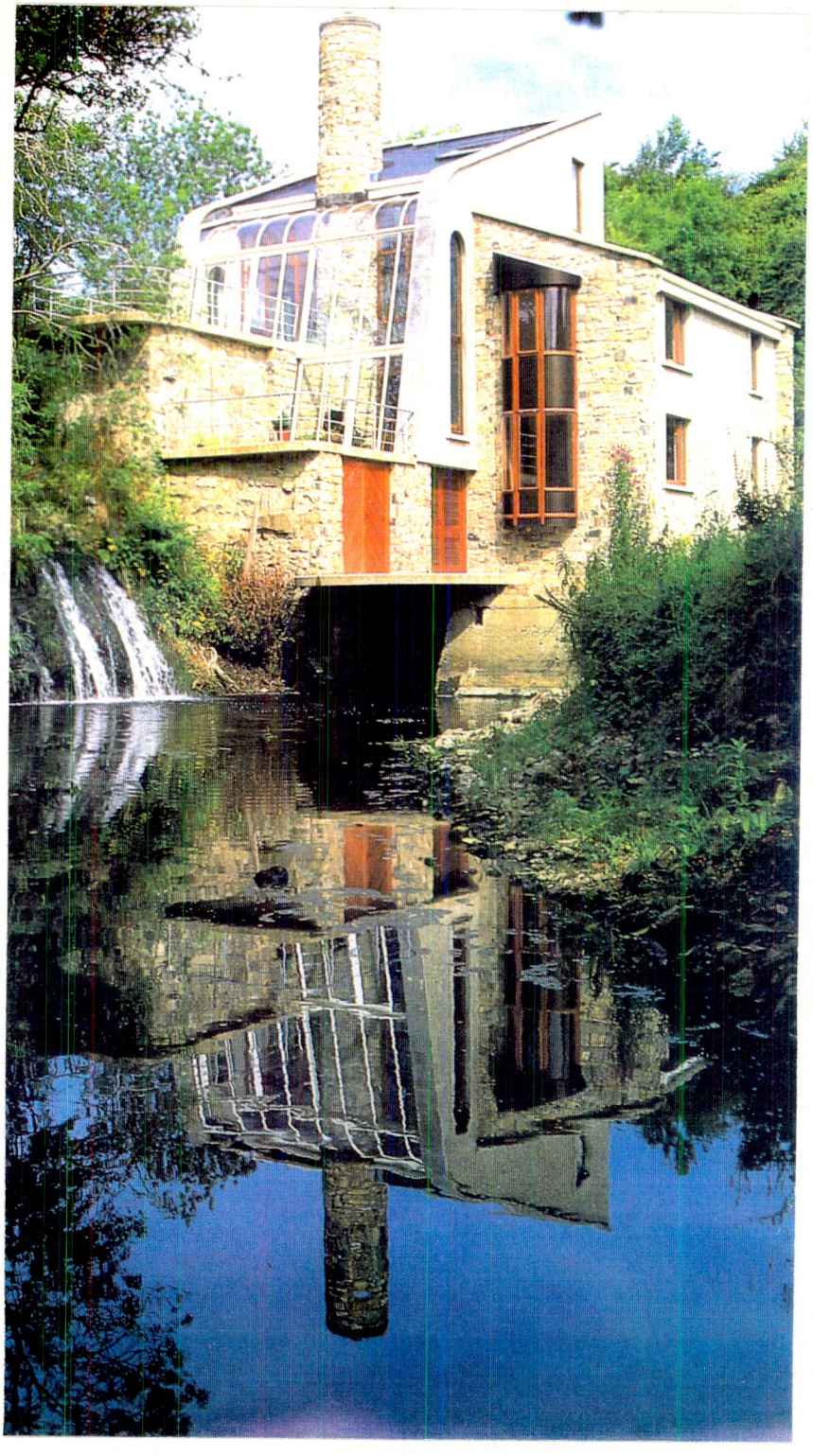
The Work of Paul Leech and Gaia Associates

No discussion on 'Green' architecture can be assessed fully without the introduction of a case study and in this instance two of the earlier works of an Irish architect and his associates are appropriate.

Paul Leech and Gaia associates have been practicing sustainable architecture to a greater or lesser extent since the late 70s. This, in fact, makes their case quite an unusual one in terms of Irish architecture, since it could not be said that 'Green' architecture was in any way fashionable or commonly practiced in Ireland in the 70s or the 80s. This climate would have made it extremely difficult for any architects to express any 'Green' ideologies in their work since without the initial interest of a client in 'Green' ideology it is almost impossible for the architect to include it. The two buildings referred to were both built in the late 80s which meant that they pioneered, to some extent, the environmentally sustainable aspect of architecture in Ireland.

Paul Leech's work is mostly based in Co.Meath as this is where he was brought up. Paul Leech does consider himself to be a radical to some extent in the architectural field' and as he says himself he is a necessary radical. He feels that there is simply not enough time to mess around doing anything else. This view is generally only shared by the deeper thinkers of the architectural practice and so it is extremely difficult to spread the ideology fast enough. Perhaps the this urgency regarding the degeneration of our natural environment is due to the fact that we are unable to fully see the consequences of our actions immediately.

Chapter 3



The Coughlan House
with the mill pond in the foreground.
Plate 1

The Coughlan House.

The private residence of Mr. C. Coughlan in Kentstown valley, Co. Meath is one of the first realisations of 'Green' elements in Irish architecture. While the client and the architect both agree that it was not singularly designed to a 'Green' brief, as we would see it today. Having said that it does contain some of the main elements of sustainable architecture. Paul Leech himself considers it to be at a sort of "Middle Term" (Leech, 1995) compared to where he is now The house was designed and built in 1985 and '86 and, with this in mind, it could be said that the house is revolutionary in some of its elements,in that they break away significantly from some of the traditional design normalities of the time. Mr Coughlan chose Paul Leech primarily because he was the first architect who considered the whole site rather than just the building design as other architects had done. He had also seen some of Leech's work in Navan. Some may say that these are not 'Green' intentions and this is true. However it could be argued that clients rarely take on board the same ideals as the architects they employ but they work together to find a design they are both satisfied with. This happens to a lesser or greater extent depending on the willingness of the client and the designer to change and adjust. The client may be the one who has a greater concern for a 'Greener' design and the architect may be the one to change.

The site is all important in any building and even more so in the 'Green' architecture field. In the case of the Coughlan house the site was originally an old sawmill and previous to that it was an old copper mine, so it can by no means be considered a virgin site. The Kentstown river flows into a small valley and the mill was located at a turn in the river where the river drops over 3 meters in height. This was a source of power for the old saw mill and is eventually to be used as a source of power for the new building. Before building could commence' the mill, which was really an array of derelict old asbestos roofed sheds and machinery, had to be dismantled. Many of

The West Facade of the house
looking down from the driveway.
Plate 2

the materials ie. the asbestos roof sheeting were saved and reused later. The mill cottage was left standing but is unused. The location for the new house was chosen essentially to provide easy access to the old 'Gilkes' water turbine which dates back to 1900. It was decided that the turbine could be refurbished to run a generator for an electricity supply for the house. The turbine has in fact taken a lot more work than was previously envisaged and is now in working order but still as yet does not have a generator mounted on the top. This will be installed in the near future thus making the house fully self sufficient in energy needs. This micro hydro electricity is probably one of the most important parts of the design because it was realised at an early stage that this source of power was more than enough to supply the houses energy needs. This is in 'Green' terms, an ideal situation but it was perhaps one of the reasons that the house is not as 'Eco-friendly' as the architect might have wished at the time or even looking back now.

The heating or cooling of any house is one of the single largest difficulties when one looks from either an economic or an ecological point of view. The Coughlan house is of course no exception and its heating and insulation system is quite unusual in this respect. Since the turbine was to provide an excess of electricity it was decided to use that to heat a huge 1000 litre 'Water Battery" for the house. This tank in the basement is fully insulated with a half inch double foil backed foam liner which is much more efficient than traditional polystyrene insulation that was and still is used. This type of insulation would probably be considered less appropriate now but at the time it was a move towards a greener material or even just a more efficient one. The water battery is used to run a hot air circulation system since this type of system is more effective and efficient when heating large rooms such as the kitchen and sitting room. The hot air system works in combination with the passive solar heating provided by the large conservatory on the south facing side of the house. The air is heated and rises to the ceiling where it is then taken in by the ceiling height ducting to be circulated around the building again for further use. The mass of the house itself was also designed to form a battery type system since the heavy stone

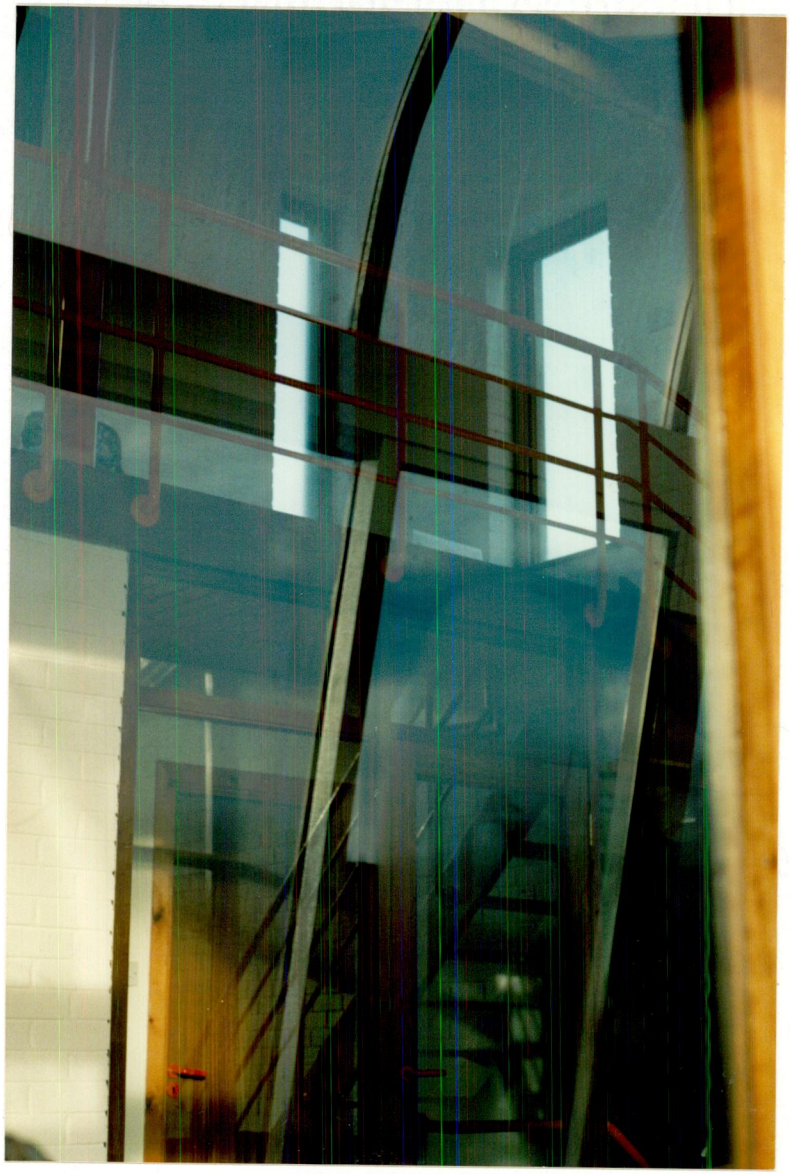
The Turbine is contained in the turbine house
behind the left hand wooden doors.
The turbine location was the primary consideration
for the location of the building
Plate3

The Gilkes Turbine which dates back to 1900
Plate 4

The mill race enters at the west facade of the building
and the water falls under the terraces
to power the turbine.
Plate 5

A detail of the air circulation ducts placed at the top of the conservatory to re-circulate the solar heated air.
Plate 6

A view through the double conservatory to the terrace looking from the high living room area.
Plate 7



Looking into the living room from the terrace
Plate8

The extensive use of glass allows natural light to filter into all areas of the house.
Plate9

The double height conservatory area allows for a winter garden and green space to be cultivated.
Plate10

walls balance out the temperature from summer to winter. Over one third of the external wall space is glass and so this acts as a simple solar heater. There are a number of difficulties with this idea which is used as a basic principal in many "Green houses". The main difficulty, if one is in a cold climate, is that glass has very few insulatory properties and so if designed badly the house can loose much of the heat it gains through solar heating. This is normally combated by using double glazing and more recently thermoglaze type glass which all cut down on heat loss. The Coughlan house falls down significantly on this front since none of the window or glazed areas are double glazed but this is due to the fact that the house is self sufficient with regard to energy needs. It was not considered a priority to double glaze if the hydro generator was working and the cost would have been much more if double glazing had been installed.

The generator is not yet functional and so the water battery runs on night rate electricity. This, while being far from ideal, is still less than half the estimated cost (financially) of heating the same house on gas or oil fired central heating. The reason the use of the national grid is considered less ideal is due to the means by which the national grid is powered. It is run mostly on fossil fuels which are either imported at great financial and environmental cost or else, in the case of Ireland, the natural bogland is cut away to provide power. This has multiple effects which are for the most part ignored at a national level in the interest of a small number of jobs. The whole area of bogland destruction is a difficult one and is too complex to deal with in this context.

Perhaps the most striking feature of the building is the amount of natural light that is designed to penetrate into almost all of the rooms. The two main living rooms on the first and the second floor are extremely large and yet due to the clever design of the double conservatory glass area they receive direct sunlight almost all through the day even in the short days of winter. This is again a feature of many eco building designs since it cuts down on the amount of artificial light that must be generated. It also provides a more natural and healthier light for working and living by. This is a

characteristic of much of Paul Leech's work, combining the clever placement of rooms with large areas of glass to cut down on unnecessary electrical lighting. It is seen again in the Navan Credit Union building which we will examine later. The bedrooms and the bathrooms are placed on the north and east sides of the house since they are used less in daylight hours but the master bedroom and the dining room both have large bay windows which maximise on the morning light and provide a good view of the waterfall.

It is interesting to note how Paul Leech himself defines the house.

> What the building achieves most is in transforming the site,
> It achieves a bit in terms of art,
> But not enough in terms of ecological design science
>
> (P.Leech,1995)

The building does indeed transform the site from as he puts it "A sort of post industrial nightmare" (Leech, 1995) into almost an idyllic building.

While one could argue that from a stylistic point of view the house has dated quite a bit, it must also be noted that the building reflects a number of important issues. It is a reflection of the initial, if somewhat undeveloped 'Green' ideals and 'fads' that started in the late 80s in Ireland and the world generally. While it is not a perfect 'Green building' it must be remembered that it was not designed to be a totally 'Green building'. In fact there can be no such thing really as a fully 'Green building' since the very act of building changes the landscape and uses resources. We can only strive to develop an environmentally sustainable way of building and that is in essence what this building has elements of, a striving or an exploration into the alternatives to a nihilistic architecture which still unfortunately prevails to a greater extent.

The Coughlan house will be self sufficient in its energy needs even if many of the materials used in the construction have large amounts of embodied energy and are less desirable from our present 'Green standpoint'.

One of the other noteworthy features of the house is the means by which it was designed around the site. There is an ancient Chinese art known as "Feng Shui" which is a Taoist practice used for the placement of buildings and designing their layout. It seeks to find a harmony between a building and its surroundings and to use the good "Chi" or natural energy of the site and its elements. This practice and other more occidental forms of building placement have become a feature of many 'Green' architects design process. This idea is almost a development of the basic 'Green' design principals, which deal with materials and building techniques, to a deep ecological feeling for the site. It is an area of ecology that receives much less thought since it is more a philosophical and theoretical practice than the more tangible areas.It is however an element that writers such as Arnie Ness (The founder of the 'Deep Ecology' Movement) would stress as being of great importance if the architect is to be sensitive towards their design.

Paul Leech does seem to feel quite strongly that it is possible for one to read the site and feel where the building should be placed and also the form the building should take.He states the following:

> The site will tell you what the building wants to be,
> and if you are open enough to read the site ,both its history
> and its space,time and ecology ,then it is possible for a site
> to speak through a building.
>
> (P.Leech,1995)

This idea allows the building to be defined sensitively and using the site as a design tool means that the architect becomes aware of the consequences of that building on the local environment. This unfortunately is a luxury that architects do not often have since man has tarnished much of the natural environment already and before one can feel the natural site one must dig through the layers of rubbish man has built up over it over the years.

The interesting thing about the Coughlan house is that intentionally or otherwise it conforms very well with 'Feng Shui" principles. The flow of a river to the front of the house,the situation

of the house half way up the hill and the fact that it is surrounded by hills are all considered ideal.

Whatever one's view on how 'Green' a building should be before it can be considered a truly 'Green' building, it has to be recognised that without developments and experimentations such as this it would have been impossible for Paul Leech to get to where he is now in terms of environmentally sustainable architecture. This building is a landmark in Irish 'Green design' which is still almost ten years later a small movement. It provided a training for the architect and from here he went on to work on the Credit Union which is very similar in many ways but different in that he had much less freedom with the design.

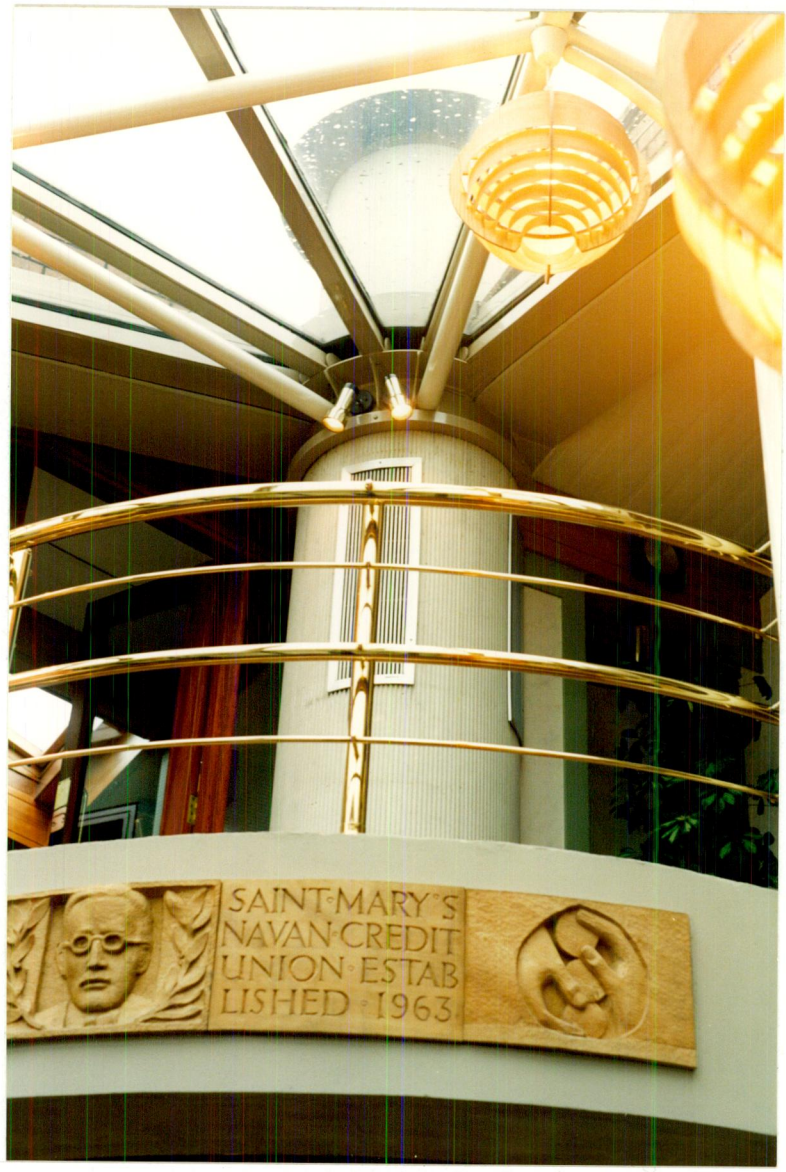
Chapter 4

St Mary's Credit Union
Navan
Plate 11

The Credit Union Symbol
at the top of the pillar is central to the form of the building
Plate12

The Inside of the building is enhanced by the adition of hanging and standing plants these also help to re-oxygenate the air
plate13

The Glass 'Cascade' and entrance to the building.
This is the key passive solar heating device
Plate 14



The Central column of the building.
This contains the air circulation system.
Plate 15

green architecture and it uses very successfully this indoor/outdoor idea .

The semi-public areas of the building within the Credit Union have also been given a 'Green' priority. The large meeting room on the second floor at the south eastern edge of the building receives a good deal of natural light through the full length windows. The downstairs part of the building is also carefully aligned to get as much of the natural light as possible to the desk spaces and so as the clerks and staff can have a quality, comfortable and peaceful surrounding.

The second factor in the design of the building was the fact that it was contracted by a committee as against a private client. This according to Paul Leech causes problems since it is difficult for a committee to be as singular about the task as one might like. There are personal agendas to be met and these may not always be similar to the central idea of the design. In this case the building was primarily designed to be a functional building that suited the needs of a co-op type financial institution. To satisfy this for most architects would be sufficient challenge. However, in Paul Leech's case, it was also necessary to introduce an ecological sensitivity to the design and building. The most significant physical feature in this sense is the glass cascade on the front of the building which acts as the lobby and main facade. It symbolically mimics the fountain which is placed at the front of the building and its flow of water. From a technical point of view the glass forms the primary heating source of the whole building since it is in essence a passive solar heating device. It is a double glazed skin which maximises on the heat gained and also works in conjunction with the simple air circulation system. This circulation system was made simpler than that in the Coughlan house since it is more of an open plan building and so the air flow can be directed more naturally.

The basic mechanics of the circulation system are that the sunlight heats the air behind the glass lobby, This hot air rises and is taken in through the central column of the building which contains the main ventilation duct. The hot air is then drawn down to ground level again to be re- circulated around the lower floorspace. There is

The Peace Garden
Plate16

The Salmon Fountain
Plate17

The South East Facade
The large roof window lights the stairwell and internal office area.
Plate 18

also an intake of fresh air from the roof vent which is mixed with the hot air so as it does not get stale. This vent at the top of the central column also acts as a dump valve in hot weather when the building needs cooling down. There is a top up heating mechanism provided by night storage heaters to help heat the building on colder winter days when the solar heating is not enough. The storage heater is one of the more efficient means of generating heat electrically however it is not particularly desirable from an ecological point of view since it uses the national grid.

There are some interesting smaller features in the building which make it successful from both an architectural and an environmental point of view. The external part of the site is landscaped with various arrays of trees and shrubs and a "Peace Garden" is situated in the eastern corner of the site. This garden contains a never ending gravel spiral similar to the oriental ideas of peaceful spaces. The garden also contains two large standing stones which were taken from deep underground in the nearby Tara Mines. This is almost ironic in that the mines, are a major source of employment in Navan but are also the largest lead and zinc mines in Western Europe , which raises several environmental issues. It must be said however that Tara mines go to considerable lengths to 'camouflage" the scar they have made in the earth by planting trees and supporting local environmental projects. Perhaps the presence of the stones has a peace gesture saying "yes, we must take from the earth out of necessity but somehow we must do so sensitively". The garden provides an area of peace and quiet and nature in an otherwise busy town. The size of it makes it difficult to provide a totally tranquil space. This idea of providing a meditative space is common to many 'Natural' buildings since it not only promotes a psychological wellbeing but it also provides some sort of a natural haven from our otherwise toxic lifestyles.

The front to the building is enhanced by a bronze sculpture by sculptor Eamon O'Doherty from Derry. It depicts a salmon jumping up a weir and uses the fountain water to exaggerate the effect. The fountain flow is controlled by an anemometer placed on the top of the central column of the main building. This prevents the wind

The Irish Elm Half Relief
pannels by
Domhnall O' Murchadha,
and a view of the upper balcony.
Plate19

from splashing the water over the edge of the fountain pool and cuts down on water wastage. The fountain provides an interesting central image seeing as the Boyne river is so close. Paul Leech refers to it as "a vital and fertile image that is fitting to the Boyne mythology of the salmon of knowledge" (Leech , Interview, 1995).

Internally, the balcony is adorned by a series of half relief panels by sculptor and ex professor of sculpture in the NCAD, Domhnall O Murchadha from Cork. The panels depict various scenes from the history of the Credit Union Movement and the life, work, and industries of Navan town. They are carved from Irish Elm a natural and local material. This feature is characteristic of the building and is common practice in 'Green Architecture' since local natural materials do not require as much transport and fabrication and so are less energy consuming and are also more inkeeping with naturally occurring materials. The bricks used in the building were specially made and fired by Castlecomer based 'Irish Clay Bricks'. The carpet was made from natural wool and was specially made by 'Navan Carpets' The aluminium frame work for the windows and the front section were all made in Belfast.

It can be argued that many of these materials have "Greener" alternatives but they must be assessed in terms of the architectural climate of the time. They were an effort to look for more ecologically viable alternatives to cheaper imported materials. No building can be described as pure but in striving for an alternative, the designers, clients, builders and manufacturers learn a little and hopefully the general consciousness is expanded.

Without a doubt the Credit Union building influenced the design of the Post office which was built opposite it about two years afterwards. It is blatantly obvious that no attention was paid to ecological concerns. It comes across as a sort of 'oafish' structure more akin to a barn than a public building. It would be unhelpful to go into its design other than to say that it is a poignant reminder of what could have been done with the credit union and what was being built by the majority of architects in the late 80s.

Due to the success of the St .Mary's Credit Union in Navan, Paul Leech was commissioned to design the credit union in Longford town

and this too was designed with sustainable architectural principals in mind. It does seem that throughout this time Leech was being commissioned, not because of his ecological ideals, but more on the basis that he was an established architect who in working any design managed to combine a number of architectural principles of which environmental sustainability was just one.

Chapter 5

Recent Work

Paul Leech and Gaia Associates have been commissioned to work on a number of interesting projects since the building of the Credit unions and perhaps the most interesting of these is the house they are at present completing. Unfortunately the building was incomplete at the time of writing and so it was not taken as a case study.However, some of the details about the concept are interesting since they show how much the architect has progressed in terms of Green input into the buildings. This particular house is being built in Blacksod Bay, Co. Mayo as a private residence for a barrister. It is being built around a freeform type of structure made from roundwood poles. This form of building is almost unique in that it entails taking timber that is processed to only a basic level. The timber is felled ,stripped and treated minimally against decay. The building itself is under ground, or in this case, bog level and is covered with a sod roof so as it will become almost a part of the landscape. Much of the structure will be walled in with rammed earth, clay and wattle walls and so this is a serious look at the use of low embodied energy materials. It is also an excersise in being as sensitive as possible to the natural local ecosystem. Leech does make the point that the building has been extremely difficult to work on with regard to keeping the ideals and materials pure. The round wood, for example, was originally meant to be taken from an adjacent site where trees were already being felled. It proved impossible to buy and use this timber since it was not stress rated and so they had to revert to using wood from an ESB pole yard in Kildare. This was of course a compromise since it ment that the wood had to be taken all the way from Kildare to Mayo thus using up more energy than was envisaged. It will be interesting to take a look at this house when it is fully completed and see how it is standing the testof time.

When one looks at the subject of sustainable architecture in depth it becomes increasingly apparent that very few of our local architects in Ireland actually even consider it. It may be becoming more acceptable as a way of working in the more northern European countries of Norway, Sweden, Denmark, Finland and Holland but this is mainly due to their social interest in deeper ecological issues and in their acceptance of a more sustainable way of living. Much of design is client or consumer lead and without the interest of the general public it is difficult to see how any movement towards a more sustainable design or architecture is possible.

Chapter 6

The Solutions.

There is no singular solution to any design problem and so the designer must look at multiple ways of dealing with any design. There is and has been much discussion about how 'Green' any designer should be, if at all, and who should pay for this 'Green' element if it is just a tacked on luxury? Is 'Greener' design or architecture just another affordable whim of the richer classes as high design and architecture is ? Equally, will a larger new design aesthetic come out of this new movement?

There are a number of concepts that must be discussed before one can answer these questions. These concepts are in fact solutions which are offered and can be intermingled to suit the design or building in question.

The High Tech. Solution

The high tech path to solving any design problem is often the most interesting one for the designer since it challenges their ability and ingenuity to the full. This is possibly since it is the applying of our 'non Green' way of working to a 'Green' ideology. If we take the Leech buildings that have been examined, we can see that specific problems are tackled in this way ie. the problems of energy conservation, generation and storage of heat, materials usage and waste disposal. Any one of these challenges has a number of possible solutions that do not necessarily have to be high tech.. However, the high tech solution allows the user of the building to change his or her way of living as little as possible and does not require any major revolutions in thinking. The house functions in a relatively normal way and the user does not have to be particularly 'Green' thinking to use it.

Take for example the heating of a building. The architect must firstly choose the means by which the heat will be generated. The

fuel may be a finite source like coal, gas, oil or peat or equally the fuel may be reusable like solar, hydro or wind power. The finite source is the most regularly chosen at present because of the economical and artificially low cost of installing and running a system like this. The alternatives and the 'Greener' solution is often where the high tech element of, 'Green design' comes in. The electricity can be generated using local wind or water energy (as in the Coughlan house) or solar instalations but these are highly engineered and are made from oils, metals and chemicals which are themselves finite. Of course, it is a wiser use of such resources but what if the solution to the heating problem were easily solved with a lower technology solution? This is not to say that the high tech option is not valid under Green ideology but it is a caution that we must use the technology sensitively and in conjunction with more simple solutions which may require a little less convenience to the the user.

The highly technological solution has the danger of making the building into a technical machine rather than a natural dwelling, the extreme use of wind turbines and heat exchangers and such like alienate the user from what is ment to be his own home or workplace and detracts from the natural way of living in a building.

There is the added danger that the technology is used to make the statement that "this is a Green building and don't you forget it!" It almost takes away from the fact that the building was designed to be ecologically sustainable.This is apparent to a limited degree in the 'Green Building 'in the Temple Bar area which has what seem to be a clutter of solar panels and wind turbines on the roof when their efficiency and appropriatness are questionable. The other difficulty with the high tech solution to any problem is that it is usually the more expensive option. and is often only affordable by the rich.

Provided that technology is used in an appropriate manner and in a climate that is suitable then it is valid. Essentially the technology is not the negative factor but rather how and where we use it.

The Low Tech solution.

"Simplicity is the essence of design", a much quoted phrase in the design world yet few seem to adhere to it. Design becomes an increasingly more divided discipline as specialisation becomes more and more the norm. Specialisation encourages the designer or the architect to look at the specifics rather than the general and this means that the designer no longer looks at the whole picture. The danger in this approach is that the solution becomes a collection of highly worked but inappropriate designs that fail to tackle the overall problem. Take, for example, the use of photovoltaic solar panels in the newer 'Green' buildings. This is a high tech solution to providing power to a building. If the architect was to stand back and take a look at the whole picture, he would see that it may be possible to avoid the use of this intermediary solution and to provide light and heat through the careful placing of the rooms and windows and therefore collect the solar power in a simpler method. More and more architects are looking at the use of alternative means of building to provide more mass in the building which acts as a type of battery that stores solar energy. Large walls of stone,earth and water can be used to store the solar heat from summer to winter and while this works to varying degrees, depending on the climate, it proves extremely effective not only as a passive energy storage device but also as a good insulator and a natural form of building. This low tech solution means also that the user is much more likely to understand and identify with the building.

Chapter 7

The Future Possibilities.

It is virtually impossible to predict a future direction in which architecture and design will go since they are linked directly to the fate of humanity and how we as a society make decisions about our possible futures. There are however some indications that Irish and World society is moving towards a more sustainable form of design and architecture.

In June of 1993, the "Union Internationale Des Architects" made a declaration of Interdependence for a sustainable future. The declaration, which was made in Chicago, is a lengthy one and its boundaries are far reaching.(Ref. appendix). This declaration was reaffirmed by the Royal Institute of Architects in Ireland in 1994 and by so doing, the architectural community of Ireland essentially turned over a new leaf in Irish architectural History. The declaration covers all aspects of architecture from the office practice to the conception and construction of a building and its sociological impact. The fact that the document and its declarations, guidelines and principals were all accepted by the R.I.A.I. is significant since it suggests a concern developing within the Irish design community for developing sustainable design. This concern was in no way apparent when Paul Leech and his associates first started to delve into these practices. It remains to be seen whether or not other architects take on the challenge. Paul Leech is in fact heading the work group within the R.I.A.I. which is preparing various sources of information and work packages for use by colleges, architects and designers. It is perhaps one of the most important practicle areas that needs dealing with since without the basic information on practices, materials, and building methods it is extremely difficult for any designer to inform themself and to change their practice.

Perhaps one of the more interesting developments in design in Ireland has been the recent building and completion of the "Green

Building" in Dublin's Temple Bar area. It would seem that this building shows a new awareness towards sustainable architecture in Ireland .This project, initiated under the EU 'Thermie' project', was significant in that it is the first time in Irish architecture that a high profile environmentally sustainable building has been constructed and sold to the public. The fact that it is built in Temple bar is of course significant since it is the progressive centre of Dublin but also, by building it in this area it was bound to attract a good deal of public attention. This fact meant to some extent that the building had to make a statement, the statement was of course a "Green" one. The building succeeds very well in this sense but in doing so it over kills certain elements. There is some question as to how much the more technical aspects of the building such as the wind turbines achieve and whether they are there more for statement value. Regardless of ones views on the particulars, it is without a doubt one of the most progressive pieces of design in Dublin to date and the making of a 'Green' statement is justified and necessary if it heightens public awareness. It provides people with a tangible example of what can be achieved within the confines of a city.

It is important to take these concrete developments in the design field as being a change in attitude for Irish design. The design community will not change over night, however, it does seem that there is a move to, and more of an acceptance of, 'Greener' ideologies. No area is more important than that of design education and it would seem that there is still a long way to go in that field. The young designers of the country are naturally the future designers of the country and there is a distinct ignorance amongst students of design in Ireland towards environmentally sustainable design. There is a distinct reluctance to develop any sort of deeper 'Green' sensibilities in their designs and perhaps this is due to the nature of the courses and the emphasis placed on them. It would be fair to say that within a country that is not strong in modern design it is only natural that students look to where the jobs are. There is little to be gained by developing green sensibilities on a professional level when it does not pay, or is there? Is it a chicken and egg situation? It is dependent on which type of education one feels is more valid, the

practicle education which teaches a student to slot into the existing system, or the forward looking education which forces the student to question design and design practice and to build their own skills on this learning. In the Irish case it is necessary that the later is developed along with the former. It should be possible to educate designers towards moulding the future as well as being able to work for the needs of society. The trends will not change without some sort of a push and it is vitally important that students of design and architecture are encouraged to do the pushing and not be submissive and accepting all the time.

The future of sustainable architecture and design as being the norm will not hit us overnight but as Paul Leech suggests it has to happen soon and people must change since we do not really have the luxury of time.

Conclusions

Conclusions

'Green design' and architecture have developed out of a greater movement towards a sustainable future. They are small factors of that movement but in essence they are most influential in that they offer some constructive and tangible solutions. The difficulty within the ecological movement is that it challenges our way of life and so often criticises it to the extent that people, who feel strongly that we need to develop a deeper ecological aspect to our lives, often come across as dreamers or complainers. Any movement that challenges the status quo is bound be difficult to accept even if the facts are clear.

In an Irish context it is perhaps more difficult to see a necessity for developing a 'Green' Sensibility to our design since we are lucky to live in an environment that is still reasonably unscathed. This in turn means that we are less likely to see any urgency with regard to changing our lifestyles. Social pressures such as unemployment, education and emigration all take precedence in the media over ecological issues and it is really only as a result of other countries concerns that we have been exposed to the ecological concerns. The local and immediate factors always override the more global and less immediate ones. The former are, after all, there in your face and it is difficult to ignore them. The external pressures are as a direct result of countries such as Germany, Holland and those in Scandinavia suffering from the effects of acid rain, river pollution and overcrowding in ill designed cities. They, to some extent, are pressurising us not to go down the same road that they did in the past but rather to learn from some of their mistakes and examples.

In this light the work of designers like Paul Leech developed, and when one takes into account the small public demand for such work it does seem amazing that he has succeeded in getting some of the projects realised. Perhaps an explanation for this is that in the early works we have examined and in his more recent work he

manages to combine an extremely practicle humanistic approach with a deep 'Green' sensibility. The Coughlan house and the Navan Credit union are by no means definitive designs from a 'Green' point of view but they do introduce elements of 'Green' design never seen before in Irish architecture. They are a starting point and a development exercise for both the architect and the architectural community in Ireland. This is also a characteristic of 'The Green Building' and perhaps the realisation that 'Green design' is essentially 'Humanistic design', which may mean that people will see the value of it more quickly. The question of whether it will become another 'Ism' or a new style is irrelevant since the movement has a different agenda to previous movements. It is concerned with the survival of the natural environment and hence the human race. Past movements in design have been concerned with form, aesthetics, technology and the selling of new design, all of which are introverted subjects that only take human consequences into mind.

The future for design in Ireland is just emerging and with the right input and the right concerns being developed by younger designers it may be possible for Ireland to create a design tradition based on similar principals to its inherited craft tradition- a direct link to the land and environment and to the resources available to us without destroying the environment.

The future is a challenge and a mystery but we must seek to direct it and design it positively rather than sit and let it take us by surprise.

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Appendix

R.I.A.I. Work Group on Sustainable Architecture

Declaration of Interdependance for a Sustainable Future

Union Internationale des Architectes, Chicago, June 1993

IMPLICATIONS FOR R.I.A.I.

INTRODUCTION:

The Declaration document consists of 4 sections :

1. **Declaration**
2. **Guidelines** 12
3. **Principles** 10
4. **Practices** 4 sets

Each section is directed towards 'Architects' in general. However, some of the actions in each section relate equally to the work of;

- **individual** architects
- architectural **practices**
- professional bodies and **institutions**

The following pages contain a summary of the key points in each section taken in reverse order to emphasis implementation.

IMPLEMENTATION BY R.I.A.I.

1. **Institute:**

1.1 Establish Sustainable Design Task Force within RIAI to enable Divisions.

1.2 This group to liase with interdisciplinary groups of other professionals to source and provide information.

1.3 Promote working with communities.

1.4 Promote innovative design solutions.

2. **Practice:**

2.1 Expand Code of Conduct and Duty / Responsibility of architects.

2.2 Revise Contracts to permit innovative design solutions.

2.3 Awards Scheme : promote sustainable architecture.

3. **Education:**

3.1 Pass information from working group to profession, students and public.

3.2 Exhibitions for public, industry and professionals.

3.3 Research materials.

3.4 Research suppliers.

3.5 C.P.D. Programme.

3.6 Design Competitions.

IMPLEMENTATION BY ARCHITECTURAL PRACTICES

1. **Practice:**

1.1 Adopt sustainable design.

1.2 Inform clients

1.3 Educate staff (RIAI CPD)

1.4 Adjust Contracts to allow innovative design

2. **Design Methods:**

2.1 Promote sustainable design

2.2 Passive and active solar energy

2.3 Encourage flexible design options

2.4 Encourage eco-friendly design strategies

2.5 Minimise energy and waste in construction process

2.6 Promote energy efficient buildings

2.7 Energy audits before and after construction

2.8 Low cost maintenance programmes

2.9 Use intelligent management systems to monitor use and to assist in forecasting

3.0 Specifications:
3.1 Specify appropriate materials
3.2 Specify appropriate services
3.3 Reconsider services requirements
3.4 Establish technical libraries properly revised.

4.0 Office Managment:
4.1 Employ good housekeeping
4.2 Minimise energy
4.3 Minimise waste
4.4 Recycle paper / materials
4.5 Purchase selectively.

DECLARATION PRACTICES:

1. Encourage Design and Work Practices which:
1.1 Avoid environmental damage.
1.2 Use caution to prevent rash and irreversible decision making.
1.3 Prevent transfer of environmental damage.
1.4 Permit future generations to enjoy present environments.
1.5 Avoid additional environmental and cultural damage.
1.6 Create environmentaly beneficient designs.
1.7 Are preventative rather than curative.
1.8 Rehabilitate and 'recycle' degraded environments as part of the Design and Planning Process.

2. Create buildings and environments which:
2.1 Use non-toxic materials.
2.2 Use degradeable or recycled materials.
2.3 Are designed for long life.
2.4 Using replaceable and easily updateable components.
2.5 Are of flexible use and multi-purpose.
2.6 Are energy efficient and use solar energy.
2.7 Minimise energy and waste in fabrication and construction.
2.8 Use 'intelligent' management systems.
2.9 Promote health and well being of users and of biosphere.
2.10 Respect cultural values and heritage.
2.11 Encourage user participation in design and construction.
2.12 Encourage recycling of materials
2.13 Form locally self-relient communities.
2.14 Encourage pedestrianisation and discourage motorisation.
2.15 Encourage efficient motorisation where absolutely necessary.

3. Operate Practices which:
3.1 Are compatible with global sustainability.
3.2 Are ethical.
3.3 Use environmental auditing, monitoring and forecasting.
3.4 Use informed decision making.
3.5 Ensure that similar criteria are used by all to determine acceptable levels of environmental impact.
3.6 Ensure that the integrity of the planetary ecosystem is maintained at every level.
3.7 Ensure that eco-damaging systems are no longer used.

4. Promote new designs and reintroduce neglected designs which:
4.1 Restore eco-systems.
4.2 Improve health by improving environments of individuals.
4.3 Protect and conserve;
- biological systems.
- cultural and heritage structures and artefacts.
4.4 Conserve energy.
4.5 Promote energy efficiency in use.
4.6 Choose sustainable energy sources.
4.7 Use least damaging sources of non-renewable energy.

4.8 Use solar energy for buildings and their support systems.
4.9 Minimise energy and waste in construction process.
4.10 Promote building with flexible assemblies and components.
4.11 Specify materials that;
- are long lasting
- are non-toxic
- have low cost maintenance programmes
4.12 Consider design options capable of being adapted and updated.
4.13 Reconsider services specifications and requirements.
4.14 Specify low toxicity materials and components.
4.15 Enable buildings to be adapted to other uses.
4.16 Develop and use recyclable materials.
4.17 Monitor changes in environment and the efficient management of environmental resources.

DECLARATION PRINCIPLES :

1. Advise Clients and the broader community on the environmental impact of development and design strategies.
2. Work with local communities to promote appropriate local solutions.
3. Promote sustainable design in architecture.
4. Promote sustainable designs, products, services and technologies.
5. Promote development of a sustainable future and the provision of the necessary knowledge for other peoples to do likewise.
6. Use all available information, especially indigenous knowledge.
7. Promote designs supporting a healthy and sustainable lifestyle.
8. Promote strategies recognising the rights of future generations.
9. Implement all Conventions and Agreements seeking to protect the Earth, it's Peoples and their Cultures.
10. Use CPD to expand knowledge for understanding and managing environmental impact.

DECLARATION TEXT:

Architects commit themselves individually, and through their professional bodies, to:

(i) Place the idea of sustainable design at the core of our practice.
(ii) Develop and improve practices to facilitate sustainable design.
(iii) Educate clients, the construction industry and the public.
(iv) Establish practices to ensure sustainable design becomes normal practice.
(v) Bring existing and future built environments up to sustainable design standards.

DECLARATION GUIDELINES:

Architects recognise global problems and are commited to:

1. Charting a new course for design professions in 21st Century.
2. Participating with other professionals and with local and global communities.
3. Working with local communities and their knowledge.
4. Redeveloping the existing built environment to sustainable standards.
5. Adopting a global view as the basis of sustainable design.
6. A sustainable design philosophy which encompasses economic, social and cultural conditions.
7. Encouraging innovative design solutions.
8. Developing existing practices and ethics to suit.
9. Taking the lead in propogating ideas and strategies.
10. Moving quickly to promote the transformation of existing environments.
11. Localising the impact of motorisation and enhancing local self-reliance.
12. Encourage sustainable and more appropriate land uses.