

Landscape Design, Ecology and Art.

a thesis submitted by Sean Durack
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Introduction

During the past three years, while studying Fine Art at the N.C.A.D., I have become increasingly aware of many aspects of a world-wide situation, & the continual deterioration of the natural environment in the face of the machinery of progress. Many factors have contributed to the process of my awakening to the reality of the situation, which was sparked off by looking at and painting, aspects of the landscape, and I feel that my eyes are just beginning to open.

While I am conscious that there are many people who are well aware of the situation, I also believe that there are many who are being swept along blindly in this fast-moving world, unaware of the destruction being wrought on the planet.

I hope therefore to make some impression, however minute, by writing this thesis so that those who read it might at least question some of the actions of the men and the machines of progress.

I believe that the need to re-consider our direction, is very immediate. Real progress lies in the universal realization that we must work as partners with nature and not against it. We must learn from history — from experience, and cultivate a healthy and enlightened attitude to all areas of planning and land use, giving due consideration to ecology and to art-forms related to the environment.

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Background

My own background is rural. I was raised in East-Clare, a predominantly agricultural area of fertile pastureland close to Lough Derg on the River Shannon. As a teenager, I rejected the countryside for a time, in favour of the urban environment. It seemed to me then, that there was nothing happening in the countryside, even in the villages and towns. Everyone went about their daily routine and seemed quite contented, but for me the pace seemed too slow. I was aware of new ideas and trends in the cities which were readily acceptable there, but would take so much longer to make any impact on a small rural community. If I had had a choice, I would have moved to Dublin at a much earlier age. Cities seemed to offer so much more: entertainment, activities, alternative ways of living and of course, prosperity. However, my attitudes began to change and I began to see the real beauty of the area in which I lived. I became interested in painting and used the landscape as the most obvious reference point.

While still at school, I became aware of topics such as pollution and industrial waste and similar questions which sometimes were subjects for debate. However, I was not aware of the importance and relevance of 'conservation' and 'ecology', words which were sometimes used by people like myself, who had little idea of their real implications.

They were really problems for other nations to solve as far as I could see — the industrialized countries, Britain, Europe and America, who themselves had created the problems, and it seemed that we in Ireland were in little danger, never having had an 'industrial revolution'.

There is in my hometown, one factory which produces chipboard sheets and kitchen furniture units, and this little industry, at first based on local wood supply, now raws timber from all over the country. Although being quite small, the factory continually releases effluent into the River Graney by which it stands. Students from my school at the time had carried out a 'survey to determine the effects of the waste material on the river'. The survey showed that the toxic substances had had some impact on the freshwater fish population and similarly on the underwater vegetation, but there was nothing alarming discovered and it seemed that the community accepted that some cost had to be paid in return for the

employment and increased trade implemented by the factory's presence. However, most people remained oblivious to the amount of fine sawdust and smoke which continually seemed to cloud the atmosphere. Recently, the dust has become almost intolerable. When the wind blows through the factory and directly into the town, one must walk, head bowed, as in a duststorm, to avoid being temporarily blinded.

This dust is evident on blades of grass in pastureland up to a mile away.

I mention this as one of the prime factors which made me aware of the importance of environmental issues, and helped to open my eyes to similar situations. I have begun to question the many ways in which 'progress' changes the landscape, and I began to realise as I looked closer at the East-Clare landscape in particular and world landscape in general, that much of what I thought to be 'natural landscape' is not natural at all and though much is still unspoiled, all is in real danger of being spoiled, wasted or even destroyed.

Looking at the landscape

I started out painting the landscape, then rejected it in search of other sources of inspiration and points of reference, but gradually returned to it as the only source of reference I could readily relate to. Living only temporarily in the city, the landscape always confronted me, looking fresh and new, every time I returned to it. I have begun to see it as a whole, while looking at individual aspects — a tree, a blade of grass, a pebble or an earthworm. I am beginning to see how everything is linked, how everything is interdependent and how everything conforms to a great Natural Order which is constant, though ever-changing in its seasonal cycles.

* "A landscape is an organism, a living entity, possessing organs and functions which react and interact according to definite laws"

In my experience of making images, drawings, paintings and photographs, which come from the landscape, I am constantly learning how to see. I have tried to explore different ways of looking and seeing, through my own eyes and through the camera's eye. I have tried to capture the moods and atmospheres of particular times, particular places, to celebrate the beauty in nature, and to come to terms with that beauty. While I am still exploring the visual aspects of landscape in a graphic manner (painting and drawing),

* Thorenfried Preiffer: 'The Earth's Surface'

I find myself drawn more and more to the camera as an instrument with which to capture instantly the beauty, the color, the light in a situation. I feel that the camera can be a powerful tool in the right hands, and there have always been photographers dedicated to the creation of ecological images, for example Ansel Adams, Edward Weston and Paul Caponigro, and many others who have contributed greatly to the appreciation and protection of untouched unspoiled land by means of aesthetic visual images.

* "Today, more than anything else, the landscape photograph is a cry for conservation"

The Natural and Man-made landscapes

I have found it to be quite a stunning revelation, realising that many features I had accepted as being natural in the landscape — the land in enclosed areas we call fields; the hedgerows; the shelter belts of trees and large areas of woodlands, are not natural at all, but owe their presence, or at least their placing, to man.

Of course the hillsides, whether they be large or small; the glacial deposits we know as eskers and drumlins; the rivers and streams (with the exception of some whose beds have been deepened or whose courses have been altered); and areas such as the Burren in West Clare and the Giants Causeway in Antrim, and the many other features in the mountains, valleys and bogs, are as they are due to natural conditions, but it is still surprising to realise that the landscapes we see are, by and large, the result of changes occasioned by man's long occupancy of the land.

Hubert Dalwood wrote in 1974, in an introduction to an exhibition called "Art into landscape":

'The English countryside, all but the most economically useless parts of it, is not even as it was fifty years ago. The early destruction of forests, farming, and then the growth of population and the development of industry and transport, have made enormous changes, changes that have accelerated to such an extent that now the effects can be seen and experienced within much less than the span of one lifetime'

Although he refers to the English countryside specifically, the same holds true in a similar fashion, for every so-called 'developed' country. The race of progress moves at an enormous speed and changes, removes or destroys anything which gets in its path.

My interest in the landscape, in its own beauty, and as an artist, as a source for ideas, has led me into the area of landscape design. The importance of ecologically aware landscape design in todays world, I feel, cannot be underestimated. We are moving into an era (what J.S. Collis refers to as the 'Era of Ecology'; in his book, 'The Vision of Glory') when landscape design may well be recognized as the most comprehensive of the arts. There is an ever-growing awareness that mans interference with his environment is reaching that critical point where the changes wrought will not only be irreversible, but may in effect bring about an environment that is hostile to him. It has aptly been said that one thing in the world is invincible - an idea whose time has come. Such an idea in these days, is the care of mans environment, or in a word, conservation. Governments have begun to recognize the necessity for a comprehensive ecological approach to all areas of development, urban and rural; housing, agriculture or industry.

Man and the landscape . A brief history

Beginnings

The mind of intellectual man has always responded to the tranquility and assurance of certain geometrical forms such as the square and the circle. How these manifest themselves in the landscape varies according to geography, society, economics, morals and philosophy.

Paleolithic man, the hunter, created an internal landscape art in the cave art of France and Spain which was inspired by observed happenings and direct experience. There was no mathematics, no geometry - it is pure biological art.

Neolithic man, now becoming the agriculturalist, spread his culture from Mesopotamia, westwards along the shores of the Mediterranean and established his identity on the landscape in the form of great standing stones and mounds.

Bronze age man introduced a system of trade which extended communications and also encouraged the spreading of ideas. The monuments of the peoples of this period remain today in Carnac in Brittany and Stonehenge in England.

After 3,000 B.C., the landscape began to be transformed by the clearing of the forests for agriculture. Geometric patterns of cultivation began to creep over the northern hemisphere representing two opposing attitudes of mind to the earth mother, that persist to this day; the one exploiting the capital resources of the humus laid down by the forests, and the other creating a recurring ecosystem of stock-farming and crops.

The environment was already changing due to the presence of man, and with the emergence of the world's first literate civilization, the Sumerian culture, from the delta of the Tigris and Euphrates, the scale of the features and structures which man was capable of imposing on the landscape grew beyond that of the family and clan unit. City states evolved, later unified into a single empire with the capital at Babylon in 2250 B.C.

From this civilization emerged the structures (social) based on class, which basically persist today, with a code of laws governing behaviour, and a king at the summit, with a priesthood which also had a moderate influence.

The first gardens, as an expression of man's determination to place his mark on an endless flat surface, emerged from this period also. The origins are found in Old Testament history which refers to the first garden north of Babylon and contains the idea of heaven symbolized on earth by the square, which has remained to this day the basic inspiration of garden design in the central civilizations.

The basic geometry of the square and its relation to the circle, continued to evolve in the cultures which followed, and reflected aspects of their philosophies and concepts of God and heaven and became expressed in architecture as well as in the gardens, and in the art of these peoples.

Individual aspects of style vary, naturally, between different cultures, due to the different spiritual responses to different geographic features and regions, but the garden evolved in the cities of so many civilizations as a place for retreat and for relaxation and meditation.

In India, the degree to which the environment can influence thought and design can be noted in the philosophies of Mystic Buddhism and Hinduism. The fertility and abundance of nature around the Indian seems to have given him time, inclination and subsistence for metaphysical contemplation; he was wholly preoccupied (with) in making visible the invisible world. He worshipped place spirits, tree spirits, sap, water, and the whole source of the vegetable and animal worlds — he worshipped the powers of nature and expressed the wholeness in pure geometric shapes — symbolic mandalas representing earth and the cosmos.

In China, landscape design evolved through the eye of the painter, and centred around the balance of yin and yang. (yin: the tranquilizing force — still water; and yang; the stimulating male force — rock, hill or mountain) The Chinese created gardens for every mood and occasion — daylight, moonlight, and for mist, rain or clear skies.

Stillness was essential, for meditation was what the gardens were used for. Japanese gardens were similar. The Zen gardens of Contemplation contained rocks and groupings of rocks composed within a rigid structure, forming a symbolic picture of man's spiritual life and journey.

In Europe in the Middle Ages, garden art was confined to either cloister gardens or small enclosed domestic or castle gardens with raised beds, fountains etc.

Apart from the gardens, any landscape arts of the age were intuitive rather than conscious design and the appeal lay mainly in the symbolism. A cross on 'calvary' in open air places such as were numerous in eight century Ireland, or

fifteenth century Brittany, gave a sense of meaning and purpose to all in the whole countryside, and to the common man whose Bible it was.

This age of emotional rather than intellectual landscape influenced the future in two ways:

- (a) as an inspiration for the romanticism of the eighteenth and nineteenth centuries, and
- (b) as an aesthetic standard or guide for a symmetrical composition, whether based on that of farm, monastery, castle or town, which persists today.

In Renaissance Italy, gardens were often terraced, situated on hillsides, and were made for man and dignified him. They were intuitive rather than mathematical in design.

In sixteenth and seventeenth century England, garden design was based on geometry, imposed in huge rectilinear layouts, foreign to the landscape of soft undulations, green grass and luxuriant trees. This conception was rejected in the next century for a harmony of geometry with natural form which came about with the revolution in thought, of the eighteenth century.

The Dutch painters had a profound effect on the way Western man saw the world around him. Political freedom allowed scientists and philosophers to develop new ideas, including the realization that man was not the centre of the universe but a fragment of the totality of nature. Even the most commonplace object now acquired a status. The Dutch themselves lived in neat brick houses with small geometrically enclosed gardens including sculpture and colourful flowers. The artists made them look (at) outside the planned environment — an attitude which led to the Picturesque and then to Romanticism.

'The full significance and inherent beauty of the planet's atmosphere was unconsciously recognized by the Dutch painters of the seventeenth century, far in advance of science'

Claude

Evolution of the Modern Landscape.

* 'During the sixteenth, seventeenth and eighteenth centuries, the Western civilizations began to transform themselves from a restrictive to a liberal society. Their classical basis of philosophy and law had enabled them, through scientific enquiry, freedom of enterprise, and social mobility, to prosper and expand to a greater extent than the Central and Eastern civilizations with their static basis of religion or ethics. From this time began the universal interchange of ideas that ultimately lifted landscape arts from the level of local and domestic design to the modern concept of comprehensive planning.'

During the eighteenth century, three schools of thought influenced and motivated landscape design:

- (a) Western classicism which originated from Baroque Italy or through the Grand Monarchy of France, and most European countries copied from this and sought to rival its grandeur.
- (b) China, which the French court first looked upon as a novelty, not recognizing its inner quality of symbolism. The principles of irregularity of this school became so confused with those of the English, as to be known on the continent as Anglo-Chinese.
- (c) England, which was in revolt against classicism (though not in architecture) and in favour of the expression of a totally new and liberal age. It had a strong influence on Europe, which became noticeable by the middle of the century.

Throughout the century, French classical and Italian influence, together influenced landscape design, encouraging extension of formal space through geometry, the main elements being closed avenues with open spaces which turned easily from green walls of clipped hedges into the streets and squares of city planning. Germany established the conditions for landscape expression of all kinds, sometimes to the point of freakishness. Originality and inventiveness appeared in innumerable landscapes and gardens foreshadowing the German outburst of philosophy and art at the end of the century. The development of the concept of landscape-planning as an extension of parks and even town-planning may have been due to land claustrophobia.

* Geoffrey and Susan Jellicoe, 'The landscape of Man'.

The most obvious aspects of Chinese landscapes seen firstly in the west in drawings of Palaces and gardens, were the Serpentine line, the ingenious use of water, the miniature scale and the all-over pattern of small rounded hills. Chinese landscape design reached a climax in the Summer Palaces of Peking at the same time as Versailles in Paris (as the climax of classical design) and with a very similar objective. The style was a continuity of history, but the poetry within it had declined. The conception of the organization of space was in direct contrast to that of the French (whose unified splendour was comprehended at a glance) and was concerned with the breaking down of scenery into comprehensive compartments that were a succession of unfolding and asymmetrical scenes whose scale was not majestic but rather that of the tree.

The English 'school' grew from a relation to nature that had always been latent but only now emerged from beneath the fashionable Italian and French classical overlays. It was sympathetic to the Chinese 'school'. Nature was no longer subservient to man, but an equal partner; irregularity rather than regularity was proclaimed the objective of landscape design.

One interesting aspect of the English 'school' was the theory of the 'Ornamental Farm' which had no immediate influence, but the idea that a farm or factory can be lifted into a work of art, is one which needs consideration in the present age more than at any other period in history, and is seen successfully created in the modern factory at Herning in Denmark.

The nineteenth century

The intellectual life of the nineteenth century has been briefly summarized by Bertrand Russell

It was more complex than that of any previous age.

This was due to several causes. First, the area concerned was larger than ever before; America and Russia made important contributions, and Europe became more aware than formerly of Indian philosophies, both ancient and modern.

Second: Science, which had been a chief source of novelty since the seventeenth century, made new conquests, especially in geology, biology and organic chemistry. Third: machine production profoundly altered the social structure, and gave men a new conception of their powers in relation to physical environment. Fourth: a profound revolt, both philosophical and political, against traditional systems in thought, in politics and in economics, gave rise to attacks upon many beliefs and institutions that had hitherto been regarded as unassailable.

The phenomenon of the age was an excessive urge for escape and romance, excited by literature and travel. In architecture, all countries became littered with styles that were Gothic or Greek, Egyptian or Indian or High Renaissance. Town planning was more conservative. In sympathy both with internationalism generally and with the particular need to absorb foreign plants, the English garden pioneered its way through the 'gardenesque' style to the cosmopolitan nature habitat with its marked Japanese influence. In Europe it is mainly through engineering and painting that the significant direction of landscape art towards a new era can be detected. The century began with Turner, Constable and watercolourists influenced by the Lake Poets. The inspiration then passed to France through Impressionism and Post-Impressionism, prophetic of the revolution that was to take place in man's whole attitude to his environment.

With the decline of the monarchy in France, and with the development of nationalism on the European mainland generally, the more spectacular urban landscaping was now directed to the glory of the nation rather than the individual monarch. Under Napoleon, France was criss-crossed with tree-lined canals. In Paris the Champs-Elysées and Arc de Triomphe were the expression of an empire at its zenith; architecture was neo-Greek, elegant and dignified. Mid-century plans by Baron Haussmann became semi-military for the control of mob-violence, the regularity of the streets encouraging a Romantic park system as an antidote. The French capital remained throughout the century, the world capital of classicism and the

Ecole des Beaux-Arts the centre of its teaching. In contrast to Haussmann's contemporary Paris, Vienna transformed a medieval military strip of land into the majestic anti-military and romantic-classical 'Ringstrasse'. In 1889, a Viennese, Camillo Sitte, published 'The Art of Building Cities', which argued against superhuman urban spaces in favour of an urban environment that was above all of individual human and tree scale. The response was immediate and international, and a new era of democratic planning became foreseeable.

The centre of European Romanticism lay in Germany. The poet-scientist Goethe, exploring the human mind and its relation to environment more widely and deeply than any philosopher before or since, responded equally to the romantic and classical. Just as the English attitude is conditioned to soft undulating land and the French to the plains of northern France, similarly, that of south, central, and west Germany appears to have sprung from the dense woodlands, the mountains and the River-valleys. The culture was more philosophical, literary and musical (the Valhalla of Richard Wagner as an expression of a national dream-world fantasy) than visual but in the next century Germany was to prove to be the germ from which much of the European experimentation into the aesthetic form, was to spring.

In Britain, along with the traditional landscapes, there was evolving a new concept, that of the collective environment for the 'lower', or working, classes. The leading pioneer of this idea and of the idea that environment makes character, and that environment is under human control, was Robert Owen. Previous parks had been private with the public having access to some, but the first built and owned by the public specifically to improve its own industrial conditions, was Birkenhead in 1843. It was not until the present age, that Owen's ideas were universally recognized.

Between 1850 and 1900, development everywhere in Britain was left to individuals, the industrial cities with their satanic mills and slum dwellings being allowed to run rampant except for the newly conceived public parks. By the end of the century, Britain in particular was in a bad state. The population had trebled with railways and expanding roads criss-crossing the countryside; with towns spreading independently into suburbs; with huge areas ravaged by exploitation; with smoke pollution damaging the life of plant and man and destroying human pride in environment. The urban society had overwhelmed the old country society and the new values had not yet found their own equilibrium.

In the New World of America, a similar situation to that of Britain emerged, but on a much greater scale.

In 1800 the population of the U.S.A. scarcely exceeded five millions, occupying some 868,000 square miles; by 1900, the population had exploded to seventy-five millions, occupying nearly 3,000,000 square miles. Throughout the period, more than 15,000,000 immigrants arrived from all parts of Europe.

In the sweeping rush westwards, land division and property plots were divided by T-square and drawing-board rather than topographically as in the Old World. The apparently inexhaustable resources of this rich and varied continent were exploited with tremendous energy; the extractive industries relying on the Great Lakes for transportation, the agricultural on the railway system whose mileage by 1865 exceeded that of all Europe. Society was divided by slavery until after the Civil War.

In the rush for the creation of material wealth, there was little time for the arts, which for prestige reasons were imported wholesale from Europe. By 1900, the wastefulness of uncontrolled exploitation of natural resources was at last apparent to government.

The American 'conquest' had obliterated the native Indian tribes who had for centuries lived in harmony with their environment. They had respected the land, the plants and the animals, and saw no virtue in imposing their will over their environment. Americans today are realizing that their only future lies in a rediscovery of their environment and in establishing a relationship of co-existence and co-operation with the land and its resources, and that otherwise the destruction of the Indian will be followed by the destruction of nature, which will ultimately lead to self-destruction.

The twentieth century.

* The human species had roughly doubled in number during the nineteenth century, and was now pressing to make its patterns upon all but the most remote and self-protecting parts of the globe such as the South American hinterland and the Polar regions. Wild life, especially that which was larger than man, was threatened with extinction. With notable exceptions like the Great Wall and Grand Canal of China and the Roman roads, all major patterns previous to the industrial age had in general been conditioned by agrarian systems or local land tenure related to geography, and by the capacity of human and animal labour. The materials that made this pattern were likewise local. But now the scientific innovations that had begun two centuries previously, were making themselves manifest: the patterns were becoming larger and cruder; there were scars of denuded land surfaces such as the dust bowls, that were added to those of denuded forests; the cities had expanded beyond the size that could be regionally supported and the air about them was permanently polluted. Industrialized man had now begun to alter the agrarian balance and timing of nature upon a global scale and in doing so to bring upon himself problems which he himself must now solve.

In America, the economic depression of 1929, led to the 'New Deal' of Franklin D. Roosevelt, which recognized on a national scale that the use of force by man on nature was ultimately less advantageous than co-operation with it.

The historic agrarian structure of society had been the tightly knit and personal unit of peasant, tenant farmer and resident landlord. All took pride in an environment in which they lived and worked. In the newly developed and heavily industrialised countries, this structure was now mainly replaced by impersonal organized labour complimented by the public company and by an ever-growing and counter balancing middle-class. The industrialists had no interest in environment other than that of production. It was almost wholly from the middle-class that there emerged creative ideas towards the progress of civilization. In England, the 'Garden Cities' movement began as a middle-class private venture based on moral values. Throughout the Western World, it was from the middle-classes that individuals arose to express new ways of living in a servantless economy.

Landscape planning had been conceived by the environmental societies but was now accepted as an economic necessity.

Almost alone, the Scandinavian countries, unaffected by the nineteenth century-type Industrial Revolution, and by two World Wars, had achieved an elegant synthesis between environment and mode of living.

* Geoffrey and Susan Jellicoe, *The Landscape of Man*

In the industrial countries where confusion and chaos ruled the environment, two different creative forces were germinating, independent from one another: (1) the science of land-use in the interests of the community as a whole, which concentrated on urban design, land and landscape planning, and the conservation and proper exploitation of natural and historic resources, and (2) A new art form which arose from the Constructivist movement in art. It was the so-called 'functional' and 'international' architecture based on machine production and truth to factual purpose, but containing within it a profound search by individuals for a new liberalization of space and the consequent study of machine proportions.

Ecologists turned away from modern architecture in the new garden cities and elsewhere, and it seemed that the twin forces of ecology and constructivism, were in opposition. The contemporary way of thought of constructivism is admirably symbolized by the Dutch painter Mondrian in a series of abstractions in which a realistic tree loses its identity to become geometrical. In architecture, the movement led to mass-produced concrete jungles removed from nature and devoid of human feelings. Seen in perspective, the separateness of these two fundamentals of environment has been a disaster, not only to Europe, but to the whole world. By the early 1940s the science of planning and the new architecture had begun to coalesce; the role of landscape design as synthesizer between universal and particular was recognized. Today it is recognised beyond doubt that amalgamation is necessary in an ecosystem and the concept of comprehensive landscape-planning has been finally accepted.

The earth has changed little in its climate and geography during the short period of recorded history, but there has been a total change in man's attitude towards it. He no longer fears his environment and the local spirits have been chased away. Superstition and religion have, for the greater part, ceased to be 'obstacles'. Not until European Conservation Year, 1970 did man become acutely aware that development of the human species on the historic principle of multiplication, could not continue indefinitely. The capacity of the earth to sustain life was not unlimited; natural resources must be conserved and not wasted; population must be related to food available; natural disasters such as earthquakes, famines and floods were predictable and ultimately might be prevented. This meant a reversal of idea: for survival, all human activities must be part of the biosphere or framework of nature. Rather than

antagonistic to it. Man has just emerged from a period of intense struggle against stronger adverse forces, through which his outlook and makeup have been moulded, to a position of immense power and responsibility for which his background has done little to fit him.

Only when the primary needs of subsistence and shelter were provisionally satisfied would the advanced democratic countries seriously consider the major expenditure of surplus wealth and energy on landscape design as a necessity rather than a luxury. In England, good national landscape was not generally accepted as good national business until 1970, some twenty-five years after its acceptance by the more forward looking industrialists. And in Ireland, it seems that we are now accepting the same.

In the 'Era of Economics', the dilemma lay in the economic balance of needs: those that were pressing and obvious and those that were indirect. Unfortunately, the Western world seems so steeped in extravagance and materialism, that luxuries have often been confused with necessities.

Perhaps it was the discovery of nuclear energy and radioactivity which awakened man's consciousness to the precariousness and necessity of his survival in new dimensions. Destruction by radioactivity lasts for a period of ten or more years after a nuclear explosion and the exact time when organisms become capable once more of birth and growth after the ten-year period, is not known.

* 'What we are doing in basing a larger and larger part of our energy supplies upon atomic energy, is to bring down to earth the powers which would never have permitted any kind of organic life to develop on this planet had not billions of years been spent in building up protective mechanisms — the oceans, the first creations of oxygen and ozone, the breaking out of the all-encompassing atmosphere, by the earth's growing cover of green plants'

In the eighteenth century, man started to become interested in the prolongation of life, and research has carried through up till the present day with more knowledge feeding knowledge. Due to the enormous expansion in communications media, news of discoveries and disasters reach the public within a few hours, and the increase of public awareness results in greater response and retaliation against those fundamentally responsible for the neglect and destruction of organic elements in our environment. It is apparent today from our newspapers and magazines that pollution and the resulting destruction of the environment, is exceeding all limits, and conservationists in all areas are uniting forces to arouse the authorities to control the destructive potential of industry.

* Barbara Ward and René Dubos, 'Only one Earth'

The Role of TREES

*¹ We were nursed into life by trees. It is to trees that we owe the development of a physiology which made Man possible — that is to say, made conceptual thought possible. These fundamental facts should be sufficient to explain the intimate quality of man's relationship with trees. There is a still more practical side to the connection. Trees are necessary to our existence because they are the chief guardians of the soil, keeping it stable and watered.

When man evolved from the stage of hunter to the stage of farmer, so began the clearance of land for tillage, and so began the destruction of the forests. For a long period, man respected or feared the trees, believing that in them dwelt spirits, or perhaps in some unconscious knowledge that they were the guardians of fertility. However, when this way of thinking gradually broke up, the trees were destroyed with ever-increasing energy and efficiency. Trees became an economic commodity and man developed a vast range of uses for wood and timber products generally.

Agriculture has been the number one enemy of trees and today, we have so much artifice around us that we tend to forget how artificial agriculture really is. There is no more common sight than a field, and no one up till now has ever dreamed of questioning the right or advisability of cultivating a field. Without doubt, land must be cultivated for the provision of food, but the clearance of forests has reached the point where the balance has been upset in nature and the consequences and ill-effects of de-forestation can be seen to be far-reaching and detrimental to the whole earth.

Looking at the U.S.A., we can see clearly the waste and destruction which can be set in motion by de-forestation. In 1630 the land offered 820 million acres of forest, 600 million acres of grassland, and 430 million acres of open woodland. Today it is calculated that not more than one-tenth of the forest remains and that the annual loss exceeds the annual growth by over fifty per cent; and it is calculated with regard to the soil that one half of the fertility of the continent has been dissipated. With the removal of trees and prairie grasses, often by fire, the soil was unprotected and vulnerable to erosion by wind and rain. Good crop yields were achieved in the beginning but gradually the soil depreciated.

* John Stewart Collis, 'The Vision of Glory'

Sheet-erosion was, and still is, one of the worst forms of erosion, occurring wherever the land sloped, (and eighty-per cent of America is sloping) and meant that, the topsoil, loosened by the removal of vegetation, was literally washed away. After the sheet followed gully erosion - the torrents of rain deepened and widened small gullies to the extent that they became canyons, and the soil was washed away to the sea. The Mississippi alone carried (and still carries) 400 million tons of solid earth, daily to the sea, taking with it microscopic organisms that make humus what it is - the minerals amounting to 40 million tons of phosphorus, potassium, nitrogen and sulphur. Even greater than the carriage of soil by water, is the carriage by air - wind erosion. After the vegetation disappears, the sun bakes the soil dry until it can be blown away in fine particles. The now famous Dust Bowl, taking in parts of Oklahoma, Kansas, Colorado, Texas and Wyoming, blows its farms two thousand miles away into the Atlantic Ocean. This form of erosion, taken with the action of water, brings the figure up to three billion tons of top-soil lost every year in the U.S. alone.

With these facts at our disposal, as evidence of our mistakes, one would think that we would have learned, but the destruction of the forests continues. Climatologists have suggested that the destruction of the South American rain forests, which is well under way, will probably set in train cataclysmic effects upon world climate. One third of the world's trees grow in the forests' five million square kilometres - an area larger than Europe. Calculations made by Harold Sioli (Director of the Max Planck Ins. of Limnology, W. Germany) based on seventeen years of field studies showed that the Amazon forest contributed through photosynthesis, fifty percent of the world's annual production of oxygen. He argued that it could not be sacrificed without a dramatic, if not fully predictable deterioration in world climate. He calculated that the forest contained about 300 tons of carbon per hectare, and that its total extension of 280 million hectares, if burnt down, would allow sufficient carbon dioxide to be released into the atmosphere to cause a ten percent increase of the gas. The threat was two-fold; the loss of the forests important contribution of oxygen, and of its capacity to absorb carbon dioxide. Sioli noted that the burning of fossil-fuels had already caused a 15 per cent increase in carbon dioxide over the past century and that the forests were failing to contain the increase. He concluded that destroying the Amazon Forest would be like getting rid of one of the world's major oceans - environmentally suicidal.

Another expert, Eneas Salati (Prof. of physics and researcher in agriculture at Uni. of São Paulo), was quoted as saying that the destruction by burning of the Amazon forest, and consequent increase in the carbon dioxide content of the atmosphere could result in heightened world temperature, the melting of the polar ice-caps, and a sufficient rise in ocean levels to bring about the inundation of hundreds of coastal cities throughout the world.

In only one year, 1975, Amazonia lost four per cent of its trees, and scientist Harold Sioli said that if the rate of destruction was not slowed down, that nothing would remain of the forest by 2005. The Rain-forests of South East Asia, which currently supply eighty-five per cent of the world demand for timber, are also being destroyed. If clearing continues at the present rate, it has been calculated that the forests will be gone by the year 2000. In some areas, replanting has been done with fast-growing temperate climate trees, but for oxygen supply, they are of little value as they photosynthesize at one tenth to one fifteenth of the rate of tropical rain-forest trees.

The predictions of these experts are deeply worrying in their various ways and despite some scientific disagreement, the issues are too real to be ignored.

Conclusion

There are vast amounts of information available, in reports and studies, both in facts and figures, which highlight and prove beyond doubt that man has brought the earth to a crucial point in its development. Now, it remains to be seen what direction will be taken to avert disaster.

- * 'The world is moving into a phase when landscape design may well be recognized as the most comprehensive of the arts. The reasons for this are threefold:
- (a) The existing delicately balanced order of nature within the biosphere, or protective envelope of the planet, is being disturbed by the activities of man, and it seems that only his own exertions can restore a balance and ensure survival;
 - (b) these exertions call first for ecosystems that are no more than a return to an efficient animal state of sustained existence; and
 - (c) man's destiny being to rise above the animal state, he creates an environment around him that is a projection of his abstract ideas.

The first has aroused an intuitive urge in biological man and caused the 'green revolution'; so described at the Stockholm Conference on Human Environment, 1972; the second has encouraged comprehensive ecological planning by experts; and the third is promoting a landscape art on a scale never conceived in history.'

There is an immense need for more open-minded, fully aware ecologists, planners and designers, in every field. Within such diverse but inter-related areas which cover almost every area of human activity, it would be difficult to see one organization coping with the problems, but one central worldwide institution could cater for research and for the exchange of information, and work towards cultivating a comprehensive approach which would slow and eventually stop the destruction and re-direct energies in a positive direction. There is also an immediate and urgent need for a new approach in educating people about their environment. The great informative media are doing much, but can do so much more in this area.

"If ecology is not studied well enough, and if conservationists are not keenly enough interested in its development, people cannot be blamed for failing to understand its relevance or to appreciate its importance" -- Max Nicholson, 'The Environmental Revolution'

* Geoffrey and Susan Jellisse, 'The Landscape of Man'

But it is not enough for man to be part of an ecosystem. He is in search of an abstract idea which in history was expressed in the silhouettes of domes and spires, and which he seems at a loss to replace at the present day. He sees all around him commercial buildings confusing the skylines and in appalling juxtaposition with the old.

The possibility now before man is the creation of an ecosystem that is immediate, comprehensive and based on unlimited recurring energies known to exist in the universe. Computer technology can play an enormous part in this organization. This can be achieved on current theoretical knowledge, but it is not enough. Can we also turn scientific data into abstract thought and art, as did similar civilizations in the past, so to sustain ourselves as humans and not as animals?

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