WILDERNESS
The Way Ahead

Edited by Vance Martin and Mary Inglis
WILDERNESS
The Way Ahead
With the kind permission of Lady Fraser Darling and family, the 3rd World Wilderness Congress was convened in memory of the late Sir Frank Fraser Darling, and to honour his work. As a British naturalist, Fraser Darling was internationally respected and admired for his pioneering contribution to the science and philosophy of nature conservation. This book is dedicated to him and to all who value and work for the preservation of the world's wild places.
Acknowledgements
Many dedicated people have contributed towards helping the proceedings of the 3rd World Wilderness Congress be published in this book, which is not only interesting to read but is also visually appealing. It would be singularly difficult to name them all, but mention should be given to a few: Sandra Kramer for her eagle eye in proof-reading, Jane Engel and her team for hours of typesetting, Marcus Frey and the Findhorn Foundation Design group for the design, Lucia Spowers for her constant awareness and efficient handling of promotion and distribution while the rest of us had our heads down in the origination work—and of course the speakers themselves, who provided the text and often freely contributed photographs and illustrations. Thanks too to all those who so generously offered personal support and encouragement, particularly the Publications Department of the Findhorn Foundation, and Kate Martin, for being there. Special thanks go to all those at the Findhorn Foundation who provided efficient, warm and supportive services for 'Wilderness '83'—without the Congress this book would not have been possible.

Vance Martin, Mary Inglis, Editors

Photograph and Illustration Credits
The logo of the World Wilderness Congress is the Erythrina leaf, surrounded by arrows to indicate the bringing together of peoples from around the world who care about the wilderness and its protection.
# Table of Contents

11 Foreword
   Finlay MacRae

12 Introduction
   Laurens van der Post
   
   Dedication

15 Sir Frank Fraser Darling
   Morton Boyd

I. WILDERNESS: Science, Management and Politics

23 Forests and Their Role in the Future of World Civilisation
   Alan Grainger

29 From the Incas to C.I.T.E.S.
   Felipe Benavides

38 Brazilian Wilderness: A Problem or a Model for the World?
   José Lutzenberger

47 The Franklin Saga
   Barry Cohen

55 The Silent Valley Story
   Ramakrishnan Palat

61 A Wilderness Concept for Europe
   Franco Zampa

66 Wilderness in the European Community
   Anthony Fairclough

74 Evolution of the Wilderness Concept in the US
   John Block

78 Working to Conserve Wild America: The Wilderness Movement in the US
   Sally Ranney

88 Conservation and Management of American Wilderness Areas
   Ray Arnett

93 Attitudes Towards Wilderness and Environmental Protection in the US
   John Hendee

99 Marine Wilderness Areas and Multiple Use Use-Management
   Hance Smith

103 Energy and Environment: Preserving a Delicate Balance
   William Molfret

108 Restocking the Wilderness with Captive-Bred Animals: The California Condor Story
   Sheldon Campbell

124 Management Objectives and Goals for Wilderness Areas: Wilderness Areas as a Conservation Category
   Bill Bambridge

125 Ekistics, Ecumenopolis and the Wilderness: Planning for a Global Balance
   Gerald Dil
II. WILDERNESS: Culture, Education and Philosophy

145 Whither World Wilderness 2083?
Ian MacPhail

152 Wilderness and the Search for the Soul of Modern Man
C.A. Meier

162 Seekers, Eye-Jugglers and Seers: Ways of Viewing Wilderness
William Pitt Root

178 The Essence of Nature
Dorothy Maclean

186 A Spiritual Vision for Nature and Society
George Trevelyan

194 The Bible: An Ecological Perspective
Gordon Strachan

199 Human Rights Within Natural Law
Carolyn Tawangyawma

202 Sacred Lands are a Source of Balance
Joan Price

206 More than a Pretty Picture: Photography as a Tool in Wilderness Conservation
Theodora Litsios

211 Wilderness Vision Quest
Michael Brown

219 The Use of Wilderness and Environmental Studies across the School Curriculum
Don Richards

226 The Value of Wilderness for Young People of Today and Tomorrow
Karen Blair

231 Wilderness: A Way of Truth
Laurens van der Post

III. WILDERNESS: Focus on Scotland

242 A Message from the British Government
George Younger

246 A Brief History of the Origins of the Scottish Wildlands
Drennan Watson

257 Some Aspects of the Scottish Countryside
Jean Balfour

262 Wilderness Values and Threats to Wilderness in the Cairngorms
Adam Watson

269 The Seas Around Scotland
Hance Smith

275 Human-Nature
Robert Cowan

279 Edge of the World: Fraser Darling's Islands
Morton Bord

Afterword

285 Wilderness: Trail to the Future
Ian Player

291 Summaries of Talks not Included in this Book

306 Material on The 3rd World Wilderness Congress
As I write, the first dusting of snow is on the high mountain tops, and thin crimson easterly winds search the Moray coast. The voices of the 3rd World Wilderness Congress are scattered to distant lands, but the echoes linger for a while in Highland Scotland. It is time for quiet reflection.

Away back in the wild places, the roaring days are past and red deer come down to the forest, there to await the freshness and promise of spring. The wild geese speak freely from the stubble fields, their voices praising the fullness of autumn.

The wilderness delights in late autumn and winter when warm wind-song and tempest shake hands and part and meet again. The imprint of human beings is weak on the soft path in the glen, fading as they wander from the beaten way.

By grey crags, the old, blue-headed, red-stemmed Scots Pine holds the wind in its sail, long enough to bring forth song or tell the tale of great deeds, long, long ago, when it was young.

Gaelic—the gentle musical language of the Celts—takes its life from the tumbling burn, and the loch sparkles with a myriad tiny suns that toss and pass and slip away to the shadows, then surface again, far far away.

A thousand moods of the wild embrace us, gently but firmly, until we cry inwardly, saying, “I am part of you, the great whole, and I try to understand.”

It was an honour and a great pleasure for all of us in the Highlands to host the 3rd World Wilderness Congress, and I would like to record my personal heartfelt thanks to all who came from distant lands to help us toward a better understanding of the good earth—HASTE YE BACK.

Finlay MacRae
Chairman, 3rd World Wilderness Congress
Introduction

Laurens van der Post

One of the things that emerged at the Third World Wilderness Congress was the feeling that perhaps we should be more political and scientific, and that perhaps we are too poetic and idyllic about wilderness. And I am reminded of something Jung said to me not long before he died. He said that the truth needs scientific expression, it needs religious expression and it needs artistic expression. It needs the poet and the musician. And even then, he said, you only express a part of it.

The truth is total, and the inspirational idea that falls into the human consciousness is total. It is the artist in us who is able to apprehend the original inspiration in its totality. But we are condemned by the nature of consciousness, according to our own particular gifts, to serve and express it only in part.

While both the political and scientific approaches are vitally necessary, it is important also to remember that they work well only if they serve a transcendent vision. Since the French Revolution we have lived in a time when people increasingly think all the answers to life are political ones. But while the political approach can carry out a vision, it cannot create one. The vision has to come from somewhere else. There can be a political vision of how to serve the wider plan of life, and the best politicians have it, but the values have got to come from somewhere else. Politics cannot create its own values.

However, the political approach is tremendously important. People who have a gift for politics perform an enormous service and one for which there is often very little gratitude, because we project all the failures on to them. A nation which does not take its politics seriously is doomed. In Asia, for instance, marvellous spiritually orientated cultures and civilisations have in a sense failed themselves because they didn’t take the political approach sufficiently seriously. They never
developed political systems for expressing the spiritual values. One of
the great saving graces of the western world, from the time of the
Greeks, is that we have taken very seriously this problem of expressing
values in an organised manner. In one of the great moments in Dante’s
Divine Comedy, written in the middle ages, he is asked the question
whether life would not have been better if there had been no
citizens—which means cities, for citizens live in cities. And he said the
answer was, without a doubt, no, it would not. Life needs citizens; it
needs the political approach too. But the political aspect is only a very
small part of the total picture. It does not create the original values.
Political systems work well only if they serve a transcendent, apolitical
vision.

The difference between politics and this great apolitical vision is like
the difference between true science and applied science. Applied
science doesn’t necessarily serve the progression of science. Einstein
said that his great concept of the universe, the theory of relativity,
came to him in less time than it takes to clap your hands, but it took a
lifetime to prove it. The vision which his science served was greater
than the merely scientific vision.

Some of our scientists talk about ‘managing wilderness’, and this
worries me a bit. It is like saying they want to control revelation. But
the moment you try to control it, there is no revelation. Not one of
those scientists could have created the vision of something like
wilderness. The vision of wilderness is not very complicated. We try to
give it elaborate definitions, but we all know what wilderness really is,
because we have it inside ourselves. We know it is a world in which
every bit of nature counts and is important to us, and we know when it
isn’t there. Every person in the modern world knows how deprived
they are in this area.

Those of us who have spent time in wilderness are aware of the fact
that there is something more to wilderness than we ourselves can ex-
press. This is rooted perhaps in the effect that wilderness has on human
beings who have become estranged from nature, who live in in-
dustrialised environments and are estranged in a sense from their
natural selves. Wilderness has a profound impact on them, as well as on
those of us more familiar with it.

I can perhaps illustrate this best by the example of three boys of dif-
ferent families and different nationalities, whose parents regarded them
as ‘problem sons’. All three boys had very privileged backgrounds, but
somehow they couldn’t come to terms with their own environments
and with their own futures. Their parents came to me and asked what
they could do to help their sons, because schools, doctors and educa-
tionalists did not seem to help. And I found a strange aboriginal voice
in me saying, “Send them to the wilderness.” I persuaded their parents
to send them out to Zululand where they went on a wilderness trail
with Ian Player. Nothing was said to them about themselves. All they had was the mirror which nature presented to them, and through this experience, which had a profound psychological impact on them, they found something of themselves, something to do with their natural selves and the wilderness within. They returned to Europe and to their schools and universities and today all three are creative citizens distinguishing themselves in the world.

Wilderness is an instrument for enabling us to recover our lost capacity for religious experience. The religious area is far more than just the Church. If you look at the history of Europe since Christ, you will see that the Church has tended to be caught up, as it is today, in the social problems of its time, and to be less than the religion it serves. The churches and the great cathedrals are really, in the time scale of human history, just tents on the journey somewhere else.

What wilderness does is present us with a blueprint, as it were, of what creation was about in the beginning, when all the plants and trees and animals were magnetic, fresh from the hands of whatever created them. This blueprint is still there, and those of us who see it find an incredible nostalgia rising in us, an impulse to return and discover it again. It is as if we are obeying that one great voice which resounds and resounds through the Upanishads of India: “Oh man, remember.” Through wilderness we remember, and are brought home again.
In June 1931 a tall, dark-headed man bought a copy of The Listener before boarding the southbound train from Oban. A momentary thought of anguish at leaving the land that he had come to love had prompted him to seek solace in reading. Little did he know that this chance, everyday event was to change the course of his life.

His name was Frank Fraser Darling, a man of ideas and great motivation. He had already sharply changed the course of his life, firstly in leaving school and home against his mother’s wishes on his 15th birthday and, secondly, by giving up a safe, respectable job as an estate factor in Buckinghamshire for the life of a postgraduate student in Edinburgh—which led to his taking charge of the newly created Imperial Bureau of Animal Genetics, a job he did not like. Another change was in the wind without his knowing quite what that change should be, but he had strong leanings towards a life close to nature in the Hebrides.

As the train sped towards Edinburgh, Frank noted an announcement in The Listener of the first Leverhulme Research Fellowships. He had had disappointments already when previous research schemes had fallen through—for reindeer in Labrador and elephant in Uganda; yet his mind and heart were quick with exciting ideas and the more he thought of the freedom which such a fellowship would bestow, the more inspired he became with one idea: a study of the ecology and behaviour of red deer, hopefully on the mountainous Isle of Rhum. Such a project, he thought, would provide a dual opportunity of describing through painstaking research the life of the red deer—a noble creature entwined in the fortunes of the Scottish Highlands—and of satisfying his desire for the freedom and spirit of the Isles.

His application was successful, and he left his office job in Edinburgh to head for the wilderness. As we know from his writings, the laird of Rhum refused him entry and he found his study area in the magnificent
country of Wester Ross, the rough bounds of which did so much to inspire him in later life and prepare him for his experiences in the High Sierra, Alaska, Bahr-el-Ghazal and the Luangwa Valley.

One clear morning in 1935 from the summit of An Teallach, Frank first saw the small island of North Rona on the northern horizon—the *ultima thule* of his island-going. This was the beginning in earnest of the island life which was to take him from the deer to the study of seabirds on the Summer Isles and of Atlantic grey seals on the Treshnish Isles and North Rona.

In contrast to the results of his red deer studies, those with sea-birds were disappointing. His theory of social stimulation to the breeding condition of bird flocks was not supported convincingly by his data and was later discredited. However, it is still a live issue in the teaching of animal behaviour, known by students as 'The Fraser Darling Effect'. Later his seal work, planned to cover a national survey of the seals using a specially equipped 'Fifey' (fishing smack), was killed by the war, which found him reclaiming derelict land on Isle Tanera.

It was only a matter of time, however, until his great physical and intellectual energy made him break out of the confinement of the Isles and their local issues into the national and international arena. There were several key men in Frank's life. Some, like Frank Crewe, Charles Elton, Konrad Lorenz, Julian Huxley and Aldo Leopold, were responsible for shaping his ideas, while others, like Tom Johnston, Fairfield Osborn, Michael Swann and Max Nicholson, used his ideas to further a just cause. Tom Johnston, the then Secretary of State for Scotland, was Frank's pivot man of the 40s. Admiring his ideas on land-use and ecology, Johnston put Frank on the path leading to the West Highland Survey and appointed him to bodies concerned with the planning of national parks and nature reserves. Throughout his life Frank remained deeply grieved that Scotland was denying a system of national parks but he was well satisfied with the Nature Conservancy and the series of National Nature Reserves. One of the largest and most important of these is the Isle of Rhum, because, paradoxically, of the research on red deer. Frank had the great pleasure of seeing his aspirations for Rhum realised fully in his lifetime.

Frank saw himself as a pioneer in the frontier between animal behaviour and animal ecology. His thinking on wild animals was extrapolated gradually into human nature. His romanticism probably devalued his science on occasions but there emerged the maxim which, though perhaps obvious to the biologist, needed to be stated to a wider audience: namely that human beings and nature are a unity and that this special state of interdependence required acknowledgement and research. He propounded this in nearly all his major works using a wealth of illustrations from the world at large; his Reith Lectures entitled *Wilderness and Plenty* in 1969 were a final affirmation.
In the 1950s Frank was man of many parts—Director of the Red Deer Survey, Senior Lecturer in Ecology at Edinburgh University, Rockefeller Travelling Fellow in the USA and adviser to the Conservation Foundation in Washington on conservation in North America and Africa. His reputation as an ecologist and philosopher spread in America, while in Britain he was in decline. His West Highland Survey, he claimed was better known in the USA than it was in Britain; his red deer survey ran its course to an uneventful conclusion; under pressures caused by repeated absence, he gave up his job at Edinburgh University; his book *Wildlife in an African Territory* was not well received by Government. In his own country Frank sadly found himself in another type of wilderness which was made even more severe by the death from cancer of his second wife, Averil. Through it all, however, there were great compensations in a multitude of friendships and associations in many parts of the world. The ‘establishment’ in Britain might politely disregard his ecological prognosis of the human situation in all the places at which he looked, but the non-establishment, free-thinking, intellectually unfettered people lapped up his every word. His reports on the National Parks of the USA and of the Masai-Mara in Kenya were outstanding documents in conservation philosophy and planning.

Frank’s first international assignment was as a delegate—not of UK, but of UNESCO, a distinction which he was always very particular to draw—to the United Nations Conference at Lake Success in 1949, where he made a big impression. There was a much greater awareness of ‘conservation’ and ‘environment’ in America than in Britain and he found himself in vogue. There is a sense of triumph in his words at the time: “...[by a special fellowship] The Rockefeller Foundation unlocked the door, Fairfield Osborn held it open and the American people said ‘Come right in.’” Between 1950 and 1952, Frank travelled the length and breadth of North America looking at national parks and reserves and reflecting upon the great historical episodes of colonisation and exploitation of the fabulously rich country. His eye for country and people and his fine prose make his American journal, *Pelican in the Wilderness*, a compelling commentary of people and environment in the grandest of settings from the Sierra Madre of Mexico to Mount McKinley in Alaska.

The tide of public awareness of conservation reached Britain in the 1960s, mainly through Prince Philip’s Study Conference ‘The Countryside in 1970’. Frank was by then a Vice-President of the Conservation Foundation of Washington DC and the editor of several key works of which *Future Environments of North America* (1966) is the most important. As an international celebrity he was welcomed back to Britain as a long-lost elder statesman of the conservation world. He was appointed to the Nature Conservancy, delivered the Reith Lectures,
was knighted, became a member of the Royal Commission on Environmental Pollution and received honorary doctorates from the Universities of Glasgow, Heriot-Watt, Ulster and Williams College of Massachusetts, USA. He was a Commander of the Order of Golden Ark of the Netherlands, and received the John Philips Medal from IUCN, and the Mungo Park Medal of the Royal Scottish Geographical Society.

After an absence of some 30 years from Scotland, except for short business visits, Sir Frank and Lady Christina Fraser Darling retired to the Scottish Highlands, which throughout his life he regarded always as his first laboratory.

Sir Frank had a remarkable sensitivity to material things. In speaking about something—or in the case of a living creature to it—he would pass his huge hand over it to enhance one’s appreciation of shape; and find words, often with a flicker of his natural stammer, which superbly expressed its qualities and roots in civilisation. He could provide a commentary on the material and design of his possessions which sounded authoritative, though it is possible that not all of it was well grounded. He was particularly proud of his collection of Chinese jades and ceramics, English and Jacobite glass, Persian rugs and bronzes, French clocks and clarets, and handled everything with great care and an affection which seemed to me to be far beyond the pleasure of possession. Each piece seemed to be a passport to another time, place and people, bringing a sense of triumph as in the case of the jades; heroism in the equestrian bronzes from Persia; pomp in the peafowl by the pond and peace in the cat curled upon his lap.

He came back to the place he loved more than any other part of the world he had known in his far-cast life. During this time I had the privilege of sitting with him to look again at the great canvas of his life recalling vignettes of An Teallach, North Rona and Tanera, of the Great Smokies, Yellowstone and Yosemite, of Tsavo, Amboseli and Serengeti. He died peacefully at Forres, Moray on 22 October 1979.

In conclusion, I fall again upon his words which describe his most favourite animal, the red deer:

See how the deer, now bright red-coated, lie at ease in the alpine grassland. Listen, if you have stalked near enough, to the sweet talking of the calves who are like happy children. Of your charity disturb them not in their Arcadia.
Ecological sanity and social justice are like the two faces of the same coin—they are inseparable.

José Lutzenberger
WILDERNESS
Science, Management and Politics
Forests and Their Role in the Future of World Civilisation

Alan Grainger

Lake Cristabel, alpine lake surrounded by dense Nothofagus forest in proposed Maruia National Park, New Zealand

Civilisation, according to my understanding, implies a certain dynamism, a sprouting forth of creative energy, matched by a structure which keeps everything in balance and harmony. Also important, perhaps, is a sense of tradition which is visible in both the landscape and in the actions of people, and which brings a sense of security and acceptance of past, present and future. One gets a feeling of civilisation when walking around the Moray Firth or the ancient streets of Oxford—and also when strolling through a forest.

Not so long ago virtually the whole world was covered by forests—a sylvan civilisation of global proportions, far exceeding the scope of the empires of Rome or of Britain. That civilisation paved the way for ours, in much the same way that modern civilisation can trace its roots back to Greece and Rome.

As Richard St. Barbe Baker, late founder of The Men of the Trees, said: "The trees worked for millions of years to make it possible for man to come on this planet."

To build our civilisation we have had to conquer that sylvan civilisation, whether we are talking about Saxon England, the Pilgrim Fathers

- Montane forest in the Impasse Falls area of Custer National Forest (USA)

23
in the early United States, or present day Amazonia. The forests had to be cleared and the life in them controlled if there were to be stable human settlements and farms.

The poet Charles Mair has written about the loss of the North American forests and the coming of human dominion:

There was a time on this fair continent
When all things thrrove in spacious peacefulness.
The prosperous forests unmolested stood,
For where the stalwart oak grew there it lived
Long ages, and then died among its kind.
The hoary pines—these ancients of the Earth—
Brimful of legends of the early world,
Stood thick on their mountains unsubdued.
And all things else illumined by the sun,
Inland or by the lifted wave, had rest.
And all the wildlife of this western world
Knew not the fear of Man; yet in those woods,

Lowland tropical rain forest directly on the beach of Cape Tribulation, Queensland, Australia
And by those plenteous streams and mighty lakes,  
And on stupendous steppes of peerless plain,  
And in the rocky gloom of canyons deep,  
Screened by the stony ribs of mountains hoar  
Which steeped their stony peaks in purging cloud,  
And down the continent where tropic suns  
Warmed to her very heart the Mother Earth,  
And in the congealed north where silence self  
Ashed with intensity of stubborn frost,  
There lived a soul more wild than barbarous;  
A tameless soul—the sunburnt savage free—  
Free, and untainted by the greed of gain;  
Great Nature's man content with nature's food.

The battle to subdue the sylvan civilisation is still continuing. The tropical moist forests which account for over a third of all forests are being cleared at a rate of more than 11 ha (28 acres) every minute. They contain half of all the species of plants and animals on this planet—a
vast diversity of life forms valuable for their own sake and for possible future economic exploitation. It is estimated that one species is becoming extinct every day. The tropical moist forests also contain half of all the carbon stored in vegetation on the surface of the planet, and their destruction threatens the balance of the global Carbon Cycle—contributiong to the building up of carbon dioxide in the atmosphere and consequent changes in global climate (‘the Greenhouse Effect’).

While we can only guess at the possible repercussions of major losses in forest cover in the humid tropics, elsewhere in the world deforestation is a problem which affects large numbers of people on a daily basis and in a very direct way.

Millions of people in the Ganges Delta, for example, are in fear of their lives when the monsoon rains flood down from the Himalayas, unchecked by the forests that used to cover that massive watershed, and which have also been stripped away at a voracious rate in the last few decades. In September 1982, almost eight million people in just three states of northern and eastern India were either marooned or driven from their homes by monsoon floods. So far this year 403 people have died as a result of flooding in the state of Uttar Pradesh alone.

In many countries of the tropics, fuelwood is the primary source of energy for about 90% of the population. The average citizen in a developing country burns as much wood each year as a North American consumes in the form of paper. Worldwide, half of all wood cut is burnt as fuel. Yet, particularly in arid areas like the Sahel region of West Africa, deforestation has reached such critical proportions that there is a fuelwood famine. Women in Upper Volta may have to walk for between four and six hours, three times a week to gather fuelwood. Lack of wood does not just mean that it is cold at night. For people already short of food the inability to cook food and boil water poses an added threat to their health.

Despite the dire problems of the tropics, and the fact that forests still cover one fifth of the land surface of our planet and form the basis for an international trade amounting to some $59 billion a year, forests and forestry are still not accorded their rightful status at international level.

The tropical moist forests disappear, but we don’t know with any great accuracy just how fast they are disappearing. Only about half of the total area of the tropical moist forests has been surveyed recently with modern remote-sensing techniques such as LANDSAT satellites, side-looking airborne radar and aerial photography. Of the 63 countries having some tropical moist forests, rates of deforestation have been measured by remote sensing for only six. The majority of the deforestation rates used to form the latest estimate of 11 ha (28 acres) lost every minute have been estimated by the UN Food and Agricultural Organisation (FAO).
Huge efforts are expended for the sake of feeding starving peoples and for agricultural development. Relatively little is done to help those suffering from a fuelwood famine who need a massive programme of reforestation to reclaim their devastated environments and provide them with a sustainable source of fuel.

The UK remains totally complacent about its low forest cover (only 9%) and its excessive dependence on imports: it spends some £3 billion a year importing 92% of its forest products needs. On the other hand, the Government is determined to maximise self sufficiency in food, and spends between £2 and £3 billion every year in subsidies, encouraging farmers to grub up even more hedgerows and woods and turn our once beautiful landscape into one vast prairie to grow food in such quantities that are far in excess of what people wish to eat.

The whole European Community spends £10 billion a year on the Common Agricultural Policy—just so it can be as self sufficient as possible in food. Yet, although collectively the Community is the largest importer of forest products in the world—accounting for some 40% of all imports—it has no common forestry policy to safeguard its present and future interests in this field.

This complacency has got to stop. The latest FAO estimates of future world wood supply and demand suggest that by the end of the century the world will be nearing maximum sustainable yields of industrial wood supplies. The fuelwood deficit in the arid tropics alone will be equivalent to an area of fast growing fuelwood plantations twice the size of France. In Africa south of the Sahara this will require the planting of an area of fuelwood plantations that together would form a green belt 6,000 kilometres across the Sahel from Senegal to Ethiopia and 34 kilometres deep. Also by the end of the century between a tenth and a quarter of the present area of the tropical moist forests will have disappeared. Such trends, I should point out, are independent of any major moves to substitute renewable resources like wood for non-renewable resources like oil and coal.

However troubled the world may be in other respects, however divided it is into developed and developing nations, it is united in its dependence on forests, whether for fuel, raw materials, foreign exchange, jobs, control of flooding, or an equable climate.

The developed nations cannot walk away from either their global responsibilities or their own self interest. Forestry must therefore be placed firmly and decisively on the international agenda. The following are some initiatives which I think are worthy of immediate action.

The European Commission must put new impetus behind discussions to formulate a Common Forestry Policy. It should also follow the USA’s lead and set up a task force to investigate the policies it might adopt towards deforestation and reforestation in the tropics. It should give strong support to the new International Tropical Timber Agree-
ment currently being negotiated under the auspices of UNCTAD and which will support the development of more sustainable forest management practices in the tropics.

The USA should fund a NASA programme to use the NOAA-6 and NOAA-7 AVHRR weather satellites to estimate the overall area of the tropical moist forests. Just as importantly, it should build upon the successes of its satellite-based agricultural crop monitoring programme AGRISTARS and establish within the new NASA Global Habitability Programme an embryonic continuous monitoring system for the tropical moist forests so that we can know, for the first time, just how rapidly these forests are being cleared.

The USA and Canada together, as the two leading OECD forest nations, should place forests and forestry on the agenda for the next Western Summit.

The Commonwealth Prime Ministers, when they meet in the near future, should initiate studies that can lead to a new programme of assistance and cooperation by the Commonwealth countries on forestry matters of mutual concern.

Last but not least, the UK should reaffirm its commitment to a programme of afforestation involving both the Forestry Commission and the private sector. This programme should embrace both the deforested uplands (mainly in Scotland and Wales) and the English lowlands and be planned in the context of both economic and ecological rehabilitation.

The developed nations still have to come to terms with the role of forests in world civilisation. The image of the wild forest that must be conquered if a civilised agriculture is to be established is still very strong. It is also possible that sometimes, so as not to detract from the status of modern civilisation, we subconsciously wish to put behind us or ignore the forest habitats of those apes from which we are descended. But come to terms with the forests we must, and not just by mouthing platitudes about the future importance of renewable resources at a time when the tropical moist forests are being exploited in the manner of a non-renewable resource like oil. Forests are an important part of our lives now, and this fact should be recognised.

We are the heirs of that original sylvan civilisation and should not turn our backs on our forest heritage. Instead, we should treat the future of the world’s forests as one of the major international issues of our time, and consider our ability to bequeath these forests to those who will follow us as one of the hallmarks of a civilised humanity.
From the Incas to C.I.T.E.S.

Felipe Benavides

Guano birds, the Guanay or Peruvian cormorant (*Phalacrocorax bougainvillii*), a valued resource of Peru.

Garcilasco de la Vega was born in Peru in 1539, the son of an Inca Princess and a Spanish Conquistador. He was an outstanding writer. At 69, he wrote his famous *Royal Commentaries*, and from this comes much of our information on early Peru.

The capital of the Inca Empire was Cuzco. This, the most deeply revered place in the empire, was where all the kings held court. These great, elegant and proud people considered Cuzco the centre of the world. Cuzco in Quechua means 'navel'.

In the time of the Incas the Korikancha, which is today a convent, was entirely made of gold, similar to all the Royal mansions. In its gardens all sorts of plants, flowers, trees and animals were represented in both gold and silver. Tiny crawling creatures like lizards, snails and snakes, with butterflies of every size, were placed at spots that best suited the nature of what they represented. There were fields of corn with silver stalks and gold ears, on which the leaves, grains and even the corn silk were shown. Birds were set in trees, as though about to sing, and others hovered over flowers drinking in the nectar. These natural history museums, as we would call them today, as well as zoos of living animals, were to be found in most mansions where the Inca lived.
The Incas were brilliant engineers as well as warriors. As soon as a new province was conquered, engineers specialising in building irrigation canals were despatched to increase corn production in desert lands. Evidence of this can be seen today all over Peru. Their earthen terraces, sustained by stone walls, can be seen on mountain slopes, peaks and all rocky surfaces. Along the coast the only fertiliser used came from the unbelievably numerous flocks of seabirds. The islands not far from shore were covered with such quantities of their droppings that they looked liked mountains of snow. There was a penalty of death for anyone killing one of these seabirds or even approaching their islands during the laying season.

The Incas shared a common cult of the sea, which they called ‘Mamacocha’ or our ‘Mother Sea’, because the fish population was so abundant that it fed them like a mother. They worshipped certain fish, and the vast size and mysterious presence of whales stretched their imagination.

On the Nazca Pampa are the famous Nazca lines—artistic drawings covering at least 300 square miles of desert, mountains, valleys and rocky ground with straight lines. A single ‘drawing’ can be up to 30km across. Speculation about their origin still goes on, and we do not understand their purpose. Mathematicians such as Maria Reiche and Gerald Hawkins, author of Stonehenge, will possibly in time prove that the lines had a direct relation to astronomy.

In the valleys where the national marine reserve of Paracas lies today, lived the Chinchas. The fishermen of that area originated 9,000 years ago. The Chinchas, named after their general, decided to defy the Inca. “We want neither your god, nor your King,” they said. “The sea is much bigger than the sun that only prostrates us with its burning rays; it is natural for you who live in the mountains to adore it, because it gives you warmth, but it is also quite natural that we should prefer the sea, which is our mother. Tell your General therefore, to return home and not to pick a quarrel with the King of the Chinchas, who is a very powerful lord. We shall come and show him how we defend our freedom, our lord and our faith.” Their freedom, lord and faith was nature.

When I stand in Paracas today, after driving for hundreds of miles across the driest desert on our planet, and when I see the hump of a whale far out at sea or the flight of migrant birds from Arctic to Antarctica, I feel uplifted. I hear the whistling wind and see the moving sand covering my tracks. Only then can I describe what wilderness really means to me, and I thank God for it. It is an area where homo sapiens with modern conservation management has not yet interfered with nature.

The Incas were great conservationists, very wise in the use of their wild animals. Their great annual royal hunt took place shortly after the
mating season, when some 20 to 30 thousand Indians assembled in the province chosen for that year. The Inca then divided them into two groups who walked in circular formation across the fields and prairies, rivers and mountains. As they advanced they herded all the animals they came upon, forcing them towards the centre with shouts and clapping of hands. As the circle of beaters closed in on the creatures, it became possible to catch them by hand. The big game animals called guanacos and vicuñas were caught in vast quantities, often as many as 30 to 40 thousand. Of the game collected, the females of an age to bear young were freed, along with the finest male specimens, while the old or ungainly animals were killed and their meat divided among the ordinary people. The guanacos and vicuña were sheared before they were set free, and a complete census of all this game was taken according to sex and species.

All the guanaco wool, which is coarse in quality, was distributed among the common people, while that of vicuña, which is the finest in the world, was sent to the Royal Stores. Only the Inca or those to whom he expressly granted his favour had the right to wear it. Any infraction of this law was punishable by death.

Nowadays we admire the canals built by the Incas, but modern technology finds it difficult to explain how they were built. Often the course of entire rivers was diverted from source by blocking the beds with stones. Unfortunately my ancestors, the Spaniards, did not understand the useful purpose of these valuable works, which are now in ruins, nor did they understand the Inca wildlife conservation laws. We brought them civilisation and taught them the use of the wheel; we forced them to believe in our God and destroyed their culture and their worship of the Sun God. We broke down their agriculture and slaughtered their valuable animals. We melted their gold idols and conquered their admirably organised empire. The destruction of wildlife was so scandalous that the King of Spain had to intervene. In 1577 he signed a royal ordinance prohibiting the hunting of vicuña, stating that they must be captured and sheared so they would not become extinct. He ordered these instructions to be proclaimed in all cities of the provinces. Unfortunately, as can happen today, it all remained on paper and the killing went on.

In 1815 the King decreed royal protection for whales. Again, while the legal intentions were admirable, the results were rather feeble.

General Simon Bolivar, who led the armies of independence, was a conservationist and a man of great vision. His close friendship with naturalist Alexander von Humboldt made him realise the importance of natural resources. In 1821, in Cuzco, he decreed that all efforts be made to increase the vicuña population, ordering strict punishment for their killing and decreeing that they should be captured and sheared
only in summer so as to protect them from cold. He also established the new coat of arms of Peru, featuring the vicuña.

He also decreed that millions of trees should be planted throughout South America, and that canals to improve the land should be built, following the Inca tradition. In Colombia, he decreed that the destruction of great forests should cease. But his laws also remained on paper, and the destruction went on.

In the late 1800s, the demand for Peru’s rich timber became so great that European families moved to towns along the Amazon. The rubber boom in Peru and Brazil also created cities of utter luxury, where artists such as Melba and Caruso sang in the opera houses. A wealthy Frenchman even brought to Iquitos a whole pavilion designed by Eiffel after the Paris Exhibition. Extraction was abandoned in the early 1900s, companies closed down and families returned to Europe or moved to Lima. But the damage had been done.

Then the ‘Guano Rush’ began. Guano, the fertiliser made from bird droppings on Peru’s coastal islands, had not been exploited during the Spanish colony. Now, slaves were imported from Africa to do the dirty work under a deadly sun, and there was no control whatsoever of the amount taken. In 1910 Peru exported 400,000 tons. The reason for this zeal was obvious: Peru’s whole economy depended on the export of guano.

In 1925 ornithologist Robert Cushman Murphy described the bird population on Peru’s coastal islands as ‘the largest concentration of birds in the world’. On Chincha Island alone, he estimated the population of ‘guanay’, a white-breasted cormorant peculiar to the Humboldt current, at six million.
The main source of food for the birds is anchoveta, which is the fundamental link in the whole food chain of Peru’s coastal waters. From time to time the ‘Niño’ current adversely affects this food source, and as a result the bird population decreases, but it builds up again in the intervening years.

In 1925 Murphy warned the Peruvian government, which then exported about 300,000 tons of guano a year, that if they ever went directly to fish the anchoveta, instead of keeping it as a food source for the ‘guanay’, they would lose both. Despite this warning, fishing of anchoveta began, and soon millions of tons were being extracted from the sea. There were no restrictions on amounts taken, and foreign companies established fishmeal plants. Peruvians, following the example of their foreign friends, joined the boom until my countrymen prided themselves on being the largest fishmeal-producing country in the world. Well over 14 million tons of anchoveta were gathered each year, producing 1.4 million tons of fishmeal to feed cattle and chicken for consumption by the rich nations.

In 1957 the ‘Niño’ current was very strong, and the temperature of the sea went from the usual 15° to 27° centigrade. This, together with the extensive fishing, decimated the anchoveta and led to the bird population dropping from 22 million to 7 million.

The demand for anchoveta continued to increase, with big prices being paid for fishmeal. In 1972 the coast of Peru suffered another ‘Niño’ current. Twelve million tons of anchoveta were caught that year, and millions of birds died. This was the coup de grace to both anchoveta and birds, for neither have ever recovered. In 1982 it was estimated that there were around five million birds but with the present
'Niño' current, the strongest on record, 60% of the population have already died and the recovery will be negligible due to the fact that anchoveta is on the brink of extinction. In February 1982, on an island off Paracas National Reserve, David Attenborough filmed a good number of boobies and few 'guanays'. Two weeks ago, I found the islands totally desolated and dead birds all over the area. It may well be the end of both 'guanay' and guano.

Since the time of the Incas, no laws or rules with reference to nature conservation have been respected in my country. There are two main reasons for this—the greed of other nations, and the immorality of government officials. The history of Peru's destruction of its most valuable wealth, its natural renewable resources, is a prime example of the fact that laws within the Third World will never be strong enough to stop contraband and illegal trade, as long as the demand of the rich nations prevails.

Consequently, I believe it is imperative that the civilised nations of the world make it their business to strengthen CITES—the Convention of International Trade in Endangered Species; and that all illegalities committed by officials should be internationally denounced and punished.

I blame the modern consumers for the disasters in Peru. They have the money to pay for whatever they fancy and have no respect for a nation's future basic food. Corruption and bribery are rife in connection with fishmeal, animal skins, whales and vicuña wool. Both buyers and sellers are guilty of the crime of contraband, but those who should receive the severest punishment are the wealthiest, the buyers.

Another difficulty in Peru is the illegal traffic in cocaine. The Incas chewed coca leaves, and our Indians living high in the mountains need it also, to keep up their strength and to stay warm. Now consumers elsewhere want the white powder for their vices or to enjoy a frivolous moment in life. This demand has created a gigantic problem in Peru. Hard up though it is, it has to try to control one of the greatest multi-million dollar rackets ever known in South America. In some countries, the illegal trade in drugs is larger than their national budget. The Mafia has modern weapons and fast planes, and through its money it corrupts authorities at all levels. Even more tragic, they work together with terrorist organisations which have already accounted for the lives of thousands of innocent people. It is not the coca leaves chewed by humble Indians that do the damage, but the people abroad who pay large sums of money for these drugs.

There is great concern these days about the destruction of the Amazonian rain forests, particularly among scientists in the industrialised world and in IUCN (International Union for the Conservation of Nature). Yet the industrialised nations themselves support some of the government projects in the rain forest areas. In 1981, a 12-man
team of specialists in ecology, biology, agronomy, forestry and social anthropology spent a month in an area projected for one of these projects, and issued a report stating: “Poor soils, poor quality of the local forest, high rainfall and steep terrain render this area difficult to cultivate under normal circumstances, and from these observations this much publicised plan to settle 150,000 colonists will lead to disaster.”

Nevertheless, today this project is going full speed ahead. It has the support of industrialised nations, while IUCN’s Regional Counsellor for Central and South America has publicly stated that it has been managed with common sense and efficiency. This is in total contradiction to the report of the team of foreign experts.

At the CITES conference in Costa Rica in 1979, the Peruvian delegate did his utmost to move vicuña from Appendix I to Appendix II, so as to increase trade in vicuña furs and skins. Fortunately this was defeated. A later Peruvian Parliamentary Investigation Commission on the vicuña found that government officials had violated the La Paz treaty and that mismanagement and serious irregularities had occurred. It recommended that government officials connected with the project be taken to court. This is the first time a parliament has investigated a case concerning illegal request for a change in one of CITES appendices.

I realised at Costa Rica the importance of just one vote to the conservation of an endangered species. As a member of my government’s Advisory Commission on vicuña conservation, I will see that our delegates in future have proper credentials.

Meanwhile, due to gross mismanagement, 6,000 vicuña (on Appendix I of CITES) have been shot by inexperienced marksmen. This tragic slaughter deserves the public trial of those who gave the order to kill, as well as of those outside my country who encouraged them. Two million dollars of Peruvian and West German tax-payers’ money turned a national reserve for endangered species into a game farm, with the shady intentions of putting the wool and skins on the open market. The headquarters of what was ironically called ‘The Vicuña Rationalisation Project’ included a slaughter house and a deep freeze plant—in the high Andes of all places!

After 30 years of struggling to save the wild creatures of my country, I believe that CITES is the greatest weapon we have at our disposal to save endangered animals—as long as the officials running the convention give priority to the animals we are trying to save. However, the attitude of the recent meeting in Botswana towards illegal sales of vicuña cloth in Hongkong and Washington makes CITES weak.

The populations of many countries in the world are exploding. They need more land to till, more sources of income, more schools, hospitals, roads. Their governments often find themselves with their backs to the wall. If they do not provide the means for people to earn a livelihood, precarious as this may be, they are overthrown. Conse-
sequently, politicians will often agree fully on the necessity for a particular conservation step, but will then explain that it is not the right time and that the measure is not vote-catching.

Fortunately this is not always the case. For instance, Peru’s position on the cessation of commercial whaling in 1985 means unemployment in the whaling station areas, which are the most depressed in Peru. In the North, where the ‘Niño’ current has resulted in ten months of rains and floods, thousands are homeless and hungry children roam the streets. In spite of this, I recently asked for the closure of a whaling factory which employs and feeds 200 workers and their large families. The owners, in an attempt to keep the factory open, promoted the idea that they were giving whale meat away to the hungry. However, the whales won. In a starving nation, it takes very decent rulers to take such steps. We shall save the whales, and we hope the industrialised nations will help us save the hungry children, who will not otherwise live to see a whale.

Hard-pressed countries of the Third World at times enact laws that cancel previous conservation legislation, or do not have the means to enforce their conservation laws. Many people in the industrialised world donate large sums of money to private conservation organisations which channel funds to some of the projects in Third World countries. But not all these funds are well administered after they are received, and some get into the wrong hands.

In my own country a law has recently been passed determining that areas previously proclaimed as reserves can be opened up. This has far-reaching implications which are obviously not being taken into account by the financial and policy planners of my country. Our national forests, declared as reserves, are being cut down by both Peruvians and foreign countries. Our national parks and reserves are no longer protected. Mining and oil drilling have priority. One of the largest rain forest reserves in the world is now in great danger, with plans to build a road across the park to join two watersheds. This last true wilderness in Peru’s Amazonia was declared a biosphere reserve by the United Nations in 1977, but this appears to make no difference.

It is amazing to see the low profile some of our government officials take about these serious problems, never uttering a word on behalf of whales, seals, guano birds, sea turtles or vicuñas. I do not see why taxpayers should pay the salaries of officials who fail to protect our wildlife, forcing us then to raise funds from generous donors to repair the mischief they have done.

Industrialised countries often give large amounts of financial aid, called ‘soft loans’, for various Third World projects including roads, dams, buildings and even cities. Here technology and economics come into the picture. We need the technocrats and financiers of these countries to get together and to plan their projects with the far-reaching ob-
jective of conserving watersheds, natural resources and biological banks. Unless this is done, those same industrialised countries giving loans will no longer have their source of raw materials, without which they cannot subsist. It is a vicious circle.

We need also to see an end to narrow financial interests in the industrialised nations. These countries say the Third World should become more industrialised, but protectionism and lack of the latest innovations negate the markets for our industrial products, so the only things we can export are raw materials. For most of our people, agriculture is their only means of livelihood.

Urgent action is needed now. Those I call the ‘conservation mercenaries’—ecologists, economists and bureaucrats—must act according to their consciences to work out clear-cut plans for the future. If they do not do this, our voices will continue to cry in the wilderness...or what will be left of it.
Brazilian Wilderness:
A Problem or a Model for the World?

José Lutzenberger

Tropical forests worldwide are a valuable resource, and Brazil contains the largest areas of this fast diminishing ecological treasure house.

With eight and a half million square kilometres, and only 120 million people, Brazil should be a model of wilderness preservation. But it certainly is not, unless by this we mean a model of how to devastate nature. We have enough space to afford to leave three-quarters of our land in its wild state, and we could have the best national parks in the world. However, we have less than 1% of our land in parks, and these are so badly kept and preserved that they don't even deserve the name of parks. Even now one of our beautiful large reserves, which is not
only a nature reserve but also the home of an Indian tribe, the Xavantes, is being destroyed. It is being crossed by a new road. One of the chieftains of the Xavantes, Juruma, was elected to our federal parliament last year, and in one of his speeches he referred to all our ministers, our president and our military, as bandits, thieves, liars and bad characters. This caused a tremendous scandal in government circles, and was on the front page of all our newspapers. The government reacted in an extremely violent way and wanted to have Juruma thrown out of parliament. Fortunately, practically all the other deputies voted for him, and he remains in parliament. At least we now have enough democracy to make it possible for the representative of the oppressed Indian tribes, who have constantly been subject to genocide and rape of their land, to speak out.

Today we are witnessing a biological holocaust the like of which has never been seen in the three and a half billion years of the history of life on this planet. We are witnessing the wholesale systematic demolition of all natural systems. It is not just beautiful landscapes that are being destroyed, but whole ecosystems and biomes. This is occurring in areas all over the world, including Europe, although here it is sometimes less apparent.

Let me give you some figures on the demolition of the Amazonian rain forest. In *Deforestation in the Brazilian Amazon: How Fast is it Occurring?* Fearnside, an American scientist working in the Amazon, put together data on the demolition of the rain forests. He made extrapolations showing that if present trends continue, the state of Parama, which is the largest state in Brazil, at the mouth of the Amazon, will be completely deforested by 1991. The state of Roraima will be naked by the year 2002. Maranhão will be cleared by 1990, and Goiás by 1988, five years from now. The state of Acre will be deforested by 1995, Mato Grosso by 1998. Amazonas, the second largest state in Brazil’s Amazonian basin, will be naked by 2003. If these rates continue, the whole Amazonian forest will be deforested by 1991, less than ten years from now. Of course, this is not going to happen, because things will change in time. But they will change only if we all fight for it.

What is really being destroyed? *Everything* is being destroyed! The rain forest is going, as I have said. The Atlantic forest, another type of forest along the Brazilian coast, is almost completely gone, as is the Araucaria forest, the large southern pine forest in the states of Rio Grande do Sul, Santa Catarina and Parana. I was born in Parana and when I was a young man 30 years ago that forest was still almost intact in its majesty. Today it is gone, and the few small relics that remain are now being demolished too.

In Cerrado, Cerradão and Caatinga, is another biome, a savannah type ecosystem as large in area as the Amazon. This is being destroyed
at a rate close to 100,000 sq km a year—equivalent to half the size of Great Britain. Our coastal ecosystems such as the Restinga, the salt marshes and the mangroves, are all either being demolished or degraded. The same thing is happening to our swamps. We have a government agency which considers it to be its sacred duty to dry up every last swamp either by drainage, by filling it in or by making polders. The prairies in the south, the Pampas and the Panalto, are being ploughed and destroyed by erosion, and precious ecosystems such as those existing on steep mountain slopes, mountain tops, rock outcroppings or on cliffs are also being demolished.

How is all this destruction occurring? First there is clearing on an enormous scale. Cattle ranches in the Amazon are usually between 10,000 and 200,000 ha in extent. The alcohol producing programme in Brazil is on a similar scale. Forests are also subjected to clearance through a programme of the Brazilian Settlement Agency, Incra, which is called 'the largest agrarian reform in the world'. Taking settlers into the jungle is a way of not facing agrarian reform in other areas, where we do need it.

Outside these colonisation schemes, we also have wild settlers in areas that as yet have no owners. Here deforestation often takes on forms that are totally absurd. A wild settler has a chance of receiving deed to the land he claims if he can show that he improved it. Incra accepts forest clearing as improvement. Wild settlers thus have an interest in clearing as much as they can, even more than they can use. I visited a place where a Brazilian agronomist had cleared 150 ha of forest to make pasture, but he had no cattle and no money to buy them. He openly conceded he had cleared much more than he could use, but he claimed 500 ha and he got them. This gives some idea of the stupidity of the present settlement policies. Although he has no cattle, this settler burns down the tall grass every year to keep 'worth-less scrub' from coming up.

Commercial logging is another form of destruction. Until recently the type of logging in the Amazon valley was more or less compatible with the survival of the forest. It was carried out only in the flood plains, where the soils are fertile due to the annual flooding which deposits rock powder from the Andes. Here logging is done by small loggers, in a selective way. The trees are cut when the water level is low, and floated out when the water is high. They are bound into rafts and taken to the saw mill, usually a small, local enterprise. In the fertile soils of the flood plains, big trunks grow back in 20 to 30 years. Older loggers can resume logging where they started in their youth.

The export of rare plants is another form of devastation which is very little known, as it is not spectacular, but which causes irreversible destruction and affects some of the most fragile ecosystems. Those of you who like cacti, orchids, bromeliads and other exotic plants should
think twice before buying a beautiful ‘import’. When the exporters find a new species or variety they take all they can. But most of these plants are very limited in their habitat. Sometimes a species has a population of only a few hundred individuals, in some cases only a few dozen. Its discovery by the exporter is equivalent to its extinction.

Another factor contributing to large-scale destruction is indiscriminate mining. The Carajás Project, for instance, entails the demolition of a whole mountain range for the export of minerals. Fortunately, the world recession has put a brake on this project, and for this reason I hope the recession gets worse. We seem only to learn from adversity.

Large hydro-electric schemes such as Itaipú and Tucuruí will each flood up to 200,000 ha of forest. Two Indian tribes have been displaced, which almost amounts to exterminating them. The real reason for these mega-technological schemes is not to provide electricity—we already have too much of it—but because of the building contracts and corruption that goes with them. This also applies to nuclear energy. We don’t need it. We could get all the electricity we need from small, decentralised, locally-owned plants.

The worst factor for destruction in our country is perhaps the way in which agriculture is practised today. It is rape of the land. The few peasant cultures we had are disappearing. Throughout the history of Brazil, the big landlords have done all they could to prevent healthy peasant cultures from developing. The landlords want all the good land for themselves, and they need a poor population to provide cheap labour. This is particularly evident in the amount of misery and starvation in the north east of Brazil, where there is certainly no lack of land or water. All the good land which can be farmed and irrigated is in the hands of the landlords who are less interested in producing food than in making money. They create monocultures of sugar, cocoa and other crops that under given conditions offer the most profit. The peasants are actually prevented from growing food. That is why we see millions of nordestinos in the slums of Rio, São Paulo, Belo Horizonte and other towns further south.

It is often said, by those who have an interest in continuing the devastation, that the population explosion is responsible for the wholesale destruction of the last wilderness areas. This is a lie. The rain forest is being destroyed by forces that lie outside it. If we left the rain forest to its inhabitants, to the Indians, the caboclos, the rubber tappers or the small urban population, the forest would be safe for at least another 500 years. We would have plenty of time to learn to handle it intelligently and in a sustainable way. The destruction that the inhabitants of the forest cause is on a scale that hardly matters. Large-scale devastation originates in outside interests, in technocratic and political interests in other regions of Brazil and overseas.
Large areas of tropical forest are burned daily.

What happens in the Amazon region is an example of classical imperialism. Whether the imperialist power is overseas or within the borders of the same political union makes no difference. The local people are being robbed of their resources, marginalised and driven off their land. They either end up as poor day-labourers, chronically unemployed, or they go to the slums of the big cities.

The Jari Project of the American multi-billionaire, Daniel Ludwig, is an example of one that caused much controversy. He somehow managed
to acquire six and a half million ha of land, and cleared close to 200,000 ha. The clearing work is done either by spraying a tree-killer—‘agent orange’ of Vietnam fame—and then burning off the forest; or by ‘coorentão’, where two super-heavy tractors pull a thick chain between them and tear everything down. There may also be armies of men wielding chainsaws. The timber is then all burned, and wasted. In the ashes, Ludwig planted a monoculture of a fast-growing tree—first Gmelina and then, when that failed, Caribbean pine. From
Japan, he brought a floating cellulose factory. He also planted some 30,000 ha of rice monocultures in the ‘varzea’, the flood plain. Fortunately the project failed, and Ludwig had to sell. But the new owners, Brazilian industrialists from the south, will probably be more devastating. They can certainly count on more government help.

This kind of project does not improve the lives of the people who live in the forest. All they may get are seasonal, badly paid jobs with no security. In fact, when Ludwig decelerated the project, thousands of people brought from far away were left stranded.

Today there are hundreds of large-scale projects in the Amazon region. Some are those of European and American companies such as Volkswagen, Nixdorf Computer, Nestlé, Liquigas, Kennicot Copper, Borden and others, or of Brazilian enterprises from the south—even a farmers’ cooperative, Cotrijui, which is mostly setting up cattle ranches. It is a fundamental dogma in our modern industrial society that all capital must grow. An ‘empty’ jungle is seen as a good place to make money grow. But this happens at the expense of the people who have lived in harmony with the forest for millennia, like the Indians, or centuries, like the caboclo, and who have an interest in its preservation.

Rubber tappers in Amazonia live a much better and more abundant life than metal workers in São Paulo, actually making more money. But they hardly need it. They get all their food from the forest—fruit, game, fish and a few crops such as maniok, sweet potatoes and maize. They hunt only for their own subsistence and do not exterminate game. Today they are no longer the slaves they once were. Their transistor radios tell them the price of rubber in São Paulo or Chicago, so they cannot be exploited the way they used to be. They get half their income from rubber, half from Brazil nuts. But, because the rubber tappers, like the Indians, have only a sense of territory rather than land ownership, they can suddenly be confronted by a ‘jagunço’, a hired pistol man who tells them they are squatters and must go. The ‘owner’ is usually someone powerful who secured a deed for an enormous tract of land, marked out on a map, without reference to the people living there. The seringueiro has no choice—he either goes or becomes a day-labourer on the holding of the big guy.

I must emphasise that the destruction of our last wilderness areas has nothing to do with the population explosion. In fact, the big cattle ranches actually contribute to starvation. In a film I made recently with ITV, there is a scene in which we show a felled Brazil nut tree rotting in a field. The trunk was some 40 metres long. When that tree lived, it must have produced several hundred kilos per year of a very precious food, and there were several such trees per hectare. The cattle ranches produce ridiculously low yields of meat, less than 50kg per hectare per year during the first year, with yields going down rapidly in the following years. Compare this to yields in northern Europe—about 600kg
per hectare per year, plus some 6,000 to 7,000 litres of milk on the same hectare. No milk is produced on the Amazonian cattle ranches. That is why the caboclo wisely says, "Where cattle come, there comes starvation, and we go." The irony of it all is that the little meat produced is meant for export. The owners of these projects rely on subsidies, and low yields are compensated for by the enormous areas.

In the case of the big dams, for example Tucurui, the advantages also go to the powerful people who live outside the region. The reason for producing eight gigawatts of electricity in the middle of the jungle, where there is no demand for energy, is to produce aluminium for export to Japan. The next time you take beer in aluminium cans, think of it! It cannot be stressed enough—the destruction of the rain forest is done in the interests of outside capital. Most of the time that capital doesn't even need multiplying. What makes a man like Ludwig, 80 years old and with no heirs, who owns a fortune close to ten billion dollars, set up that kind of project in the jungle, thereby destroying the lives of the people living there? This is one of the great indecencies of our modern way of life.

Earlier I mentioned the small settlers. It may seem that they are also responsible for the destruction of the rain forest, and in fact they are. But they are there because they have been driven off the land elsewhere. Down south, where I live, the only relatively healthy peasant culture that developed in Brazil is being destroyed. There we have relatively fertile soils that, if well treated, can produce high yields on a sustainable basis. But the agrarian order of the Common Market which led to a situation where now more than ten billion dollars are spent annually to destroy food, has also promoted soybean monoculture on those good soils. The small guy cannot compete with the big mechanised and chemicalised farms, and government policies promote only cash crop monoculture for export. There is very little left today of the once beautiful and locally adapted peasant culture that German and Italian immigrants created there.

The Brazilian central government has set aside the state of Rondonia and other regions in the Amazon basin to serve as escape valves for farmers displaced elsewhere, in south and central Brazil, and for the masses of people from the north east who were never allowed to develop a peasant lifestyle. However, while the soils in the regions where they come from are fertile and able to support sustainable agriculture, the soils in the regions of the tropical rain forest are the poorest in the world. The settlers will soon be uprooted again. When the last tract of forest is cut down, there will be no more place for them to go.

Ecological devastation and social injustice always go together—or, in other words, ecological sanity and social justice are one and the same thing, two faces of the same coin. We often hear the phrase, "we have
to find ways to make development compatible with the preservation of ecosystems and of wilderness." I believe that what we call development today is fundamentally incompatible with survival and social justice. It is development itself that is a disaster, because it means using and consuming nature, not living in harmony with it. We must question the fundamental tenets of this fanatical religion by which all live, the religion of 'progress' and technocracy.

Technocracy wants us to believe that both science and technology have nothing to do with ethics, politics or morals. They deliberately confuse science with technology, making the two terms almost synonymous. But, in fact, every technology is political. Every machine, technique or patent is an instrument of somebody's power. We need a political critique of technology. Whenever a new technology is introduced in the name of 'progress' and 'higher efficiency', we must ask: higher efficiency for whom and at the expense of whom? Is it good for the people or only for the powerful? Who profits by planned obsolescence, by one-way containers, by wasteful management of raw materials and by pollution? Is it the consumer, the people or the powerful? These techniques, philosophies and devices are invented by the powerful for the powerful.

It is not enough merely to change our own individual lifestyles, because those in power are changing the world in such a way that we have no choice. We cannot avoid buying poorly-made or non-ecological products. Nor, because our cities are organised in the way they are, can we avoid continually driving long distances.

The fundamental point is that if we want to change these things, then we must change the whole philosophy of development and all our economic thinking. For this to become politically feasible we must get the ear of the common people. I have noticed that in Europe and the USA these people still think of the environmental movement as an elitist one. We will only get their attention if we can show how social justice and ecological sanity are one and the same. In Brazil, in our movement, we have from the start attempted to do just that. This is why, even though we are very small in terms of organisation and finance, we have achieved a certain amount of political power. Politicians are beginning to listen, and we have won some very important victories. For instance, in the last 13 years we have achieved a very significant victory in terms of fighting pesticides. Today Brazil consumes less poison in agriculture than it did in 1973, while the chemical industry expected to be selling ten times as much by now.

What we need is to find ways to make science and wisdom come together again. Today, unfortunately, science, more often than not, is the whore of technocracy.
The Franklin Saga

Barry Cohen

Rock Island Bend, Franklin River

On July 1, 1983, at 10.30am, the High Court of Australia delivered its judgement on the future of a World Heritage area, the South West Tasmanian Wilderness Region. By a majority of four votes to three, the Court ruled that the Federal Government had the power to prevent the Tasmanian State Government from building the Gordon-below-Franklin Dam, which would have severely damaged one of the largest areas of temperate wilderness in Australia and one of the last such areas remaining in the world.

Thus ended the most important and controversial conservation issue in Australia’s history—the battle to ‘Save the Franklin’, one of the last wild rivers in the world. To say it was a bitter struggle is to put it mildly. It raged for over three years and in the process ended the careers of two State Premiers, a State Government and many Parliamentarians, both State and Federal. It aroused large public demonstrations, not seen in Australia since the anti-conscription days of the war in Vietnam. It ended lifelong friendships, divided families and turned politics on its head in the serene and beautiful island of Tasmania, in a manner unprecedented in its near two hundred years of recorded history.

In my capacity as Minister for the Environment, I am responsible for the World Heritage (Properties Conservation) Act, specifically enacted
by the Labour Government to avert the threat to the wilderness area, and thus I was deeply involved in that battle. I now have a crucial role to play in ensuring that the South West Heritage Area is looked after in a responsible and careful manner for the benefit of future generations, as it is one of the few unspoiled natural wonders of the world.

The State of Tasmania comprises the major island and several smaller ones off the south-east corner of the Australian mainland, and is one of the six States forming the Commonwealth of Australia. It is the smallest State, with an area of about 68,000 sq. km., approximately 1% of the total area of Australia, and has a population of less than half a million.

Tasmania’s industries have always been disadvantaged because of very high freight costs. As the island contains many short and fast flowing rivers, successive Tasmanian Governments, in an effort to reduce this disadvantage, have developed cheap sources of hydro-electric power to attract energy-intensive industries to the State. These include forest-based industries such as timber-milling, newsprint, woodchipping and mining. The metal smelting works resulted in the hills around Queenstown being turned into a moonscape. Tourism is a new industry currently being vigorously developed, and many Tasmanians now realise that the stripping of forests and the destruction of rivers is damaging the State’s major economic asset, its rural beauty of great scenic charm.

It would be easy to assume that Tasmanians are careless of their environment because of the nature of their logging and mining industries, but in fact the value of the South West Tasmanian Wilderness Area has long been recognised. As far back as 1927 the Cradle Mountain-Lake St. Clair National Park was set aside, followed by the Gordon River State Reserve in 1939 and Frenchman’s Cap National Park in 1941.

The South West Conservation Area—approximately one fifth of Tasmania—was declared a Conservation Reserve by the Tasmanian Labour Government in July, 1980, and was entered in the Register of the National Estate on the same date. The Register is an inventory of those parts of the cultural and natural environment of Australia, which have aesthetic, historic, scientific or social significance. Listing on the Register does not ensure preservation, but does impose obligations on Federal Government Authorities not to act in a way that adversely affects the area.

In 1982, at the request of the State Government of Tasmania, the Federal Government nominated for inclusion in the World Heritage list three parks within this South West area—the South West National Park, the Franklin Lower Gordon Wild Rivers National Park, and the Cradle Mountain-Lake St. Clair National Park. The World Heritage Committee accepted the nomination in December 1982, but expressed grave concern about the adverse effects to the area which would result
from the construction of a dam, and even went so far as to say: "The Australian authorities should ask the Committee to place the property on the list of 'World Heritage in Danger' until the question of dam's construction is resolved."

Why did the Tasmanians want to build a dam?

The Hydro-Electric Commission (HEC) has often been described by mainland Australians as the State religion of Tasmania. The Hydro, as it is known locally, is a statutory corporation operating under the Hydro-Electric Commission Act of 1944. It is not only dedicated to the generation of hydro-electricity, but is also a major employer of labour in the State. Its altars are the dams, as the Hydro is also its own construction company. Unless the Hydro keeps building dams, it cannot produce electricity and it ceases to grow.

The Hydro is no stranger to bitter litigation. From 1967 to 1973 the South West of the State was the site of a major conflict between conservationists—contemptuously referred to as 'Greenies'—and the Hydro over the construction of Lake Pedder dam. The Greenies lost and Lake Pedder was flooded. However, battle lines had been drawn and in regrouping, the Greenies became even more determined to stop any further 'development' of the South West area.

In October 1979, the Hydro recommended to the Tasmanian Government that a Gordon-below-Franklin dam be built. The fight to 'Save the Franklin' had begun.

The Tasmanian Parliament is bicameral. The Lower House, where
the Labour Government had the majority, rejected the Hydro’s proposal of the Gordon-below-Franklin on environmental grounds, favouring instead the Gordon-above-Olga dam. The Upper House, under control of the opposition parties, favoured the Hydro proposal on economic grounds and repeatedly blocked the Lower House’s recommendations for the less environmentally damaging Gordon-above-Olga dam. It was in order to block the Upper House’s scheme for a dam that the Tasmanian Government in the Lower House declared the Franklin-Lower Gordon Wild Rivers National Park in July 1980.

But the fight was far from over. By mid-1981, the dams issue dominated Tasmanian political life and had become increasingly important to the rest of Australia. In September, the Federal Government set up a Senate Select Committee on South West Tasmania which concluded, in its report tabled a year later, that the Franklin River must not be flooded both for environmental reasons and because of caves of major archaeological significance located along its banks. Also, there was no need for at least three years to decide on schemes for the additional power needs of the State. Finally, a number of alternative power options were in any case available.

Meanwhile, the issue was boiling up in Tasmania to the point where the Government decided to hold a referendum. Despite widespread public demand, the referendum did not canvass the ‘no dams’ option, merely putting to the people the choice between two dam sites, the Gordon-below-Franklin favoured by the Hydro and the Upper House, or the Gordon-above-Olga favoured by the Lower House.

In response to the call by the conservationists, 38% of the voters wrote ‘no dams’ on their ballot papers, thus rendering them invalid. The initial count of the referendum, which was later challenged legally, showed that 53% of voters favoured the Gordon-below-Franklin, with only 9% supporting the less environmentally damaging Gordon-above-Olga scheme. The pro-dammers claimed a victory, the Greenies claimed a victory, the Government licked its wounds and recessed Parliament for 15 weeks.

Scenes reminiscent of the pre-Civil War South followed. In May 1982, elections were held in Tasmania and for only the second time in forty years the voters elected a non-Labour Government. The new Premier, Robin Gray, claimed that the referendum result and the election victory gave him a clear mandate to go ahead with the building of the dam and had passed the Gordon River Hydro Electric Power Development Act which authorised construction of the dam. There is no question that the majority of Tasmanians, possibly around 60% of the adult population, favoured the building of a dam.

The Tasmanian Wilderness Society and other conservation groups sought a High Court injunction to restrain the Prime Minister and Treasurer from taking action in the Federal Loan Council which would
have to consider the application by the Government for funds to build the dam. The request for the injunction was refused.

Throughout 1982, the Federal Government comprised the Liberal/National Party coalition led by Malcolm Fraser, who announced that under the terms of the Australian Constitution the Federal Government had no role to play in the dam issue as it was solely a State matter. The Australian Labour Party was actively opposed to the building of the dam and spoke vigorously against it in the Federal Parliament.

Public opinion was strongly and very vocally opposed to the dam. Pressure reached such proportions that in January 1983, Prime Minister Fraser offered State Premier Gray a $500 million economic aid package in return for a commitment to preserve the South West Region. Gray immediately refused.

The following month, a Federal election was called and the dam issue was one of the principal issues before the voters, though the major one was that of the nation's pressing need of economic recovery. The Labour Party Government which was elected on 5 March came in with clear policies to stop the construction of the dam.

Under the Australian Constitution, Federal Parliament is not given plenary power to legislate in respect of all matters for the whole of Australia. The powers are divided between the Government of the Commonwealth and the States. Because the Founding Fathers made no mention of the environment nor of conservation when they drafted the constitution, the division of power in these areas is subject ultimately to judicial interpretation. However the Commonwealth Parliament can draw on various powers to give effect to environmental policies on a national scale.

The issue was not clear cut in the case of the dam, so the Federal Government had to draw on the following powers: first the Foreign Corporations and Trading or Financial Corporations formed within the limits of the Commonwealth (Section 51(XX) of the Constitution); secondly, the rights of people of any race for whom it is deemed necessary to make special laws (Section 51(XXVI) of the Constitution); thirdly, the External Affairs (Section 51(XXXIX) of the Constitution).

The Federal Parliament approved the regulations which I made entitled World Heritage Western Tasmania Wilderness Regulations, which specifically prohibited the construction of any dam in an area of about 14,000 hectares in the South West. This was the first legal shot in the battle, as the regulations were based only on existing legislation and on the foreign affairs power.

The Act itself prohibits any clearing, excavation and building taking place in any 'identified property' which is defined as property forming part of the cultural or natural heritage included in the World Heritage List, or so declared by the Regulations of the Act.
The Tasmanian Government challenged the Federal Government's claim to have the constitutional power to stop the building of the dam, so on 31 May 1983, the matter was taken to the High Court of Australia, which rules on Constitutional matters. Tasmania argued that though Australia had signed the relevant UNESCO Convention, this did not impose an obligation on the Federal Government to conserve the heritage of a State of the Commonwealth. The Tasmanians further argued that the Federal legislation was tantamount to acquisition of property without compensation on just terms and therefore invalid under the Constitution. Furthermore the Corporations and Trading powers did not apply as the Hydro was not a trading corporation.

The High Court upheld the critical sections of the World Heritage Properties Conservation Act of 1983 and all work on the dam was stopped.

Lake Selina—this place will be adversely affected by the construction of the hydro scheme which replaced the Gordon-below-Franklin power development.
The Tasmanian Government claimed that the decision had tolled the death knell of the rights of individual States under the Constitution. This is nonsense. The decision merely recognised the need for the Federal and State Governments to consult on the question of accession to treaties and their application. The Tasmanian Government had refused consultation with both past and present Federal Governments, preferring to persist in its unilateral course of vandalism to an area protected under the terms of the World Heritage List.

Since the High Court decision the Federal Government has had three main aims: to assist the Government of Tasmania to find alternative employment for those working on the Gordon-below-Franklin project; to develop long-term programmes for Tasmania’s economic advancement—tourism is an obvious choice; and to provide, with the cooperation of the Tasmanian Government, for the conservation and management of the World Heritage Wilderness Area.
Premier Gray claimed compensation of $3,500 million from the Federal Government for Tasmania's loss, the claim being based on the long-term value of all resources in the area. This clearly verges on the fanciful, as it would amount to a sum in excess of $7,500 for every man, woman and child in the State.

Federal Government disbursements to Tasmania are based on an individual project approach. The Prime Minister, Mr. Bob Hawke, and Premier Gray met on 31 August when they discussed an interim financial agreement which would provide $25.8 million in 1983-84 for job-generating projects, mainly in Western Tasmania. They agreed on a number of projects including roadworks, a rail deviation, tourist improvements, a sewage treatment plant at Queenstown, and the upgrading of the airport in the State's capital, Hobart. The total assistance committed this year is for projects totalling up to $30 million. I have been involved in the continuing process of consultation, especially as much of the work will be done in the World Heritage area to upgrade facilities to attract tourists.

We recognise that the management of the World Heritage area is a national responsibility, and we have provided funds for the restoration of damaged areas. I have found my State counterpart, Geoff Pearsall, most willing to cooperate and to let the past bury itself. Funds are being made available for immediate management needs. Shortly, for example, the number of park rangers will be substantially increased to cope with the coming summer and with the large number of visitors expected in the area.

Details of the formal management structure for the Western Tasmania Wilderness National Parks is still to be decided, but it will be a cooperative effort, as the Wilderness belongs neither to the State, nor to the Commonwealth. The wilderness soothes our longing for desolate, remote places where the spirit can rejoice in the beauties of nature. The wilderness belongs equally to us all.
The Silent Valley Story

Ramakrishnan Palat

Silent Valley contains the last substantial piece of tropical evergreen forest in all India.

Silent Valley is a unique tract of tropical rain forest in South India, one of the few such areas in the world that remains relatively undisturbed by human beings. Tropical rain forests are the richest expressions of life that have evolved on this planet, with a continuous history of several million years of evolution. Silent Valley is estimated to have a record of 50 million years of evolution. It is unique in many ways, and is important for the survival of certain endangered species. Its flora is so
diverse that plant breeders would find it an invaluable gene pool, and much of its fauna is very rare.

Situated in the Palghat district of Kerala State, about 45km north of Mannarghat, the Silent Valley Reserve covers 8,952 ha and contains many hills and valleys. The entire forest is on a plateau. Silent Valley contains India’s last substantial stretch of tropical evergreen forest and is perhaps the only vestige of a near virgin forest in the whole of South India. Because of its impenetrable nature and the lack of means of communication, the area has long remained in a near virgin state. But more recently it has been subjected to disturbances by various anthropogenic activities such as plantations, agriculture, tribal settlements, poaching and fire. However, the heart of the Valley proper has remained comparatively undisturbed.

For the last five years I have been conducting research on the bird community of this undisturbed area. For a detailed ecological study of the bird community, a fairly good knowledge of the habitat is essential. I adopted the multiple stage sampling method for vegetation studies. Ten major plots, each 100m by 100m, were selected in the forest. The plants were classified into three categories based on their size. All plants exceeding 5cm DBH (diameter at breast height) were classified as class I. Plants with less than 5cm DBH and more than 50cm height were grouped as class II and plants with less than 5cm DBH and less than 50cm height were class III. In my study plots there were 111 species of class I, 83 of class II and 32 of class III plants. In the major plot the average number of class I, class II and class III plants were 521, 572 and 711 respectively, thus showing that the forest is very dense.

Both the height and the crown position of plants in these study plots were recorded. Trees were classified into five categories based on the crown possibilities. Trees receiving direct sunlight from above and from the sides were classified CP I; those receiving direct sunlight from above and partially from the sides, CP II, and those receiving direct sunlight only from above, CP III. Trees receiving no direct sunlight from the sides and only partially from above were classified CP IV, and those with no direct sun from either above or the sides, CP V. In my study plots 12% of plants were CP I, 30% CP II, 27% CP III, 21% CP IV and 10% CP V. This shows that the forest is well striated.

Each bird species has preferences for specific crown positions. When the diversity of crown position increases in a habitat, such as in evergreen forests with numerous plant species, the niche availability for bird species also increases. If the forest is homogenous or consists of one or only a few species, the crown position diversity will be low. This affects the niche availability, and only a few bird species can exist in such habitats.

The phenology and morphological condition of plants were classified into nine categories: those with 1) leaf bud, 2) mature leaves, 3) leaf
shedding, 4) flower bud, 5) flower, 6) flower shedding, 7) fruit bud, 8) fruit and 9) fruit shedding. Because of the numerous plant species in Silent Valley, all the phenological conditions were present in certain percentages throughout the year. This helped those bird species with very specific food and other niche requirements to live there all year round. This may be why most of the birds of Silent Valley are residents. A forest homogenous in plant species has only flowers during certain months and only fruits during others. This means that birds which feed, for instance, only on fruits have to leave when there is no fruit in the forest. Because of the high plant species diversity, this is not the case in Silent Valley.

Foliage density on different vertical zones is another important factor which influences birds. The foliage height, density and diversity were also high in Silent Valley. This helped different bird species with different niche requirements to co-exist.

Bird censusing was also carried out using line transect and point transect methods. I recorded 112 bird species in this forest, with high abundance and diversity.

In 1977 the State government of Kerala started the preliminary work on the Silent Valley hydro-electric project, which resulted in the destruction of some forest area. The first thing to affect the birds was the blasting of rocks, which took place continuously from February to October 1977. When I took a census in December 1977, I recorded only 73 species. Five months later, in May 1978, I recorded 103 species, but nine species never returned to the area. The sound of blasting might have disturbed them but, since it did not affect the food potential, many returned when the blasting was over. However, some bird species were so sensitive that they never came back.

About 5% of the vegetation in my study area was destroyed for roads and temporary sheds, with a consequent 1.89% decrease in bird species and a 3.65% decrease in bird species abundance.

A temporary bund built in a free-flowing river resulted in the submergence of the natural shoreline which provided habitat for many birds. Certain amounts of biomes, represented by the original vegetation, disappeared, and the impounding shoreline did not have the same vegetation as the natural shoreline. The shoreline also offered nesting sites for various bird species. In particular, the boulders on the shoreline are very important and essential for the nesting of most birds of prey. When the boulders were submerged these birds had to migrate to other parts and this resulted in a population explosion of rodents which feed on the eggs and nestlings of birds. The sudden increase in the rodent population thus affected the population of many birds, some of which are responsible for the dispersal of seeds and for the natural propagation of vegetation. Their elimination will therefore affect the vegetation, which in turn will affect the herbivores and then the carni-
Indian conservationists succeeded in saving Silent Valley by taking the conservation message directly to the villagers. Drama, poetry and art played an important part in the campaign.
vores. The submergence of the river shore may not affect the entire bird community but it certainly affects the species which are completely dependent on riparian habitat.

Of the many wild animal species in Silent Valley, three are endangered—the tiger (*Panthera Tigris*), the Nilgiri tahr (*Hermitragus Hylaeus*) and the lion-tailed monkey (*Macaca Silenus*). The lion-tailed monkey is the only true arboreal monkey species and is considered extremely important in understanding the biological and social evolution of humankind. About half of their known world population of 500 live in Silent Valley, which is one of their two remaining viable habitats. Each troupe of these monkeys requires a minimum of 5 sq km of continuous evergreen forest, while a viable breeding population requires about 130 sq km of unbroken forest with a minimum of 33 troupes. Any destruction of their habitat in Silent Valley would be disastrous to these monkeys, which are obligate rain forest dwellers which cannot adapt to a new environment. They have been functioning in this particular ecological niche and are adapted to that particular ecosystem. The popular belief that once an animal habitat is destroyed the species will move into another one is not correct. The lion-tailed monkeys have a specific trophic status in the food web, and if forced to leave their natural habitat a chain of reactions would begin which would ultimately lead to their extinction.

The uniqueness of Silent Valley as the only vestige of a virgin forest in the Western Ghats of India has led many ecologists and conservationists to raise their voices against the construction of a hydroelectric project in this area. Both national and international organisations interested in nature conservation have drawn attention to the need to preserve it for the benefit of posterity. But it has been the efforts of the local people to save this forest that have been the most important.

Most of the people living in villages near Silent Valley are very poor and uneducated. They were led to believe that a hydro-electric project in the forest would solve most of their problems, providing job opportunities, more irrigation facilities and so forth. So they favoured the project. For them, it was more important to get food for their children than to preserve the forest for monkeys.

When the preliminary work on the dam was started, we who were concerned with nature conservation protested. But the government decided to continue the work. Then we sought help from other bodies outside Kerala and outside India. Conservationists came to Silent Valley and addressed the local people in many meetings. Unfortunately they could not feel the pulse of our poor village people. Some of them from the first world explained that forests are important as picnic spots, and in a meeting with school children one explained that only from forests can we get material to make ice-cream cups! Others emphasised
the importance of the gene pool. All this went over the heads of our villagers. They did not want to go on picnics. They did not want to conserve forests just for ice-cream cups—they had never tasted ice-cream in their lives. This type of conservation effort did more harm than good, and our villagers began to think that conservation of forests was only for the recreation of rich people.

We realised that without the help of the local population nothing could be done, and that therefore our first task should be to help them realise the importance of nature conservation. We formed the ‘Save Silent Valley Society’ which included people from all walks of life—doctors, engineers, professors, labourers and students. We went to our villages in small squads, met our people and tried our best to understand their problems. We explained the ill effects of deforestation, and selected examples from their daily life to illustrate this. We made short dramas, songs, dances and puppet shows with a conservation theme, and staged these not in established theatres but in busy market places, at roadsides and street corners. Slowly more and more people began to attend our meetings and many of them joined us. We helped the people realise that the preservation of Silent Valley had implications far beyond the requirements for preserving the monkeys. That was our real success. By the end of 1981 the entire population of the Palghat villages had rallied under the ‘Save Silent Valley’ banner. With the emergence of this popular mass movement, the government had to change its decision. Finally our Prime Minister, Indira Gandhi, took a personal interest in the issue and stopped work on the dam. A powerful committee was appointed whose recommendations are yet to be published. For the time being Silent Valley is free from the noise of developers and bulldozers. This is the first time in India that a movement of the common people has successfully fought for conservation and won.

Let Silent Valley be silent forever. Let not the bulldozers and cranes destroy the tranquillity of this cradle of evolution.
A Wilderness Concept for Europe

Franco Zunino

Brown bear of Abruzzo National Park; a symbol of the last wild nature in Europe

I had planned to speak about the wilderness I have experienced in the Gran Paradiso National Park and in alpine loneliness among peaks, glaciers and wide, silent valleys in which waters thunder and marmot screams echo. I had planned to speak about the ancient beech forests in Abruzzo National Park in the heart of Italy, and of their wonderful fauna; and in particular about the brown bear, wild symbol of a world that is being engulfed by machines, civilisation and mass tourism. The brown bear is now being expelled from the protected boundaries of the National Park to be exterminated by poachers. I had planned to speak of the message I understood one day when I first met this animal face-to-face. Wilderness was all around me then, in a little lonely valley at the edge of the wood, when a brown bear mother and her cubs appeared in a meadow yellow with flowering dandelions. In that place my mind enlarged because they were there, alive, with only silence surrounding us.

However, I will speak instead about philosophy, laws, problems,
roads and buildings. I will speak about how human beings move against wilderness and about how and why we should stop this. I do this so that others in the future will be able to see and feel in their hearts all that I have no time to express here.

Wilderness is not only a geographical feature or an environmental situation. It is also a state of mind, a psychological feeling of space that can differ from one individual to another; but it is always related to territories which foster an experience of human solitude and of intimacy with nature. Often it is not the actual extent of a space that gives us the feeling of wilderness. There are special morphological and environmental features that enlarge our horizons, allowing us a unique experience which tells us we are in touch with the wild. In Europe this is particularly important, because it allows us to find wilderness even in our over-developed and over-crowded countries. Even though much of the land bears the marks of thousands of years of human habitation, there are still certain coastlines, river gorges, valleys, mountain peaks and marshes that have the primaeval qualifications of wilderness. The impulse which compels us to seek and enter these areas is similar to that which compels American people to preserve and experience their wilderness, to discover their past in it, and to save critical habitats for the most threatened fauna.

In Europe we have lost much of the land from which the spirit of wilderness springs, and what is left is increasingly threatened. Past generations have tamed, forested, harrowed and urbanised the European lands, and have done so at the expense of those who today feel a spiritual need for the wild. They have also done so at the expense of the animals which need these lands for their very lives. Brown bear, wolf, lynx, ibex and big birds of prey now live only in the remnants of the European wilderness, and it is their last refuge. To compel these animals to live in mountains, woods or marshes broken by roads, houses and human developments which simply satisfy our desire for technological growth is to make slaves of them. For us that means losing forever the awareness of freedom and balance which these animals give us.

The ‘Wilderness Concept’ is a philosophy which sees human life in balance with the natural world around it. This balance is still psychologically within us, although it has almost no way to manifest itself today, like a seed which cannot grow without the proper ground. It is a philosophy of balanced use of natural resources based on the idea of creating an environmental heritage for posterity, and it entails imposing limits on human developments in order to preserve an everlasting space for nature and its wild creatures. If we in Europe wish to leave such a heritage for those who come after us, we must allow the spirit which moved in the USA and which resulted in the Wilderness Act to spread in us also.
Today only a few European countries, apart from those in the far north, can boast of having large areas of land which fit the Wilderness Concept. Most of these areas are generally not protected, but the very nature of their physical defences has until now kept their morphology uninjured and their unique solitude intact. However, if they are not protected, only a few will remain in years to come. Every year more roads, mountain shelters, electric lines, dams and ski-lifts are planned and built. Increasing tourism in natural areas is another pressing danger.

Even National Parks, Nature Reserves and other protected areas are injured every day. Frequently management agencies condone rash use of the environment through so-called ‘active conservation’, which alters the primary purpose of protected areas and often allows more economic considerations to prevail on conservation needs. In many of these areas, irrevocable options are open to whoever is managing them at the time. These managers may be influenced by local and transitory economic pressure coming from tourism, forestry or sheep-raising developments.

Even in the last ten years the natural environment in the European National Parks has decreased significantly. Laws misinterpreting the purpose of the Parks, incorrect management policy, lack of interest and management mistakes have all contributed to this. Viewpoints based purely on economic and tourism considerations often cause authorities to increase public use of the environment in a way that alters and degrades it, instead of limiting human use to a carrying capacity which allows for the preservation of the land and the continuity of our psychological ties with nature.

Many of the tenets of nature conservation, particularly in Europe, are based on economic, scientific and cultural needs of the present generation. But the Wilderness Concept calls upon us to look further than this, to our spiritual needs, which are durable and immutable. The need for peace and solitude in wild and free spaces is as old as civilisation itself.

Unless special measures are adopted, in a few years it will be impossible to speak of wilderness in Europe. The most dramatic ecological disaster in Europe today arises not from forest fires or pollution—which can be contained, although with considerable economic effort—but from the loss of the last areas that contain wilderness values. With their loss we will not only lose a priceless environmental heritage, but also cut the final umbilical cord with our past. Elsewhere in the world, conservationists still have some time to stop the encroachment of civilisation into the wilderness areas. In Europe, however, it is our generation which must act, and act now, on behalf of wilderness. If we do not, those succeeding us will have only a few faint memories of what Europe once was.

63
The recovery and restoration of European wilderness is imperative. A first step in this direction would be for the Council of Europe to promote an international Convention based on a specific definition of wilderness areas and including rules for their management and protection. This Convention, patterned on the US Wilderness Act, could induce European governments to promulgate laws to safeguard both protected and unprotected wild areas. Areas with unique wilderness features should form part of a European Wilderness Preservation System under sponsorship and moral control of the Council of Europe.

I would like to put forward proposals both for the definition of European Wilderness Areas and for rules to safeguard them.

Proposal for the Definition of a European Wilderness Area
To be classed as ‘Wilderness’, a natural environment area should have the following qualifications:
1. It must be uninhabited, with a wild and natural look. Generally speaking, its landscape and morphology should be uninjured. However, areas degraded by human interference could also be included provided they can restore themselves in the future.
2. It should not have any lasting or unalterable modern human structures; neither should it be crossed by roads unless these are unpaved and closed to car traffic, or due to be dismantled.
3. It must be large enough to give visitors a feeling of solitude, but its extent may change according to its morphology and environment.
4. It must generally conceal from the sight and hearing of visitors every sign and sound of human activities.
5. While previous conservation measures related to the area would be helpful, these would not be strictly necessary for its classification and protection as a Wilderness area.

Proposal for Rules to Safeguard European Wilderness Areas
1. No intervention upon woods, fauna and flora should be allowed in any designated Wilderness areas. Exploitation of fauna and other natural resources in non-designated wild areas should be rational and respectful of these rules.
2. No human works should be allowed, except for the restoration of old buildings for cultural or recreational purposes (or, in non-designated wild areas, for the building of temporary shelters and for forestry and sheep-raising purposes).
3. There should be no displacement of earth or deviation of waters, except for the restoration of previous landscapes or for the preservation of ancient unique environmental features (or, in non-designated wild areas, for forestry or sheep-raising activities).
4. No roads, trails or pathways should be opened, even on a temporary basis, to motorised vehicles, including engines employed in management of the area. Vehicles should also be forbidden off-road, even on water or snow.

5. Fly-over should be forbidden below a height of 1,000 metres, and landing by helicopters and aircraft should be forbidden.

6. The area should be kept in its most natural state, and managed in such a way that does not conflict with its environmental features and with the Wilderness Concept.

7. The number of visitors and the kinds of recreational use should be limited to a level that is in balance with the environment, and that guarantees people’s enjoyment of the peace and solitude that are the main features of wilderness.

8. Any deviation from these rules should be approved by the authority responsible for the designation of the Wilderness area, after hearing the opinions of the Council of Europe and of the main conservation organisations, both public and private, in the involved State.
Wilderness in the European Community

Anthony Fairclough

Coastlines could play a major part in new conservation legislation in EEC countries

The relationship of the European Community to wilderness is a difficult subject when, by definition, the Community is a common market dedicated to the removal of barriers to trade and movement and to the establishment of common policies in a few very practical fields—agriculture, transport, trade and so on. However, the questions raised in my mind are much the same as those being faced throughout the world.

What is wilderness? Is there any true wilderness left when, for example, PCBs can be traced in the body tissues of every penguin in the Antarctic? Is wilderness a positive or negative quality? Are we thinking of the beauty and harmony of vast tracts of land untouched by human beings or of the harsh and bitter places which rapidly destroy life and hope? Is wilderness only wilderness when people are not there or, if they have a place, what is it? And what sorts of people—only those who live in (and in harmony with) the wilderness areas, or is there room also for visitors to come and share the experience of wilderness on a temporary basis?
In reading the objectives, theme and purpose of this Congress, my mind was cast back—as far as the UK is concerned—to the Dower and Hobhouse Reports which laid the groundwork for the National Parks. Dower defined a National Park as "an extensive area of beautiful and relatively wild country in which (a) the characteristic landscape is strictly preserved, (b) access and facilities for public open-air enjoyment are amply provided, (c) wildlife and buildings and places of architectural and historical interest are suitably protected, while (d) established farming use is effectively maintained." Hobhouse recognised that "here are no vast expanses of virgin land...which can be set aside for public enjoyment or conservation of wild life...almost every acre of land is used in some degree for the economic needs of man and has its place in a complex design of agriculture, industrial or residential use." Even more important was his recognition that "since it is not possible to sterilise great tracts of land...it is all the more urgent to ensure that some at least of the extensive areas of beautiful and wild country in England and Wales are specially protected as part of the national heritage...."

These definitions already clearly saw the need to reconcile potentially competing uses of land. But they left unanswered the questions of how to achieve that reconciliation, what the priorities should be, and how to balance the various interests. And herein lies the problem.

The National Park Policies Review Committee (the Sandford Committee) tackled the question of reconciling conflicts. The designation of areas as National Parks was intended, inter alia, to exclude incompatible development; whilst as to conflicts between the two objectives of National Parks—the preservation and enhancement of natural beauty and the promotion of public enjoyment—the Committee had "no doubt that where the conflict between the two purposes, which has always been inherent, becomes acute, the first one must prevail in order that the beauty and ecological qualities of the national parks may be maintained."

More recently the Countryside Review Committee discussed what it called 'the conservation ethic' which, whilst acknowledging the necessity of accepting change, also seeks to minimise its adverse effects because of "a recognition that resources are limited and that we can no longer afford a careless, still less a profligate, approach to their use and enjoyment." Conservation must thus "be regarded as a key element in national thinking...no longer the icing on the cake...(but rather) something to be taken into account from the outset."

CRC went on to propose a two-tier system of designation of protected areas. This was not pursued, but it is interesting to note that, for the top tier, they were thinking of 'small areas of outstanding quality' where the purpose of designation would be the conservation of the environment and quiet enjoyment by the general public to the extent
Coastal sand dune systems have significant wilderness qualities: Findhorn dunes on the Moray coast, Scotland

compatible with this, and where there would be 'the strongest possible presumption against any development or other activity' in those areas likely to conflict with conservation.

This is all UK history, and I have spoken of it in some detail because similar conflicts have arisen in all the relatively densely populated and industrialised countries of the European Community, and a comparable evolution of thought has taken place. Everywhere, there has been a growing recognition that it is folly to neglect conservation and that, quite apart from the ethical arguments for the protection of wild life and wild places, people themselves have a need that they should not be destroyed.

The European Community's most recent Environmental Action Programme, adopted in February 1983, puts it this way: "The resources of the environment are the basis of but also constitute the limits to further economic and social development and the improvement of living conditions." For this reason it must be recognised that "environment policy is a structural policy which must be carried out without regard to the short-term fluctuations in cyclical conditions, in order to prevent natural resources from being seriously despoiled and to ensure that future development potential is not sacrificed." Thus, to "implement a preventive environmental protection policy in a full and effective manner, the Community should seek to integrate concern for the environment into the planning and development of certain economic activities as much as possible" thus leading to "a greater awareness of the environmental dimension, notably in the fields of
agriculture (including forestry and fisheries), energy, industry, transport and tourism."

What is involved here is the acceptance at Community level of the significance of the world-wide evolution of thought which has led to the recognition (highlighted by the World Conservation Strategy) that environmental needs and industrial, agricultural and other developments cannot be regarded as incompatible, and that a way must be found of reconciling them. The central point in the WCS is the clear acknowledgement that development and conservation are interdependent, and that to neglect conservation in fostering development is to live on capital rather than income, thereby diminishing the capacity of the environment to support future development. It also needs to be recognised that this is as true for the developed countries of the Community as it is for developing countries, which must be developed if the people are to escape from the margins of survival.

Let me say something about what action the Community has taken on the environment in fields of concern to this Congress. The Treaty of Rome said nothing about the environment: it was essentially aimed at the creation of a Common Market and at ensuring the free movement of goods and the avoidance of distortions of competition. But it also spoke of improving living standards and the quality of life, and so in 1972, when the Community's action programme on the environment was launched, it was based on both these strands.

As the guardian of the Treaty, the Commission's duty is to make proposals to harmonise action in individual Member States when it
considers them necessary in order to achieve both these objectives. A good deal of action has followed the adoption in 1973 of the First Environmental Action Programme—most of it by way of the adoption of legislation, and mostly concerned with pollution control.

In addition, numerous studies are being undertaken, information exchanged and disseminated, and cataloguing carried out. In the field of land management and nature protection, this type of activity—rather than legislation—has, to date, predominated. One reason for this is the view that harmonisation at Community level should be proposed only when necessary, and that in many fields—land management amongst them—the national or even local levels are more appropriate for action than the Community level.

Even though priority was initially given to pollution control (essentially to protect human health), the Community environmental legislative measures that have been adopted—some 70 in all since 1973—have almost all had indirect effects that benefit wildlife and the natural environment generally.

Increasingly a preventive approach has come to be seen as crucial in appropriate environmental action. To this end—to quote the latest Action Programme—"environment impact assessment is the prime instrument for ensuring that environmental data is taken into account in the decision-making process. It should be gradually introduced into the planning and preparation of all forms of human activity likely to have a significant effect on the environment."

To achieve this, there are two basic requirements. The first is a change of attitude on the part of decision-makers at all levels, both in the Community as such and in Member States, and a recognition that 'cutting environmental corners' for short-term gains is a false economy which will lead not only to unacceptable environmental damage but also in the medium and longer term to greatly increased costs; and, associated with this recognition, the development of appropriate environmental awareness at all levels of management.

The second is the establishment of regular procedures for the advance assessment of the environmental impact of proposed developments so as to ensure, before decisions are taken, that developments are acceptable environmentally. This also implies a readiness to change proposals to ensure compatibility with the environment and an acceptance of the fact that the costs of necessary environmental protective measures (or even of associated positive measures to promote conservation or environmental improvement) should be accepted as an appropriate part of the costs of the developments themselves.

A draft Directive concerning prior environmental impact assessment of major projects likely to have an impact has been under discussion by the Community's Council of Ministers for some time. Such a Directive
would require Member States to adopt certain procedures. There is also a need for the Community's own policies and actions to respect environmental requirements including, in appropriate cases, the use of prior impact assessments. I think in particular of the Common Agricultural Policy and the Less Favoured Areas Directive, about which there has been concern in Britain. The Commission as a whole is committed by the preventive approach adopted in the Third Environmental Action Programme, and by the commitment to integrate environmental requirements into policy in other fields. When the Commission's proposals on agricultural structures are published, I hope it will be felt that environmental needs have satisfactorily been built in.

So far I have addressed the question of preventing damage occurring. But there are also much more positive aspects to the Community's work to date in the environmental and conservation fields.

For instance, the Birds Directive prohibited the killing and capturing of wild birds, the taking of their eggs and their deliberate disturbance, etc. It also, with a view to the protection of habitat, required Member States to classify the most suitable sites 'as special protection areas for the conservation' of the species concerned, and asked them to notify the Commission of the special protection areas designated, as well as of areas which they had designated (or intended to designate) as internationally important wetlands. Since then a major study has been prepared for the Commission, and published, on important bird areas in the Community.

Important studies have also been undertaken of coastal zones and mountainous areas. The object of these studies has been to examine the nature of the pressures facing these areas, and to define principles which would permit necessary development whilst maintaining environmental quality.

The Commission has also undertaken the classification of protected areas. This study, which was completed a few years ago, attempted to define a common language to assist in distinguishing between different types of protected zones on a compatible basis in the different Member States, despite wide differences in terminology and definitions. Such a common language could be of considerable practical importance in a number of fields—not least in relation to possible Community financial support.

The designation of protected zones started in most countries with the protection of those which were rare or considered to be of scientific interest. But the differences from country to country (and often from region to region) in population density, economic activity, land use and natural conditions, as well as in the social attitudes towards nature, have resulted in a mosaic of types of protected zones differing (sometimes greatly) from one member country to another. Our study on 'Protected Areas in the European Community' therefore looked
first at the different types of protected zones existing in the EEC Member States. This inventory made it clear that zones with the same name can cover very different realities, and that zones fulfilling the same function can have different names.

These differences in typology and definition have obvious disadvantages for international cooperation in the field of wildlife. For example, if different countries agree to protect biotopes of migratory species—say birds—it is not enough to know that the biotopes will be classified as 'Reserves'. It is necessary to be sure that these biotopes will receive the same degree of protection in reality. Many attempts have therefore been made to establish widely accepted definitions and criteria, especially by the Council of Europe and the International Union for the Conservation of Nature and Natural Resources (IUCN).

Our study has reviewed the results obtained at international level. On this basis, in cooperation with the IUCN and Council of Europe, we have developed a classification system fully compatible with existing systems but which better meets the specific situation of the European Community. The system distinguishes eight types of zones: Strict Nature Reserve; Nature Reserve; National Park; Protected Natural or Semi-Natural Landscape; Protected Cultivated Landscape; Protected Cultural Monument and Natural Features; Specific Protected Areas; and Green Belt. For each of these categories the system describes the type of area and the reasons for protection, the form of protection and management, and the use of the area.

Another activity undertaken by the Commission is the 'Ecological Mapping' project. This had its origins in suggestions made by the Italian government and was launched by the Council of Ministers in 1974. Its aim was to develop a method, based on cartography, of mapping together environmentally related data and values, economic and social demands, and basic physical characteristics. The idea is to provide another 'common language', and to lead to the development of methodologies for establishing a European information system on the state of the environment related to other relevant characteristics.

In the course of the project's development, initial ideas have been modified and the system will now aim, in general, at bringing together information either already existing or readily derived from existing data about the environment. This could be particularly important in assisting the Community by providing good information on the environmental characteristics of zones where Community actions (eg under the Regional Development Fund) were contemplated. We hope to make proposals to the Council very shortly for the next steps in the development of this important information system.

Given that the Community is an economic one, another area of important action is that which has been taken in relation to trade in threatened species. Perhaps the most important is the implementation,
by way of a Regulation, of the Washington Convention on Trade in Endangered Species. The Regulation will enter into force in January 1984, and will provide for much stricter protection of the species covered by the Convention than by the provisions of the Convention itself. The Regulation will also cover all Member States not yet parties to the Convention, i.e., Belgium, Greece, Ireland, Luxembourg and The Netherlands. In this field, I should also mention the 1982 ban on whale products (which will be absorbed by the application of the CITES Regulation) and the Directive adopted in 1983 requiring Member States to take steps to prevent the import of baby seal skins and products. The Community has also become a party to the Berne Convention on the conservation of European wildlife and natural habitats, and will shortly become a party to the Bonn Convention on migratory species. It has also signed the protocol of the Convention of Barcelona relating to specially protected areas of the Mediterranean Sea.

The Community has done a good deal to contribute to conservation and the protection of wilderness, but more is certainly needed. One hopeful note is that in 1982 the European Parliament for the first time voted money in its budget for actions of an environmental nature. The scale of financial provision is small, and no decisions have yet been taken on a Community Regulation to control the future use of such funds. But by 1982 there were already a number of descriptive analyses defining projects to be carried out. Also, to illustrate what can be achieved, there has been action to restore a salt water lagoon destroyed by the building of a dike (Denmark); the restoration of a wetland threatened by the indirect effects of surrounding drainage (Germany); development contracts with local authorities in France resulting in the commitment of these authorities to maintain publicly owned land as extensive grazing areas; and the monitoring of the environmental effects of an integrated development programme (Great Britain, Western Isles).

The future is unknown. But the Community’s commitment to conservation, to the wise and sensitive management of all natural resources, and to the progressive integration of environmental needs into the decision-taking processes in all fields, is clear. That is perhaps the best long-term guarantee that, within the framework of the Treaty of Rome and of the Environmental Action Programme, the European Community will continue to make its contribution to conservation and to the protection of wilderness.
Evolution of the Wilderness Concept in the US

John Block

A trail maintenance crew on route with pack animals: Glacier Peak Wilderness, Washington State, USA.

To discuss wilderness in the realities of our present-day age it is necessary first to gain an appreciation of its historical significance. Wilderness is the arena in which the civilisations of humankind have slowly been shaped. For thousands of years, we challenged the forces of nature, seeing them as the enemy. But as we began to understand them and to work with and around nature, they became less of an enemy.

The benevolent idea of wilderness first came to life in the minds of poets and philosophers centuries ago, eventually taking on the aura of heritage. In 1905, this heritage concept began to develop as national policy in the United States. Forest reserves, which had earlier been set aside by Congress, became national forests, and the US Forest Service was established in the Department of Agriculture. The National Park Service and the US Fish and Wildlife Refuge System were set up as part of the Department of the Interior in 1916 and in the 1930s respectively. These three agencies were all later to play prominent roles in designating and managing wilderness areas.
The idea for a special designation of 'wilderness' came when two Forest Service employees suggested that certain areas be set aside away from the threat of roads and vehicles and any forms of developed recreation. In the next couple of decades, other areas were added to the wilderness list.

In the 1950s, a citizen organisation called the Wilderness Society, along with other support from inside and outside government, concluded that areas designated as wilderness by administrative action could be un-designated in the same way. They urged statutory designation of the areas. With the nation standing on the threshold of a great period of industrial growth after World War II, this idea of 'locking up' vast natural resources was not universally embraced. It took eight years of discussion, debate and hearings before the Wilderness Act of 1964 was passed. The purpose of this landmark legislation was "to assure that increasing population, accompanied by expanding settlement and growing mechanisation, does not occupy and modify all areas within the US."

Considering the conflict in which the new law was forged, some compromises had to be made in developing the legislation. Grazing, mineral exploitation, oil and gas leasing, and some previously established uses were allowed to continue, at least for a time.

The nucleus of the new wilderness system was already in place in the National Forests. Some 9.1 million acres (over 3.5 million ha) of this land were instantly proclaimed part of the system. Directions were also given for study of other National Forest areas, plus areas under the National Park Service and the Fish and Wildlife Service, with a view toward recommending these areas for possible addition to the wilderness system.

Since 1964, Congress has designated many additions to the system. The current 264 designated wildernesses encompass 80 million acres (over 32 million ha) of Federal land, almost 3½% of the surface area of the US. Some 56 million acres (22.4 million ha), roughly 70% of the system, are in Alaska. Under a 1976 law, the Department of the Interior's Bureau of Land Management is studying the land it administers for the purpose of recommending to Congress some additions to the wilderness system.

Growth of the wilderness system continues—and so does the debate. There is strong controversy about proposals to make further additions to wilderness from the National Forests. The land base designated as wilderness in the US is larger than many countries of the world, and some consider the designation of so much wilderness as prodigal, stemming from an embarrassment of riches.

However, there is more validity and importance to the action than that. We are learning lessons that will be of value not only to us, but to the international community.
Wilderness is relatively independent of human influences, generally uncultivated and uninhabited, and shaped only by the interactions of air on water, water on soil, soil on plant and animal. All are dependent on each other in a mix of constant natural change. We use wilderness for scientific, educational and recreational purposes, but do not modify it. Therefore, it has a special value as a scientific yardstick and possibly as a gene pool. It is useful to be able to compare modified environments with those perpetuated in near-natural condition. Quantities of data, valuable to the scientist and no longer available elsewhere, are likely to be contained in these wildland resources. Wilderness areas can serve as benchmarks against which we can model and predict favourable and adverse impacts of developmental works on non-wilderness land elsewhere.

A second and more subtle value of wilderness is sociological. In wilderness, people can, if they wish, isolate themselves from human activity. For most people, wilderness is probably simply a magnificent natural arena for rest and recreation away from the pressures of society.

Wilderness is not a concept which is universally embraced. Many people perceive it in the same context as art and music—nice, but not absolutely necessary. Others are indifferent to it.

Many who acknowledge and appreciate the wilderness concept still question how much is needed or can be afforded, especially in view of the obvious uses to which land can be put. For instance, the US today is not self-sufficient in oil, nor is it richly endowed with certain rare minerals critical to implementing modern technology applicable particularly to national defence. Deposits of oil or of critically rare minerals may exist in already designated wilderness areas. But so long as these areas are closed to exploration, we will never know. And although the Wilderness Act authorises mineral surveys by the US Geological Survey, an agency in the Department of the Interior, adequate funding to conduct such exploration is most unlikely.

These concerns have been expressed in the decades of debate over the issue, and will be questioned even more sharply as other countries consider establishing wilderness systems. Many nations are struggling desperately to provide the basic needs of food, fuel, clothing and shelter. These are all products of the land, and must be served first. However, a key consideration in acceptance of wilderness is that the wilderness resource is enduring. If situations change—if needs for food, fibre, minerals and fuel become so overwhelming they cannot be met by the land available—wilderness will still be there as a last resort. Meanwhile, we will be prompted to do a better job of managing other land resources, so as to avoid having to invade the wilderness.

The continuing debate over wilderness in the US is now focused on two matters: how much wilderness is enough, and what management practices should be followed in retaining the qualities of the designated
wilderness areas? The issue of designating more wilderness arises because of the continued existence of rather large roadless areas. There are also numerous proposals to designate wilderness in areas which have returned to a natural state after initial disturbances for logging, ranching or even farming.

As far as already designated wilderness areas are concerned, experience has shown that these need management, even though the term ‘wilderness’ and ‘management’ may appear to be contradictory. One management problem is that of protecting wilderness areas from the very people for whom they were set aside. With the growing popularity of wilderness for recreation, some places have been so heavily used they are in danger of being loved to death, particularly in areas near large population centres. As a result, Federal land managers in some areas have had to institute permit systems and other controls, such as limitations on group sizes, length of stays and use of certain overworked camping sites. Such measures are instituted only as necessary, and land managers are finding they can minimise this necessity through public education, encouraging wilderness visitors to leave few traces of their presence.

Another management challenge, and also cause for national debate, is the role of fire. For thousands of years fire has been part of wilderness, and is not always a destructive force. Complete control of wildfire in wilderness has in fact caused some unnatural conditions, such as buildup of downed trees and other forest debris. This could be the source of extensive destruction if uncontrollable fires or insect and disease epidemics break out. Researchers and managers are consequently studying areas where fire has been a significant natural influence, with the objective of determining the effects of planned or naturally-caused fires burning under controlled conditions.

We in the US are proud of our wilderness system, and thankful to have a legacy of our nation’s natural heritage. This legacy is one that can be enjoyed and used today, and then passed on to future generations. With balance and planning, the system is working. Its creation was not easy, but its success may provide an example to other countries in devising similar systems suited to their own resources, needs and desires. We now have a body of experience and knowledge that can help other nations in their efforts.

There is nothing finer to pass on to future millions than the rich heritage of well-managed natural resources. It is a worldwide legacy of resource use which includes food, fibre, wildlife, quality water—and wilderness. It will be tangible proof that we cared for them too.
Working to Conserve Wild America: The Wilderness Movement in the US

Sally Ranney

Wildlands in Alaska have been the focus for tremendous achievements in the effort to conserve North American wilderness.

There is an enduring conceptual eloquence about wilderness. It speaks to us in a panoply of paradigms. It consistently demands definition of the subtle differences between intellect and intuition, awe and fear, reality, real intangibles and the intangible. It ignites a very gut-level, primaeval passion in our hearts and stirs longings and fantasies that are beyond, as some would say, the King's English.

Yet, as author Roderick Nash stated in *The Future of Wilderness: Need for a Philosophy*, we stand "quite plainly on the edge of decision about wilderness as a factor of significance in human culture and natural process. . . . The 15,000 year effort of man to modify and control nature is amazingly complete. . . . As 500 years of continued technological transformation of the planet concludes, the debate is on... joined by scholars, policy makers and the public about the long-term future of wild in an ever-increasing synthetic environment." And, thank God, that debate is now joined by theologians.

Within contemporary political, cultural, social and economic contexts, wilderness increasingly represents critical choice. This choice is not only confined to the question of whether or not to protect wild
country, but also, and more importantly, it involves the question of our very survival, for it deals with the essentials to existence itself.

The challenge of choice, of alternatives that wilderness represents, is a challenge to our individual and collective wisdom, to our imagination, intelligence, foresight and sense of history. It is a challenge to recognise our inescapable linkage in the fragile fabric of ecosystem diversity; a challenge to consciously acknowledge the value of wilderness.

Environmentalism is an enigma on the list of social consciousnesses and political actions. Previous significant social movements—for example, suffrage, civil rights, labour, women’s liberation and even political independence—all dealt with the human condition apart and separate from the genuine meaning of a quality existence, even the true sense of survival. All derived from and evolved around concerns for human interactions with other humans. While their achievements have been significant, they have not addressed the primary relationship of human beings with their natural environment, their very source. All else is really of secondary importance. As Aldo Leopold, one of the fathers of the land ethic and American conservation, put it: “The shallow-minded modern who has lost his rootage in the land assumes that he has already discovered what is important.”

Wilderness advocates and environmentalists in America have been accused of being anti-growth, anti-construction, anti-water development, anti-progress, anti-high rise, anti-low rise, anti-pollution, anti-pesticides and, of course, anti-American—but pro-bug, pro-tepee, pro-wooden wheeled bicycle, pro-cave. We have been labelled as the men with ear-rings and the women with hair under their arms who are always looking cross-eyed at developers and industry.

As we became more sophisticated, more politically savvy, articulate and effective, we were then characterised as the ‘hired guns’—those hired to cause trouble, raise money, squash or start rumours (depending on what was appropriate at the time) and to whip both pro and con constituencies of an issue into shape.

It is difficult to separate the wilderness component from what is now a many-faceted environmental movement. To distill its origins is even more elusive, yet nevertheless important.

The early and noteworthy American conservationists and authors, Henry Thoreau, John Muir and Aldo Leopold, were responsible for the conceptual architecture of the American conservation effort. But awareness of the natural environment and the permanent value of its integrity did not begin with them. Its roots are deeper and less definable.

It really began with the shamans, the medicine men who were the spiritual forebears of today’s environmental consciousness. They knew where humankind’s life came from, its substance and how it was
sustained. They knew the heart of being in one relationship and in harmony with the Earth, and had a sense of their place and purpose in the universe.

This knowledge came from a life in and of the wilderness. Values were shaped by ancestral bonds to the land and caring for that source. This approach, however, was rudely riddled by white settlers pressing ever deeper into the wild part of the country, toting with them a distorted sense of the ‘American Dream’ of riches, land, homes and highways paved with gold. They were unaware of the cultural heritage in the wilderness. Americans became independent, self-reliant, ingenious and tough because of their contact with wilderness, but they saw it as something to be conquered, to be lived separate from. It was there to be hoed, burned, cut, built on, settled, roaded, used, stripped, tamed and subdued. America’s wild country began to diminish at an alarming rate, and the qualities of the land that had developed the American character increasingly disappeared.

However, it was this American character which built our particular brand of democracy and which established the United States as the most successful goods-producing country in the world. The new entrepreneurial breed flourished over the last 200 years, but, in keeping with the law of balance, a critical counterpoint developed in the hallmark works of Thoreau, Muir, Arthur Carhart and others. They eloquently shared the essence of what the shamans knew, blending their observations and feelings about the natural world, so that the modern intellect could grasp and understand what was being lost: the ethics of land stewardship.

The initial impact of this philosophy led to the establishment of New York City’s Central Park in 1857. But what had more significant national impact was the setting aside of Yellowstone as a National Park in 1872. The idea of government withdrawing land from settlement, and of protecting a resource of this magnitude for the value of its wildness, scenic wonder and ecological significance, was revolutionary.

In 1880, two more parks were established, Yosemite and Sequoia, and this began the National Park System which now comprises over 60 million acres.

In the early years of this century, President Roosevelt, along with Gifford Pincho, developed the idea of forest preserves which later became our National Forest System of over 190 million acres. In 1924 the first wilderness area was established in the still bandit-ridden country of New Mexico and named in memory of Aldo Leopold. Efforts to protect forests were accelerating.

In the mid-1920s a remarkable man, Robert Marshall, then a Forester with the US Forest Service, was hiking and mapping hundreds of thousands of acres of what was then called ‘the country beyond the roads’. Stationed in Montana, he worked his way into most of the wild
country of the West and Alaska. Marshall felt it imperative to inventory what was wild for the purpose of protecting it for future generations. In his short life of 38 years, he saw more wildlands and walked more miles than an average person would in ten lifetimes. He quickly became the most powerful voice for wilderness in public and political arenas. More than any other single person in American history, he influenced the future of ‘wild’ in our culture because he directly or indirectly impacted wilderness decisions both of his day and of the future on administrative, management and political levels. As a consequence of his efforts, the Forest Service formally reported in 1926 that it had some 79 roadless areas, each of 230,000 acres or more, and comprising a total of 55 million acres. The largest single tract was seven million acres in the state of Idaho in the Rocky Mountains.

Four years before his death, Marshall and a handful of like-minded individuals founded what is now known as the Wilderness Society, whose sole purpose was to work for the preservation of wilderness. Other organisations were also developing, including the Sierra Club, now one of the largest and strongest conservation groups in the States.

However, America was still suffering from what Nash calls ‘frontier hangover’. We were still rolling back the edges of untouched country under pavement and polyester. Rumblings of the ‘All American Dream’ became a roar. As we emerged from World War II, our economy was booming. We embarked upon three decades of a ‘buy it, sell it, trade it, release it, drill it, dig it, pawn it, strip it, flood it, manipulate it and dam(n) it’ philosophy which put the ‘classic’ American Dream into a twilight zone, hazy with uncertainties about the future of our natural resources and consequently our economy.

To the horror of many, and the delight of others, the dream of owning one’s own home, two cars, a vacation cottage, a boat and a large quantity of unnecessary paraphernalia to make life supposedly easier, along with the ‘get rich quick’ theme of the first half of the century, began to go through a transformation. The basis upon which the dream was predicated—accessibility and availability of unlimited natural resources—was invalid, and it could no longer be sustained.

This transformation of the ‘classic’ American dream into what I believe is a more lucid one has been fostered, promoted and nourished by a wave of awareness and caring that began with a small number of visionaries with their hearts and heritage in wildness. It has been carried forward by contemporary wilderness advocates like Sigurd Olson, Olaus and Mardy Murie, Howard Zahniser, Joseph Krutch, David Brower and others. Their vision and commitment has infiltrated and nudged the American public as well as the whole of the environmental movement.

Once the seeds of alarm about our destructive course had been planted, it did not take long for individuals here and there to come in
contact with others with the same concerns. As these seeds grew, ‘roots’ developed and networks formed. As the ‘roots’ spread, the concerns expanded from wild country protection to air, water, toxic substances and threatened species. The ‘roots’ became stronger, more resolute, thicker-skinned and decidedly more articulate.

This networking of people all over the country who were ready to stand up for the protection of their one and only habitat was named ‘grassroots’. As committed people came in touch with each other, they organised their efforts and discovered their power to effect change in an elective, pluralistic system.

There is a very large degree of public support for environmentalism and wilderness conservation. But the real test comes when decisions are to be made at the political level—in the town council, the county commission, state government or Congress. The immediate translation is in the action of our elected officials. The ultimate translation is not, however, in politics, but in the lives of individuals...in concrete, on-the-ground changes which reflect evolved awareness. Consciousness or awareness that survives comes about through education, actual restructuring and re-thinking, not through propaganda or crisis management. ‘I hear, I forget; I see, I remember; I do, I understand’ seems to be the most effective rule to remember when creating change.

In the late 60s and early 70s the environmentalist movement began a change in modus operandi, promoting a return to self-restraint, less waste and more regard for the Earth’s finite resources. We buckled down, read Rules for Radicals and tooled up with the facts. The movement baffled politicians because it was based on common sense—and a humility which recognises the value and interrelationship of all things. The American public began to recognise that perhaps it was time to live a new dream, one that acknowledged both sides of the equation: action = consequence.

In 1964 the Wilderness Act was passed, establishing our National Wilderness Preservation System and legislating enduring security for wildness in America. For the first time, legislation mandated public involvement and solicited public participation in a land allocation decision. Uses incompatible with wilderness values were prohibited or restricted, such as the cutting of timber, building roads, use of vehicles and, within a given time frame, mineral exploration. Hunting continued to be allowed.

Before passage, a series of public hearings were held throughout the country. Dr. Ed Zahniser, then Executive Director of the Wilderness Society, said the wilderness legislation in itself indicated “that an increasing population accompanied by expanding settlement and growing mechanisation, was destined to occupy all areas within the United States and its possession except those areas that are designated for the preservation and protection of their natural condition.”

The Grand Canyon, with Colorado River flowing at the bottom, presents one of the most complete exposed geological records on Earth.
This was quickly becoming the case. When the Forest Service reviewed its roadless lands in 1961, there were only 19 areas of 230,000 acres or more, compared with 79 in 1926. The total area had dropped from 55 million to 17 million acres, and the largest tract had shrivelled from 7 million to 2.5 million acres. With larger areas becoming more scarce, the rule of measure was changed to 100,000 acres or more.

Americans were staggered by the loss. It was apparent that a national policy for wilderness preservation was needed. The Wilderness Act of 1964 established 9.1 million acres in 54 areas as protected areas. Today, the National Wilderness Preservation System includes 79 million acres in over 260 areas.

Passage of this historic legislation gave an infusion of energy and resolve to environmentalism. However, many wilderness proponents were looking primarily at preserving areas within National Parks, National Wildlife Refuges or designated Forest Service Primitive Areas. Few recognised that millions of acres of de facto wilderness, primarily in the West, were the real opportunity.

Two more roadless area reviews within the past twelve years have made that opportunity very clear. After refined analysis and individual legislative measures in various states, there still remain some 40 million acres of Forest Service lands that will either be preserved or 'released' to uses which will destroy the wilderness values. The pressure is on to have the debate resolved. There is also another possible approximate 50 million acres of Bureau of Land Management lands which could be added to the System. These decisions will be made in the political theatre in the next two to seven years.

With the challenge so dramatically magnified, it became imperative to stimulate organised local wilderness committees to affect local politicians and Congressional representatives. In the years following the passage of the Wilderness Act, American environmentalism came of age. The Environmental Protection Agency estimates there are now some 12,000 environmental groups in the United States with a combined membership, not including overlap, of six to ten million. Concerns of these organisations range from solar energy, toxic wastes, mass transit, wilderness, wildlife, parks, clean air, energy conservation, consumer rights, agricultural preservation, less consumption, alternative lifestyle systems and nuclear disarmament.

Collectively we celebrated sterling victories like the National Environmental Policy Act which established our environmental impact review process, the Wilderness Act, the Wild and Scenic Rivers Act, getting solar tax credits in place, the Resource Conservation Recovery Act, Land and Water Conservation Fund Act, arrival of the photovoltaic cell (although still not economically competitive) and cancellation of several nuclear reactors.
We were sickened by the devastating blows of such losses as Glen Canyon, the upper reaches of the Grand Canyon which were flooded by a dam that still has questionable benefits; the slaughter of whales; the Three Mile Island nuclear reactor accident; oil spills; the great 'terrain' robbery—destruction of thousands of acres of wetlands, farmlands and prime wildlands and forests; the quickening pace of the loss of species and the insidious effects of herbicides and pesticides.

We pushed hard, and succeeded in getting legislation in place to protect endangered species and to control water pollution and, to some degree, toxic substances. The pinnacle of our increasingly professional approach came with the passage of the Alaska Lands Conservation Act, which not only established approximately 100 million acres of wilderness, wildlife refuges, national parks and wild and scenic rivers, but also designated areas by topographic and hydrographic boundaries rather than arbitrary section lines. Watersheds and ecosystems were protected in their entirety.

However, there have been dark passages too, such as certain administrations and tough economic times. But because we have been 'number two', we try harder. We have become very adept at coalition building, one of the keys to our success. Agency and government receptiveness to environmental concerns has been a direct result of this kind of organised, informed public pressure. Persistent and informed citizen activity succeeded in getting wilderness acknowledged as a multiple vs a single use concept, and in getting the areas we have in the System today in place. But every inch, every acre, watershed, stream, lake, mountain, desert, forest and canyon has been hard fought for.

Why will we not compromise? It is because only 300 years ago, 100% of the country was wilderness. Today only 3½% is legally protected in the Wilderness System, with only another 10½% estimated to remain in a wilderness condition. That means approximately 87% has been either altered or destroyed. If we were bankers managing a client's principal financial resources and allowed such losses, we would be charged with criminal misconduct.

Our current challenges are many. The Wilderness System has been under attack by the current administration and a contingent of members of Congress who propose to 'release' millions of acres of potential wilderness lands from any further consideration for protection within the Wilderness System. This would condemn qualified areas to other uses that most probably will significantly alter or destroy those values needing protection. Environmental policies and regulations that were carefully constructed to ensure environmental protection are in danger of being dismantled or weakened and a constant vigilance on the part of the citizen organisations is essential.

Wilderness management is receiving more attention from both conservationists and government agencies, who are working to develop
management schemes integrated with current research and that address recreational and non-recreational use as related to both the biophysical and social uses of wilderness.

Another opportunity available to conservationists is Wild and Scenic Rivers. Our Wild and Scenic Rivers Act created a National Wild and Scenic Rivers System. Recent nationwide inventories reveal that of some 300,000 miles of river, approximately 65,000 miles are still free-flowing and could qualify under the requirements of the System.

I have been professionally involved in conservation for 15 years, and in that time I have seen the movement evolve and become more sophisticated. On some levels it has been bureaucratic, and on others extremely innovative and creative. I have seen people of commitment carry the cause forward when morale and financial resources were down. Our objective has become to imbue the nation and the world with an environmental ethic.

"Wilderness needs no defence, only more defenders," my friend, author Edward Addey said. America’s wilderness conservationists are committed to using every sensibility, every internal and external resource, every talent available to preserve what remains of Wild America. We recognise that turning the other cheek on this one, or losing heart at this stage, would be like a stamp of approval for letting it all go and being too apathetic to care. We are part of a bloodless, backyard revolution—and we had best never forget it, nor let down our guard for a moment.
Conservation and Management of American Wilderness Areas

Ray Arnett

Wild horses, while beautiful and free, pose a serious threat to many fragile ecosystems

"We need the tonic of Wilderness," Henry David Thoreau wrote in Walden in 1854. One hundred years later the United States Congress agreed with the spirit of Thoreau's sentiment and passed the Wilderness Act of 1964. Thus began a brave new era in the history of American natural resource conservation, an era now entering one of its most interesting and challenging phases.

This landmark legislation assigned the land managing agencies of the Federal Government the difficult task of identifying and protecting unique and essentially unspoiled wilderness areas. These are what could be called 'capital W' Wilderness areas, places "where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain." They were to offer latter-day Thoreaus what the Act termed "outstanding opportunities for solitude or a primitive unconfined type of recreation."

The Wilderness Act codified a gradual, but ultimately massive, reversal of American opinion about the value of wilderness. Prior to the mid-19th century, wilderness was seen by most as hostile territory, something to be subdued and settled before it could be of benefit to civilised human beings. The passing of the American frontier, however, kindled a new, more benign attitude wherein wilderness
came increasingly to be valued for its own intrinsic merits of beauty, naturalness and wildness.

Wilderness untamed became a subject for poets and philosophers. Conservation of wildlife and wild places became government policy with establishment of parks, refuges and national forests around the turn of the century. A wilderness movement was spawned and has become international in scope. Its penultimate expression in the United States may have been the Wilderness Act.

The Act presented Federal land managers with two stiff challenges: first, to identify and recommend to Congress bona fide wilderness areas from those lands already managed by the Federal Government; and second, to manage these areas for their perpetual preservation in as pristine a condition as when they were designated.

The task was and is enormous. The US government is the nation’s largest landlord, owning 750 million acres or one-third of the country’s land mass. Within this domain, managers were to seek out lands in excess of 5,000 acres that possessed three broadly defined wilderness characteristics: naturalness; the opportunity for solitude and primitive recreation; and special features such as ecological, geological, scenic or historic uniqueness.

In the 19 years since passage of the Act, the wilderness study process has entailed hundreds of thousands of working hours, countless public meetings and hearings, and millions of pages of reports. The result of this enormous labour is a Wilderness Preservation System totalling 80 million acres. In addition, over 20 million acres remain in study status but must be managed as ‘capital W’ Wilderness until Congress decides their fate.

The Wilderness study process has been far from painless and, although slowed, is far from complete. But increasingly the focus of land managers has shifted to the question of how best to manage the designated areas in a manner that satisfies the mandates of the law and, at the same time, honours the ‘visitation’ rights of wilderness-hungry citizens in a highly mobile society.

This is a question we are grappling with at the Department of the Interior, where I serve as Assistant Secretary for Fish and Wildlife and Parks. It is also a question of importance to those responsible for managing wilderness-type preserves elsewhere on this shrinking planet.

The 334 National Park Service units and 417 US Fish and Wildlife Service units for which I am responsible encompass 167 million acres of land set aside for conservation, recreation and wildlife purposes. Of this total, over 54 million acres, or nearly one-third, is now being managed as wilderness. An additional 25 million acres has been designated wilderness in Forest Service areas.

Wilderness areas are places where people must leave behind no sign
of their passing. This means, primarily, no roads, no water systems, no toilet facilities, no mining, no drilling, no timber harvesting and no use of motorised equipment. Trees that fall on trails cannot be removed with chainsaws as in other areas.

These proscriptions seemingly have done little to diminish people’s appetite for wilderness experiences. Mount McKinley in Alaska, our highest peak, is one example. Ten years ago only about 25,000 visits were recorded in a good year. Today, transportation into the area has improved to the point that an apartment dweller in New York City can leave home tonight and reach the slopes of McKinley tomorrow. In 1980, the park recorded nearly 300,000 visits, a ten-fold increase in a decade. The same story is recorded in steadily increasing annual park and refuge visitor counts around the nation. It is as if all of America has decided to put on hiking boots, hoist rucksacks to their backs and head for the mountains.

Little wonder so many observers worry we are in danger of loving our wilderness to death. Compounding the problem is the conflict over recreation rights that often attends wilderness designation. Everybody seemingly has their own idea of what wilderness is and how it should be used. One purist hiker in the Pecos Wilderness in New Mexico, for example, became so enraged when he encountered another individual walking a dog on the same trail that he slit the poor dog’s throat.

In the Boundary Water Canoe Area, located along Minnesota’s border with Canada, local residents still object vociferously to the large-scale ban on use of motorised boats to reach distant fishing areas in this lake-dotted area. Similarly, efforts by the Park Service to phase out motorised rafting down the Colorado River in the Grand Canyon resulted in an uproar that led to the plan being scuttled by Congress.

Even more disturbing for wilderness managers are the growing numbers of marauding pot hunters who pilfer artifacts from remote cultural sites, pot growers who cultivate their illegal but lucrative crops in the wilderness, and even ‘survivalists’ who occasionally use these lands to practise military tactics as they prepare for Armageddon.

Managing this near tidal wave of human activity on and about our conservation and wilderness areas is testing the expertise of our resource managers in ways not even dreamed of 20 years ago. Slowly we are coming to realise these areas must be the subject of active and even aggressive management strategies and continual resource monitoring if their resources are to be protected as the law intended.

There is no doubt that the notion of ‘managing’ a wilderness would seem wholly contradictory to some of the Act’s original partisans nearly 20 years ago. Even today, several groups in the United States would publicly decry such a concept.

However, I believe we have arrived at an era in resource management wherein most of the principal advocates and administrators of
wilderness agree that effective human management is absolutely essential if our designated wilderness areas are to retain the attraction and the intrinsic worth that has made them so popular. The challenge to both the manager and the wilderness enthusiast alike is this: how do we reconcile the altruism of the 1964 Act’s language with the current demand for legitimate wilderness uses?

Some examples of how US land managers are responding are:

- Wilderness areas within Cumberland Island National Seashore, a National Park Service unit in Georgia, are being damaged by a deer herd that, under protection, has outgrown the carrying capacity of its habitat. To solve this problem, the Park Service has proposed a controlled hunt this year. More often than not, hunts of this kind are opposed vigorously by anti-hunting organisations and leave-nature-alone advocates. Yet the Park Service, following a careful programme to involve the public in this decision, reports virtually no opposition.

- In Mesa Verde National Monument, Arizona, park officials have had to severely restrict use of the 8,000-acre wilderness area within the monument because of the extensive damage being done to the park’s cultural and archaeological sites by vandals and artifact hunters. Regular users of the park reportedly understand and support the reasons for instigating these restrictions.

- In 1977, fully 90% of Bandelier National Monument, New Mexico, was officially designated wilderness. It was like putting up a neon sign. In a recent news article, the monument’s resource manager was quoted as saying: “Nothing really changed, but to some people wilderness is a drawing card. It is a word that denotes purity, cleanliness and no people—to a lot of people.” Bandelier back country use jumped 30% after wilderness designation. Almost immediately, the park instituted a wilderness permit system. One of the reasons was to find out what kind of people went where in the park. The data revealed that most of the 5,000 backpackers using the park went to approximately the same places at the same time of the year. As a result, many campsites were showing distinct signs of wear, including beaten paths and browse lines amongst trees around firesites, caused by campers seeking firewood. In some places, stones from ancient ruins were being used to form fire-rings. Another, more smelly, problem generated by the park’s popularity is unburied human waste.

All of this information is being used by park managers to protect the resources in their charge. Open campfires, for instance, will probably be banned in many of the more fragile parts of the park. I don’t know what they intend to do about the human waste problem, but in some parks we are helping the plastic bag industry by requiring people to pack it out. After all, they packed it in.

Bandelier’s problems are not atypical of those being encountered in other wilderness areas. The studies under way there and elsewhere
provide evidence of the increasingly scientific approaches resource managers need in order to develop data bases for sound decision making. We will be seeing much more systematic review and monitoring of ecological, social, psychological and physical factors affecting wilderness and other fragile areas in the future.

It would be wrong, however, to dwell just upon examples of potentially destructive human uses. There are many wilderness areas that ‘function’ quite well—thanks to a fortunate balance between public wants and management goals.

The Okefenokee wilderness in south Georgia provides an excellent example. Congress took a special interest in public use within this wilderness area, and the establishing legislation provided for 120 miles of canoe trails, the use of mechanical equipment to maintain the trail, and the use of power boats in certain areas with motors of less than 10 horsepower. About 4,000 people a year use the wilderness canoe trail for two- to six-day trips. Almost half of this use takes place during March, April and May. Another 4,000 people are day users.

To enhance the wilderness experience no more than 20 campers are allowed on the overnight trail at a time. Covered, elevated campsites with flush toilets are provided every eight to twelve miles along the 120 mile canoe trail. These sites are not only safe, but they also prevent degradation of the habitat by trampling and pollution from human waste. Trail users have demonstrated a strong wilderness/environmental ethic. Litter is a very minor problem. Most wilderness users police the areas they use and frequently pick up litter left by the few careless users. A motorised mechanical vegetation cutter is used to maintain about 50 to 60 miles of trail per year.

A few purists might object to the efforts at Okefenokee; but most wilderness users there overwhelmingly agree that the measures initiated have been an excellent compromise that hasn’t jeopardised the essential wilderness character of the area.

The more we move into this brave new frontier of wilderness management, the more we realise we are just beginning to understand what these unique preserves have to offer the future. We must guard our wilderness zealously. But we must also realise the close linkage between these resources and the people in whose trust they are held. We cannot shut the people out. To do so would be to risk losing the public support that has made protection of these areas possible in the first place. Instead, we must continue to find ways of both preserving these wilderness wonders and sharing them with those who wish to taste Thoreau’s ‘tonic of Wilderness’.
Attitudes Towards Wilderness and Environmental Protection in the US

John Hendee

A Forest Service ranger gives information to two of the many—and ever-increasing—users of American wilderness areas.

Positive attitudes toward wilderness and environmental protection in the United States are reflected in public opinion surveys, in the growth of membership in environmental organisations, and in the addition of areas to the National Wilderness Preservation System. The concept of wilderness—land areas preserved as they are—has come to symbolise environmental quality, and support for wilderness has grown with the environmental movement. The Wilderness Act of 1964 created a National Wilderness Preservation System (NWPS), set aside 54 areas totalling 9.1 million acres and identified another 34 areas to review for suitability for classification. Today the NWPS has grown to about 80 million acres, and 25 additional Bills classifying more acreage as Wilderness have been introduced in the US Congress.

During the 60s several national opinion polls documented rising concern for environmental issues. This concern peaked after Earth Day in 1970, and has now stabilised into broad and deep support for
environmental protection. In 1980, among topics of public concern, the environment drew 48% support. Although this was down from more than 60% in 1973, nevertheless only crime (69%), drugs (59%), defence (56%), health (55%) and education (53%) exceeded the environment as topics perceived as having inadequate expenditures in 1980 (Council on Environmental Quality 1980).

A more recent survey asked people to rate 'three national problems you would like to see the government devote more of its attention to in the next year or two.' Reducing pollution of air and water (24%) ranked sixth among ten categories behind only crime, unemployment, killer diseases, improving education, and helping the poor (Bloomgarden 1983).

A 1980 poll found 'sympathy with the environmental movement' among 55% of the public, with 'active participation' in the movement reported by 7%, down from 13% in 1978 (Council on Environmental Quality 1980). No more than 6% in any category was 'unsympathetic' to the environmental movement, but 'sympathy' and 'active participation' were highest among the young, those with at least some college education, and those with incomes over $12,000. The same survey found 12% of the public 'had occasion to write a letter or contact a public official directly about an environmental matter' in the previous two years, and that nine out of ten of their letters favoured more environmental protection.

These findings were confirmed by an April 1983 poll (ABC News-Washington Post) that found 61% of the public sympathised with the environmental movement, 7% said they were environmental activists and only 4% were unsympathetic toward the environmental movement. The remaining public were either neutral (29%) or had no opinion (6%).

All these findings indicate solid environmental support but less concern than in the 1970 Earth Day era—possibly a reflection of environmental protection accomplishments as well as a stabilising public opinion. One pollster, Louis Harris, testified before Congress about the broad and deep consensus of the public to fight pollution as "...one of the most overwhelming and clearest we have ever recorded in our 25 years of surveying public opinion."

Polls of the American public also indicate positive support for preservation of wilderness and wildlife. A 1980 survey found that 73% agreed that 'an endangered species must be protected, even at the expense of commercial activity' (Council on Environmental Quality 1980). A more recent survey (Bloomgarden 1983) reported that 79% believe 'we must prevent any type of animal from becoming extinct, even if it means sacrificing some things for ourselves.' The same survey found that 65% favoured 'leaving parts of our country in their natural state, untouched by man.'
In a 1977 survey by Opinion Research Corporation for the American Forest Institute, people were offered a choice to ‘...increase the yield and sales of timber from our national forests or...preserve those trees in their natural state.’ Sixty-two percent chose ‘preserving trees’, 28% were for ‘increasing timber sales’ and 10% expressed no opinion. In the same survey ‘the present amount of wilderness’ was ‘about right’ for 46% of the public, and ‘too little’ for 32%. Those saying ‘too little’ indicated concern that wilderness and wildlife habitat were being lost to development and population pressures. In a more recent survey (Yankelovich, Skelly and White 1982) the public were asked to select from a list those resources they thought would be in short

National Forest workers install a ‘hikers only’ sign on a wilderness trail, protecting a particularly sensitive area from damage caused by horses and pack stock.
supply in the future. Their priorities were farmland (55%), wilderness (52%), water (51%), lumber (44%), food (43%), recreation areas (32%) and paper (27%).

Finally, a poll of citizens in Montana (Utter 1983) found that 85% favoured designation of wilderness areas in general, 52% 'strongly favoured wilderness', 33% 'somewhat favoured' and only 11% were 'opposed to wilderness areas'. Deeper probing in this survey indicated, as have others, that some people were unclear about exactly what wilderness was, even though they supported it. Such views may reflect general environmental support, for which wilderness is a symbol.

Support for the environmental movement is also reflected in expanded membership in environmental organisations. The largest group, the National Wildlife Federation, has 4.3 million members and has grown 2.7-fold since 1970. The Sierra Club, with almost 350,000 members, has grown more than four-fold since 1970. The National Audubon Society, with over 400,000 members, has more than tripled since 1970. The Wilderness Society, with 85,000 members, and Friends of the Earth, one of the youngest and smallest of the environmental groups with 32,000 members, have similarly grown.
One recent survey compared the views of environmental group members with small business and corporate executives (Bloomgarden 1983). Environmentalists tended to support more philosophical aims for society such as 'protecting nature' (92%), and tended to describe themselves as liberals, while executives described themselves as political conservatives. But about half of the executives said they and their families 'benefit from the government's and environmental groups' efforts'.

The US National Wilderness Preservation System is supported not only by public opinion and environmental group membership but by other social trends as well. For example, research has shown strong associations between level of education and pro-environmental values, wilderness appreciation and wilderness use. In the 1970s the surging increase in wilderness appreciation and use was often attributed to educational gains during the 50s and 60s. But there were even greater educational gains between 1970 and 1980. The United States Bureau of Census reports: (1) a nearly 25% increase in the proportion of Americans aged 25 and over who have high school diplomas (up from 55% to 68% during the 70s); (2) a nearly 50% increase in the proportion who have at least one year of college (up from 21% to 31%); (3) a nearly 50% increase in the proportion graduating from college (up from 11% to 16%), with even bigger gains among women (up from 13% to 21%). Furthermore, large and small colleges and universities in the US offer courses that teach various aspects of wilderness values, benefits, use skills and management. College graduates who have taken such courses and become opinion leaders are likely to reinforce positive views of wilderness.

Other trends also nurture support for wilderness. Social forecaster John Naisbitt, in his book Megatrends, identifies a major trend in the US away from representative democracy where elected officials dominate the important decisions, toward participatory democracy where people affected by decisions insist on having a direct voice in them. Increasingly, citizens are expressing this voice through ballot initiatives, referenda, recalls and demand for consumer and workers' rights and participation. The growth of environmental organisations already described reflects this trend, as does increasing public involvement in natural resource decisions. For example, the US Forest Service's Roadless Area Review and Evaluation in the late 1970s (RARE II) to identify lands potentially suitable for wilderness, drew several times as many public comments (360,000) as did a similar review (RARE I) in the early 1970s.

All these factors—public opinion favourable to environmental protection, wildlife and wilderness; growth of membership in environmental organisations; rising educational levels; and increasing public involvement in wilderness allocation decisions—have contributed to
expansion of the size and use of the National Wilderness Preservation System. They have also increased the challenge of wilderness management.

In the United States, Wilderness Areas are set aside under the Wilderness Act to protect their naturalness and to provide outstanding opportunities for solitude and primitive forms of outdoor recreation. To meet these goals, wilderness management is required. The guiding principles of such management are to do only what is necessary to meet the wilderness objectives set forth in area management plans, and, when management actions are necessary, to use the approach that will least impact the area and its visitors.

Wilderness management must address many issues. At popular locations, crowding by hikers and backpackers can destroy fragile wilderness vegetation and the quality of experience for users. In a few locations recreational activity must be regulated to prevent impacts. In many areas visitors are contacted by wilderness rangers to educate them about the need to behave in ways that will protect the environment and the experience of other visitors. Trails must be maintained and patrolled, and occasionally new ones built. Campsites need to be evaluated and closed for rehabilitation if they become too heavily impacted. Because of rising costs, many of these wilderness management activities are increasingly being carried out by volunteers with supervision by managers.

Natural wildlife is a special attraction in wilderness, and regulation of hunting and fishing, fish stocking, and protection of wilderness-dependent wildlife are special management problems. Wilderness conditions must be monitored to assess their naturalness and the limits of acceptable change. Increasingly, exclusion of fire is causing unnatural change in some areas. Wilderness fire management plans are therefore being developed to reintroduce fire to natural levels by letting some wildfires burn under safe conditions. Planned ignition of prescribed fire to restore naturalness may some day be considered. Perhaps most important is the preparation of wilderness management plans for each area, to address all these problems with full public involvement before any actions are implemented.

Within a decade or two, all the wilderness allocation decisions will have been made in the US. Thereafter, the enhancement of wilderness values will depend entirely on wilderness management. Even closer cooperation among environmentalists, wilderness visitors, volunteer workers and wilderness resource managers will be required. The future of the National Wilderness Preservation System depends on these partnerships.
The sea is perhaps the greatest wilderness of all: the Stonga Banks, Shetland Islands (UK)

The world ocean covers 71% of the globe. Despite publicity from time to time on the feasibility of human settlement in this vast area, in reality it belongs, in the words of David Attenborough, to the fish. The sea is arguably the greatest wilderness of all, yet its emptiness is deceptive. For the past century or so, parts of it have been under great pressure from certain industries in the developed countries, notably whaling, the pelagic fisheries and bottom trawling. Since World War II there has been a great intensification in fisheries generally and in navigation,
especially of ships carrying hazardous cargoes. There has also been a vast expansion in uses of little importance before the 1940s, including oil and gas exploitation, waste disposal, the use of coastal areas for recreation, and a heightened importance of the sea for science and for defence.

These developments have proceeded in association with an unprecedented effort in global law-making, beginning with the Geneva Convention of 1958 and culminating in the new Law of the Sea Convention of 1982, now awaiting ratification. These legal developments give a formal aspect to a process of enclosure of the sea by coastal states which will encompass over 40% of the 71%, including most of the shelf seas which are rich in resources.

All these events bring the potential wilderness value of the sea into sharp focus, and highlight the fact that the maintenance and development of marine conservation approaches will take place largely in relation to and at times in competition with other sea uses.

The wide range of sea uses may be classified into eight groups representing fundamental purposes which, from a management standpoint, may be further reduced into five groups. The first and earliest, apart from fishing, is the use of the sea for navigation and communication, including navigation and related activities for the other uses. Until the advent of motor ships and the carrying of hazardous cargoes (of which by far the most important is crude oil), this use had limited environmental impact, apart from numerous wrecks and the modification of port approaches for navigation purposes.

The second three groups involve varying degrees of manipulation of the marine environment through extraction or addition of materials. These are respectively mineral and energy resource exploitation, most of which requires the establishment of large fixed installations in the marine environment; fisheries and fish farming; and waste disposal. The fifth group consists of those uses in which the marine environment as a whole is the object of use, including strategy and defence, research, recreation and conservation.

The inclusion of conservation as a specific use may appear as something of a departure: most marine conservation activity has been aimed at aspects of other uses such as the control of marine pollution from shipborne sources. Depletion of oil and gas resources is largely a function of national and international political and economic circumstances, the rate of exploitation being a major determinant of environmental impact. The large effort directed at fisheries conservation is greatly complicated by the objective of allocation of resources, which is really the primary political problem, as in the recurring controversy over the Common Fisheries Policy of the European Economic Community. The elimination of pollution through waste disposal is more obviously a conservation issue in that maintenance of the integrity of
Marine pollution is one of the greatest dangers to coastal birdlife. Puffin (*Fratercula arctica*)
the environment is clearly a key objective, although straightforward hazards to human life are often the driving force. In the field of environmental management *per se*, reasons for conservation put forward include maintaining environmental quality for scientific and aesthetic purposes—research and recreation. Even the defence interest is often the first to promote wideranging environmental studies, as has happened recently in the North Sea.

There are two reasons for considering conservation as a primary use group cutting across the other activities. First is the obvious effort to preserve endangered species, together with the beginnings of control of specific areas at a number of scales, ranging from localised habitats to extensive regions with complex objectives in which conservation *per se* is of primary importance. The second is that conservation, at whatever scale, involves the designation of specific areas of sea, and the establishment of priorities among uses.

The impetus for marine conservation thus comes from two sources. The first, and currently most important, is the conservation activities of other use groups, notably fisheries and waste disposal which are extensively institutionalised at local, regional, national and international levels. The second, and fast developing, source is the designation of conservation uses through the activities of conservation organisations. Out of these groups arise a diversity of management regions, with specific ordering of objectives, ranging from fishery conservation regions such as that instituted in the USA to a series of designated conservation areas such as the Great Barrier Reef.

Although marine wilderness areas have been recognised in many places, notably tropical and polar regions, much of the initiative has come from international bodies such as IUCN and UNEP in research and the establishment of regional seas programmes. At national level the response is less obvious, a significant point in relation to the enclosure of the sea and considering the paramount importance of states in maritime administration. Perhaps the most notable initiative is the planning of the Great Barrier Reef. In the UK, statements relating to marine conservation are appearing in response to the World Conservation Strategy. The Nature Conservancy Council are about to designate a number of relatively small coastal areas, while a significant number of coastal sites are covered by national park and related legislation. These include heritage coasts and sites possessed by private trusts.

The designation of marine conservation areas, which includes those of both natural and human interest, may be classified into four scales. The first are individual sites, such as prominent natural features or historic wrecks. Second are the reserves, restricted areas often of special scientific interest, perhaps as habitats for endangered species. Third are the marine parks, which include a wide variety of conditions
of national or international significance, such as coral reef coasts. Fourth are the very large regional sea areas required for the control of pollution, such as the UNEP Regional Seas, and those areas necessary for the protection of marine mammals, which may be of oceanic scale as in the case of whale conservation in the Indian Ocean.

Broadly speaking, the range of objectives and tightness of control decrease with increasing scale. The conditions for individual sites and reserves can be strict, as in the designated areas within the Great Barrier Reef Marine Park. At small scales, natural wilderness attributes may be maintained and even human aspects conserved, such as very early maritime artefacts connected with early voyages. Most of the human interest aspects are necessarily conserved in maritime museums, which are perhaps the most significant development in the marine conservation field overall. At the marine park scale, zoning approaches are generally necessary to accommodate other uses within a proper geographical and legal framework. At the regional seas level, use objectives are relatively few, and the main problem, as in the North Sea case, is the establishment of a sufficient degree of political, legal and administrative cooperation to make even limited objectives workable.

An increasingly important aspect in the context of the 1982 Law of the Sea Convention is the institutional framework of conservation activity, particularly as regards designated areas of explicitly conservationist bodies. In an area such as the North Sea, political and administrative authority resides at four levels: regional, national, supranational (the EEC) and international. Local laws may also be relevant. Sites may be located partly on the coast (land and sea), in internal waters, the territorial sea, continental shelf, exclusive economic zone or high seas, or combinations of these. Only in the first two is the state’s authority perhaps great enough, or the influence of voluntary bodies strong enough, to promote effective conservation. As it happens, many of the most important sites are located on or close to coasts, at least in the North East Atlantic, but jurisdiction to seaward may be just as important, especially as it affects marine ecosystems and environmental quality. The number of jurisdictional zones is great and therefore legal complexities are many.

For a review of sea uses and the development of marine conservation approaches in the waters around Scotland, see p. 269, The Seas Around Scotland.
One Scotsman did a lot to teach Americans to appreciate their own wilderness areas—John Muir, born in Dunbar, Scotland in 1838. It was Muir who took the first long walk along the misty ridges of America’s Appalachian mountains, who called Alaska ‘God’s crystal temple’ and who reminded us that ‘the clearest way into the universe is through a forest wilderness’.

I am both a nature lover and an oil man. While it may be surprising to some to find an oil man so enthusiastic about wilderness, I find no inherent contradiction in those two roles. After all, energy development and wilderness preservation are not mutually exclusive. As human beings we need both: energy to heat our homes and run our cars and
factories, and wilderness to cherish and enjoy. There is no real reason for industry and society to disagree about environmental responsibility. Business and the public live in the same environment. People in corporations breathe the same air, drink the same water and enjoy the same scenery as everyone else, and when the physical environment deteriorates, business declines.

The relationship between energy and wilderness has been a long and intimate one. Oil, coal and other natural resources are most often found in remote wilderness areas, and in developing these resources, energy companies have necessarily been deeply involved with nature. The relationship has not been without problems. As in any long marriage, it has had its ups and downs. We have had some rocky points, especially in the early years, but, as in any good marriage, we have learned from our experiences and now find it natural and necessary to work in harmony with the environment.

In my view, energy companies and environmentalists have a shared goal: to seek a balance between economic growth and environmental protection. We need to think less about conflict and more about finding reasonable ways to balance human activities, so both business and the environment can prosper; and it has been encouraging to see the relationship between energy companies and environmentalists evolve from one of mutual suspicion and hostility to one of communication. Hopefully this will soon move to cooperation.

For energy companies, the main issue is that of land access. In the US, the Federal Government owns or manages nearly one-third—720 million acres—of all land. Except for National Parks, monuments and historic sites, most of this land is in principle open to oil and gas activity. In practice, however, vast areas are closed to all commercial activity, without any serious thought about their resource potential.

However, if we are to develop any form of energy—oil, coal or natural gas—we must have access to some of this land to determine its energy and mineral potential. We do not want to trample through designated wilderness areas or to destroy our nation’s wilderness heritage, but we do want to explore lands which have not yet been designated as protected wilderness areas. We have had problems with this because government laws and regulations keep even wilderness candidate areas off limits, even for exploration purposes. These are areas which are merely being considered for protected wilderness status.

We suggest that lands not designated as protected wilderness areas should be opened up for multiple use, that energy companies should be permitted to conduct seismic surveys and use other research methods to discover the energy and mineral potential of the land, and determine whether it would be economically feasible to produce the reserves, if they exist. But the land should also be preserved for recreation.
In those areas where the natural environment is unique and irreplaceable, as well as those areas where technology does not exist to probe the land without disturbing its natural balance, neither industrial or recreational development should be permitted. However, on most public lands, controlled and regulated multiple use would maximise the benefits for as many people as possible. It is not necessary to waste energy resources to preserve environmental riches.

It is important to remember that energy and mineral use of land or water is temporary. Although energy exploration and production might cause some disruptions in the short-term, in the long-term the land can be restored to its original state. Nowadays, energy companies take great care to ensure that the most modern and environmentally sound technology is used. For example, the Alaska pipeline was built below ground in some places, and quite high above it in others, depending upon which method would have the least impact on the surrounding environment. In the same way, seismic surveys today generally avoid the old method of drilling a hole of about 200 feet and then exploding a charge of dynamite in it. Now we use subtler and less environmentally disruptive methods of seismic survey.

Further, once energy extraction is completed—which generally takes a few years—we now have both the technology and the commitment to restore the land to its original state. Our own corporate policy in Gulf Oil is not to extract minerals from land unless we can restore it to its original productive state. We replace topsoil and return disturbed land to approximate original contours. We also control surface water runoff to prevent downstream sedimentation and potential acid-mine drainage.

The reason energy companies are worried about land access when there is an apparent glut of oil in the world is that we don’t believe this so-called glut is a permanent condition. Once the world recession is over, demand for oil, coal and other forms of energy will pick up again. We can’t be short-sighted about this. There may be enough oil for ten years, but what about 20 or 30 years from now? If Middle East instability flares again into overt war, it could quickly lead to another shortage, and I doubt whether we want to repeat that experience.

Energy companies need lead time to explore for energy before energy demand picks up again. If we wait for another shortage before we begin exploring in frontier areas it will be too late, because fields that we begin to explore then might not yield a commercial find for years. Hence our concern for access to land now.

While Gulf Oil is committed to energy development, we are equally concerned about protecting the environment. We want to reduce acid rain, limit air and water pollution, and minimise toxic waste. We want to secure a clean environment and preserve areas of natural wilderness both for our own benefit and for that of future generations, and to
translate this philosophy of environmental protection into practical action. We have hundreds of employees whose full-time job is to monitor the environmental impact of Gulf operations on the community. We take them and their jobs seriously, listening to their evaluations and acting upon their advice.

An example of the way Gulf’s coal mining company handles land reclamation can be seen in Kansas, where we operated a surface coal mine covering 8,000 acres. When mining was completed in 1974, Gulf spent over $1 million in reclaiming and restoring the land. We then donated the restored land to the Kansas State Fish and Game Commission which now manages the land for many uses. Most of it is used as a recreation area for fishing, swimming and hiking. Some serves as forage and pasture land for nearby farmers, and some is used as a research facility by scientists from the Pittsburgh State University who try to determine what kinds of fish would best survive in water habitats in the area.

On a national level, Gulf has been the sole sponsor of the award-winning National Geographic TV series for the last eight years, and we also support a yearly programme honouring outstanding conservationists in the US for their achievements. In 1983 we were proud to receive the Outdoor Writers Association of America’s Mountain of Jade Award for Environmental Work, especially because Gulf is the first corporation to be so honoured.

We also support conservation and environmental projects in the UK, and have sponsored books on wildlife, conservation and country walks, among others. A grant from Gulf enabled the Royal Society for the Protection of Birds to make Osprey, a 40-minute award-winning film which traces the return of the osprey to the Scottish Highlands after many years’ absence.

We have certainly not solved all the problems connected with energy development and wilderness preservation. Acid rain and toxic waste disposal are not issues that will disappear overnight, and there is still a lot of serious work to be done. Essentially, however, the energy companies have recognised the problem and are making an honest effort to arrive at solutions which will preserve the delicate balance between social, economic and environmental needs.

Nature is both beautiful and bountiful. In developing her bounty, it is possible to destroy her beauty. We in Gulf are interested in developing energy—but we are only interested in that kind of energy development which is compatible with wilderness preservation. For, as human beings, we need more than just material comforts. Our spiritual need for an untarnished and natural wilderness must also be satisfied.
A stated purpose of most efforts to breed vulnerable or endangered wild animals in captivity is to provide cadres that can augment dwindling populations or completely restock a former habitat. Captive breeding is no substitute for keeping a species alive and well in its own habitat—it is either a hedge or a last recourse, resorted to when adverse trends in animal populations become apparent. Serious breeders realise also that some of their charges will no longer be acceptable in areas from whence their ancestors came. One does not conceive of breeding Sumatran tigers or Scottish wolves with the idea that the people occupying their former space will welcome them back. Some captive breeding, then, is an end unto itself—done to preserve a perceived value like beauty, strength, legendary status or admired behaviour, or to assist nature in maintaining genetic variety.

The record in breeding animals for return to wilderness is dismal, but not beyond redemption. Zoos, the principal breeders, got a late start after missing the boat completely with some animals that were once kept but are now extinct—the quagga, the passenger pigeon, the
Carolina parakeet and the Thylacine, to name a few, were all once in zoological collections in numbers and sexes (since both are necessary) sufficient to start captive breeding.

Against the failures, captive breeders can also place a few successes. Pere David’s deer has been extinct in the wild for 3,000 years, but now exists in impressive numbers, with some 1,900 distributed in a number of zoological gardens. The European bison or wisent was captive-bred up from a population of 17 to the point where it has been returned, if not to true wilderness, at least to reserves in Poland. The New York Zoo was largely responsible for breeding American bison from the low point they had reached at the end of our Indian wars (c.1890) to the point where large new herds now populate our bison range in Montana, and bison can be found in virtually all major zoos.

The Arabian oryx, one of the current success stories, has been bred up from the pitiful few that remained alive in the group captured by Ian Grimwood and his associates and a few more kept in private zoos by Arab nobles and sheiks. To date we have produced over 100 new oryx in our two collections at the San Diego Zoo and San Diego Wild Animal Park. We have also bred over 50 southern white rhinoceroses from the 20 we originally obtained from Ian Player and the Natal Parks Board in 1971 to help keep that subspecies from the endangered list on which its northern relative now finds itself. In addition, there is now talk about returning a herd or two of Mongolian wild horses to their original habitat—an objective made difficult for us, however, by the fact that the United States has no diplomatic relations with Mongolia.

All the species mentioned so far are hooved animals. For the most part, these are not as difficult to breed as are many other mammals such as primates and carnivores, some birds and several reptiles.

Captive breeders have also had some success with birds, over and above the thousands of game birds commonly bred and released for hunters around the world. The Patuxent Research Center of US Fish and Wildlife has bred, trained and released thousands of the endangered Arizona masked bobwhite, while the work done by Tom Cade and his associates at Cornell University in breeding and later releasing peregrine falcons is a good example of combining research, effective husbandry, determination and lots of money to help turn around the decline of that noble bird. A model for breeding exotic birds with a view toward saving them from extinction was set by Sir Peter Scott and the managers of Slimbridge, which probably saved our nene, or Hawaiian geese, from passing entirely into the great beyond, and eventually restored them to the volcanic slopes of their former home. Several European zoos, particularly in Germany, regularly breed the European owl for release to the wild.

When we consider that one to two million of the five or ten million plant and animal species now living are slated to be extinct by the year...
2000 (according to the report of the US Presidential Commission), we can grasp how insignificant our efforts have been and are likely to be in any effort to stem the tide. We are in a retreat which will continue until either universal revelation, universal reason or catastrophe finally prevail. The efforts of captive breeders are directed at prolonging that retreat, hoping eventually for the equivalent in conservation of a Waterloo, Moscow or Stalingrad. Then we can have more remaining than we would have had we not fought.

In the meantime we can breed some species and return them to wilderness, a process which can help us accomplish a two-fold objective: first, to save the species, and second, to help save the wilderness. Ironically, in several wilderness areas all wildlife inhabitants depend for their continued existence on the perpetuation of a key species—a species for which land was originally left wild or undeveloped, and without which there would be less excuse for preventing the omnipresent earth movers from grinding through on caterpillar tracks.

The California condor (Gymnogyps californianus) is one such species, and one that provides a model for all that is involved in successful captive breeding. Ultimate success, of course, is guaranteed only if enough of the species’ original habitat has been saved or if attitudes which have contributed to the species’ demise have been altered. The steps involved in captive breeding are: identifying the need; agreeing to its desirability; developing a breeding plan; acquiring the animals; researching husbandry and reproduction; breeding; developing a release plan; and releasing the animals. All this sounds rather easy when delineated here, but in practice becomes complicated and often extremely difficult.

From evidence accumulated in the La Brea tar pits near Los Angeles, the prime days of the California condor occurred during the Pleistocene era, when there was an abundance of large animals to provide, eventually, condor fodder. Between that golden age for condors and the present day, the species has suffered a shrinkage of its former range, a shrinkage which accelerated rapidly as American pioneers moved westward and settled in California, and in particular as the megalopolis called Los Angeles burgeoned into an acre-eating monster which exhaled poisonous smoke. The condor population dwindled year by year, until their last fortress was in the rugged mountains of the Los Padres National Forest behind the cities of Ventura and Santa Barbara. Here the remaining birds nested and from here they soared forth to seek carrion along the mountain slopes on the west side of the immense San Joaquin Valley.

The need to take action to arrest the decline of the California condor was identified two to three decades ago, but at first captive breeding was not considered because those who counted the birds and found fewer each year still lived in hope that somehow the declining trend would ar-
rest itself. Vain hope! Finally, in 1980, all but the most sentimental conservationists agreed that captive breeding would have to be tried. The question was—and still is—has captive breeding started too late? Behind the decision to start it were US Fish and Wildlife, and the National Audubon Society, the latter of which had only a few years before stood adamantly against such an undertaking with a slogan that could have been stated as ‘better dead than bred’. An early decision in the process was to use the San Diego Wild Animal Park as a breeding centre, and shortly thereafter the Los Angeles Zoo, which for 14 years had kept the sole captive condor, a male called Topa Topa, was also included. Now the programme involves five institutions, the four already mentioned and the State of California Fish and Game Department, which in law has final jurisdiction over the birds.

At first, it was thought that the captive breeding would proceed with the capture of birds that could be put to nesting, starting with a female to become a mate for Topa Topa. But just after the programme got under way, a wild fledgling, one of the only two produced that year, died in the hands of a Fish and Wildlife biologist who was examining it. The publicity surrounding this nearly sank the condor ark before it got under way. The California Fish and Game Commission was reluctant to issue any capture permits, and for a period the breeding effort floundered.

While we worried about the setback at the time, it may, in retrospect, have pushed forward the development of a new plan, that of taking the first eggs laid by each of the four adult pairs—the birds mate for life—and hatching them in captivity. Behind this plan lay the success we have had in ‘double clutching’ the egg-laying of Andean condors.

Under normal circumstances a pair of California condors will lay one egg every two years. Thus, if the birds are allowed to raise their own first hatched, progress in restoring a viable population would be excruciatingly slow. At present, only 20-25 California condors exist. By taking first-laid eggs, however, the birds are encouraged to lay a second (the double clutch). Over the past year, we have also found that if two eggs are taken, some pairs will lay a third, making a triple clutch. If the eggs taken are successfully hatched—and we hatched four in the spring of 1983—and if any remaining fledglings are captured, the producing pairs will be encouraged to lay again the following year. Consequently, the production of new condors will more than double ‘natural’ production, and with fewer losses of fledglings.

When we use egg- or fledgling-napping, we will have to wait longer to breed birds in captivity, for they do not become capable of producing fertile eggs until they are seven years old. On the other hand, we will probably be able to start the release programme by 1985. To maintain a population as distantly related genetically as possible—considering
that the founding stock is eight birds—we will not mate siblings. In 1983, we hatched one male, Sisquoc, the first ever hatched in captivity, and three females, Tecuya, Sespe and Almiyi. (These names, by the way, are all original local American Indian place names in Los Padres.) Sespe is Sisquoc’s sister, so obviously they will not be mated. We shall see what 1984 brings. It appears that permission will be granted by California Fish and Game to take the first six eggs laid. However, only after the first egg is taken from four pairs can a second be taken from any pair. We see this provision as illogical, but attuned to political realities. Our view is to get as many birds into the breeding programme as possible. With existing facilities, which cost over $400,000, our San Diego Wild Animal Park and the Los Angeles Zoo can house 12 breeding pairs in 3,200 square feet apartments (we call them condor-miniums) which are 22 feet high to allow for flight.

If 1984’s batch of eggs has some that don’t fit for genetically sound breeding, we can release them as youngsters in a year or so. We are doing our best to avoid human imprinting on the fledglings. From the very beginning they are groomed and fed by hand puppets, each of which is a realistic replica of an adult condor’s head and neck manipulated by a keeper who remains out of sight behind a curtain. If the young birds see humans, they see them in the distance. Currently the role models they can catch are Andean condors, but shortly one of two adult males at the Los Angeles Zoo may become a role model, either there or at our San Diego Wild Animal Park.

To date it appears the plan is working well. Sisquoc and Tecuya, the first two hatched, are already flying short distances quite successfully.
When these birds finally learn to soar, they are graceful and lovely, but at first they are terribly clumsy, sometimes landing in heaps of crumpled feathers as they tumble end over end in what any aeroplane pilot would term a crash landing.

Now a release plan is being formulated, one that will state the ‘who, what, when, where, why and how’ of releasing birds as they become available. This plan will take into account all the problems involved in any release of captive bred animals: the training, if any, they must have (like flying, eating carrion, and avoiding people); the diseases, if any, they may vector (for in releasing captive bred animals one may also release diseases exotic to the remaining wild stock, with results that might approximate the introduction of smallpox in Tahiti); and possibly, the sex education they may need in courting, nest-building, copulating and rearing young, although one hopes that behaviour in this respect is more genetically programmed than learned.

The release programme will probably follow a strategy that worked well with Andean condors, whereby birds bred by US Fish and Wildlife, the New York Zoo and our zoo were released three at a time. Of eleven birds released since 1981, seven are still alive and flying. We can hope for as good a result.

Is all this worthwhile? It is certainly expensive: the total programme will cost $25 million or more. In 1983 alone, we are spending $250,000 for labour, facilities and food (including about $50,000 for mice alone at 50c each).

But consider what we are saving: the largest of all birds in North America; a unique set of genes; a species in a world which loses a species a day; a symbol of wilderness and wildness; a wilderness itself, set aside with the justification that it was for the condor; and a symbol of immortality in the lore of some California Indians, who believed that the condor performs the role we assign to angels of transporting the souls of the dead to heaven. Even if it is not worthwhile to save the species for its own sake, for the sake of nature’s future, or for any other of the reasons normally given for conserving wild animals, let us at least consider that the Indians may be right—and hedge our bets by saving this majestic bird for the sake of our immortal souls.

I would like to end with a short poem written by first grade students in a California school. It was among the thousands of congratulatory messages we received after the first condor hatching:

Dear San Diego Zookeeper:
We’re happy that your condor hatched
We hope some day it will be free
We know it’s nature’s garbage man
And the Earth needs more than three.
Management Objectives and Goals for Wilderness Areas: Wilderness Areas as a Conservation Category

Bill Bainbridge

The Drakensberg Mountains, Natal

A great deal of emphasis has been given in the past decade to the shrinking of the world's wild places, and the need for each country to protect these. The International Union for the Conservation of Nature (IUCN) has played a leading role in coordinating a global policy for nature conservation and in providing the necessary impetus for individual nations to participate in the international conservation programme. Amongst the important contributions have been the publication of the World Conservation Strategy (IUCN, 1980) and a classification system for natural areas (IUCN, 1978).

Each nation has individual environmental, social and cultural attributes and therefore individual requirements for a spectrum of natural areas which can achieve its national objectives for nature conservation. Many countries have developed their own categories, subdividing the continuum ranging from wilderness areas through to developed natural areas. These categories are distinguished by their management objectives.

The international system was developed by IUCN to enable the conservation areas of each country to be classified according to the objectives for which it is being managed; to enable each nation to
establish natural areas to fulfil conservational functions appropriate to its own circumstances, yet to receive recognition for its contribution to world conservation; and to allow an international data bank to be established for the storage of biological and other data, for assessment of the world system. The scientific community would have access to this data bank, which would also provide information about many research and environmental educational facilities.

The first classification proposed for the establishment of a global network of national parks and protected areas was completed in 1973. Subsequently a revised system was proposed in 1978. Wilderness was included as a category in the first system, but omitted in the second.

The purpose of this paper is to suggest that wilderness area should receive international recognition as a conservation category. Inclusion in the IUCN list would generate international recognition for wilderness areas already established, and stimulate the declaration of new areas.

The revised system of categories for natural areas proposed by IUCN in 1978 complemented the concept of national parks with other ‘distinct categories, which when taken together, can provide land managers and decision makers with a broad set of legal and managerial options for conservation land management’. This recognised the necessity for establishing a spectrum of natural areas which should be managed in perpetuity to maintain representative samples of major ecosystems in unmodified state, for the conservation of natural communities and their component species, protection of scenery and landscapes, and the provision of recreation and tourism.

In the preamble to the revised system, IUCN specifically noted the urgent need to assess the status of nature conservation in the face of rapidly increasing physical modification of the remaining wild places of the Earth and to prescribe action to ensure adequate protection for areas not yet subject to agriculture or development. It also recognised the need for versatility in the system so that the conservation areas established by different nations could be recognised and categorised according to their management objectives.

A primary objective for the classification system was to encourage the development of a series of conservation categories and to define primary conservation objectives for each. All ten categories proposed (see Table 1) involve, to varying degrees, the protection of natural ecosystems. Of these, five principal categories have major commitments towards the permanent conservation of large ecosystems, biological diversity and genetic resources, while minimising human impact through recreation and tourism. Within these areas, sacrosanct core areas of undisturbed country should be maintained.

Other categories provide for many environmental and human needs, extending the total area of land maintained in both natural and semi-
Nomenclature for Designated Areas Proposed by the International Union for the Conservation of Nature (1978)

<table>
<thead>
<tr>
<th>I</th>
<th>Scientific Reserves/Strict Nature Reserves</th>
</tr>
</thead>
<tbody>
<tr>
<td>II</td>
<td>National Parks/Provincial Parks</td>
</tr>
<tr>
<td>III</td>
<td>National Monuments/Natural Landmarks</td>
</tr>
<tr>
<td>IV</td>
<td>Nature Conservation Reserves/Managed Nature Reserves/Wildlife Sanctuaries</td>
</tr>
<tr>
<td>V</td>
<td>Protected Landscapes</td>
</tr>
<tr>
<td>VI</td>
<td>Resource Reserves</td>
</tr>
<tr>
<td>VII</td>
<td>Anthropological Reserves/Natural Biotic Areas</td>
</tr>
<tr>
<td>VIII</td>
<td>Multiple-Use Management Areas/Managed Resource Areas</td>
</tr>
<tr>
<td>IX</td>
<td>Biosphere Reserves</td>
</tr>
<tr>
<td>X</td>
<td>World Heritage Sites (natural)</td>
</tr>
</tbody>
</table>

Table 1

natural states. These categories incorporate the principles of 'ecodevelopment', in which nature conservation can be interwoven into development. Natural resources can be managed in a variety of ways both to support the quality of life and also to provide for other human needs on a sustainable basis.

Conservation categories are artificial classes which a variety of people have attempted to define in order to sub-divide the continuum of conservation areas. The original concept of a national park was that of a natural area with 'supreme' status, but opinions differ about what its management objectives should be. In particular, the provision of recreational facilities for the public in national parks has varied greatly from country to country. In the long period between the creation of the first national parks and the attempts to define an internationally accepted definition of their functions and objectives, research has brought to light the potential conflicts that arise between conservational and recreational objectives.

It seems reasonable that the de facto use and objectives of important categories such as national park and wilderness area will vary from country to country, according to the ecological and cultural situations of each. International definitions will need to incorporate the full range of concepts.

In relation to wilderness, the USA initiated the concept of preserving wild country in legally dedicated wilderness areas with the Wilderness Act of 1964. It has since established the most extensive wilderness
system in the world. Other countries such as Australia and South Africa have also established a system of wilderness areas as part of their national natural areas. In these countries, the category wilderness is at least equivalent to the national park system in regard to conservational importance and legal security.

There have been few attempts to reconcile the different concepts held by nations which have already declared wilderness areas. In 1983 Stankey provided a comparison of these, stating that the essential characteristics of a wilderness area differ little from those generally accepted by most countries for national parks. He lists these as: a relatively large area; substantially intact ecosystems; physical and biological features possessing scientific, educational and recreational interest; reserved through the country’s highest competent legal authority; and visitors allowed to enter, under special conditions, for inspirational, educational and recreative purposes.

The description of a national park given by IUCN in 1978 is as follows:

The area should perpetuate in a natural state representative samples of physiographic regions, biotic communities and genetic resources, and species in danger of extinction to provide ecological stability and diversity.

National Parks are relatively large land or water areas which contain representative samples of major natural regions, features or scenery of national or international significance where plant and animal species, geomorphological sites, and habitats are of considerable scientific, educational and recreational interest. They contain one or several entire ecosystems that are not materially altered by human exploitation and occupation. The highest competent authority of the country has taken steps to prevent or eliminate as soon as possible exploitation or occupation in the area and to enforce effectively the respect of ecological, geomorphological, or aesthetic features which have led to its establishment.

There is, however, little unanimity on the functions of a national park or on the manner in which each individual nation manages its parks. In many countries, the national parks provide an important source of revenue, and sometimes also of international currency. Concern has arisen about the impact of large numbers of people on the parks and the conflicts that may arise between the conservation management objectives and the requirement to provide recreational and tourist facilities.

In 1975 Bannikov and Krinishtkii noted that the main objective for many national parks at the time of their establishment was the provision of recreational facilities with the greatest possible protection of landscapes. In contrast, the primary management objective for nature reserves was the conservation of natural communities, rare species and landscapes of exceptional beauty. Even IUCN’s present description of the category national park lists the provision of recreation and tourism services as ‘a primary objective for management of area resources’.
There are many differing concepts of the functions and uses of the categories national park and wilderness area. In most countries, both categories have a number of common conservation management objectives. The essential differences appear to be that in national parks particular emphasis is given to the provision of outdoor recreation, often incorporating public accommodation, and educational opportunities. In wilderness areas, great emphasis is placed on the conservation of major ecosystems and landscapes with a minimum of disturbance by human beings, and the provision of high quality recreational experience to a relatively small number of people at a time. Both areas may be used for scientific study and environmental monitoring. Wilderness areas in particular offer outstanding opportunities for scientific study of unmodified ecosystems, for comparative purposes.

At present there are various existing definitions of wilderness. The US Wilderness Act of 1964 defines a wilderness area as:

An area of undeveloped...land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions which,
1) generally appear to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable;
2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation;
3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and
4) may also contain ecological, geological or other features of scientific, educational, scenic or historical value.

IUCN (1973) defines the primary purpose of a wilderness area as the protection of nature, '...with the area maintained in a state in which its wilderness or primitive appearance is not impaired by any form of development, and in which the continued existence of indigenous animal and plant species is assured'. The area is also used for the provision of outdoor recreation, '...for those capable of enduring the vicissitudes of wilderness travel by primitive means (without motorised transport, roads, improved trails and developed campgrounds, etc.)'.

In 1972, Raymond Dasmann wrote:

Wilderness stands as a unit of measurement against which we estimate progress or loss in our deformation of natural areas in managed areas. It stands as a reservoir and refuge for those wild plants and animals difficult to fit into the managed landscape. It stands as a sanctuary for people seeking to keep contact with primitive values. We require great tracts of wilderness land of all biotic types, from desert and high mountain to lands that are now, or will be, occupied by farm, managed forests, or managed range. Although in percentage these wilderness areas need never amount to more than a small part of the total land area, their value in the future will far exceed their extent. The present system of wilderness areas and national parks is a strong beginning but not adequate for future needs.
From these and other definitions, it is clear that the particular attributes of wilderness, and the conservation objectives for major ecosystems and natural communities in their primitive state are: that they should be of large size; that they should be maintained by active management with an absolute minimum of disturbance or development; and that the number of visitors permitted to enter at any one time should be restricted to relatively low numbers if the quality and character of their experience is to be preserved. The natural communities conserved within a wilderness area will thus have optimal survival chances, comparable at least to the level of protection offered by any other conservation category.

Wilderness areas are of major importance for the achievement of international and national nature conservation programmes. The nature conservation objectives listed by IUCN in 1978 for the principal conservation categories should be incorporated in the list of management objectives for all wilderness areas and receive high priority ranking. These management objectives have already been adapted for use in the Drakensberg State Forests of South Africa, a high proportion of which have been declared wilderness area.

There is no doubt, at least in the African context, that a management policy of benign neglect is not suitable for wilderness areas. This is partly due, as Stankey points out, to the fact that external influences from adjacent land use and global environmental pollution make a certain degree of management essential. In addition, in some places, Southern Africa for example, natural fire is a key environmental factor which no longer occurs in the prehistoric pattern which pertained before humans created boundaries and brought in modern land use machinery. It is essential for the maintenance of a number of natural fire climax vegetation communities that a prescribed system of burns be regularly applied, in a simulated natural pattern.

The manner in which wilderness areas are managed must also take into account the primary management objectives for the area. Management must not in itself become a factor responsible for the deterioration of wilderness character.

Stankey also emphasises that the provision of adequate and appropriate interpretive services and the promotion of wilderness-associated experiences are essential roles of management.

Many eloquent pleas have been made about the need to conserve areas of wilderness for the particular types of outdoor recreation and spiritual renewal that may only be obtained in extensive, undeveloped tracts of land. Historically, these relate to so-called ‘primitive’ types of experience where mechanised recreation forms are not permitted, but where users enter on foot, relying on their own self-sufficiency to commune with nature and to enjoy solitude and the opportunity to recreate. Modern wilderness areas can provide important spiritual and
African animals, small or large, equally depend on our attempts to conserve and maintain their wilderness homes.
recreational experiences, which can have important therapeutic properties for those normally subjected to the pressures of modern life. Finson states, "In wilderness it is possible to be free, at least for a while, from the limitations that man places upon himself, and to rediscover the richness of one's whole being." It is difficult to obtain this experience in any other type of natural area.

It has frequently been asked whether land can be spared for the creation of wilderness areas in today's world of exploding human populations and ever-shrinking resources. There has been criticism of the exclusive nature of wilderness experience and the fact that relatively large areas are required for the benefit of the few people who may be admitted at any one time. Charges have been levelled that the aesthetic and social values of wilderness are currently limited in extent and are of value to a few privileged citizens with better than average education and work opportunities, who seek an exclusive social experience in pleasant outdoor surrounds.

The experience gained in wilderness is individual to the user, varying according to background, upbringing and personal perception. Some people are able to gain a personal wilderness-type experience even in semi-developed environments. Not all people who enter wilderness areas will obtain as profound and impressive a level of experience as may a person with great empathy for wilderness, just as not everyone who enters a church will have a profound religious experience. It is inevitable that wilderness users will obtain a great variety of experiences.

What is important is that wilderness managers provide adequate interpretive services to users, so that the quality of their experience may be heightened and intensified. Great emphasis must be given to encouraging youth to prepare themselves for wilderness use, initially by using parks and quasi-wilderness areas, and then by taking the greatest possible advantage of the character-building qualities and the opportunities for spiritual renewal available in wilderness. It is also important that the multiple-use aspects of wilderness areas are adequately projected through these interpretive services. Wilderness areas ought not, at least in many countries such as Africa which are critically short of land, to be created primarily for the provision of outdoor recreation and wilderness experience.

At least four countries have already established extensive wilderness areas which have legal status equivalent to national parks in several. It is desirable that these areas receive international recognition. It is also desirable that other countries, who still have sufficient wild areas, be provided with the opportunity to declare new wilderness areas in a conservation category that will receive recognition from the international community. This could be achieved by simple adaptation of the system proposed by IUCN and the inclusion of an additional category
equivalent to that of a national park. This would provide versatility for each nation to design a system of natural areas for its own specific requirements.

Much attention has been given to the rapid rate at which development is destroying the last of the wilderness in virtually every country of the world. With the pressures of escalating human populations and modern development, there can be no secure sanctuary for wild areas outside dedicated natural areas which have secure legal enshacement. If the last of the wilderness is to be conserved for posterity, it can only be done in one of the accepted conservation categories which do not cater for wilderness. There is obvious need for a specific wilderness category for this purpose.

Wilderness area is also an appropriate category for the conservation of fragile or environmentally sensitive landscapes such as high mountain ecosystems and watershed areas. The implied low recreational levels appropriate for the provision of wilderness experience makes the category particularly suitable for the conservation of sensitive areas. In South Africa, for instance, which does not possess abundant fresh water supplies, extensive areas of high rainfall mountain catchment terrain are conserved as wilderness areas.

It is becoming increasingly clear that subjecting marginal areas to even relatively light agricultural use may cause considerable environmental disturbance. Thus, unless the pressures are overwhelming, resource planners should carefully consider the possibility of protecting environmentally sensitive areas in a holding category such as a managed resource area. Alternatively, wherever possible, serious consideration should be given to protecting such sensitive areas as wilderness areas, so that the options of optimising physical benefits such as stabilised water supplies and the conservation of genetic resources, as well as aesthetic benefits for the maintenance of quality of life, may be preserved.

Examples of fragile landscapes which merit protection in this way on the Southern African sub-continent include the high mountain ecosystems containing the Afro-alpine and Afro-montane vegetation, together with many other mountainous or steep areas such as the escarpments of the Great Rift Valley. Most of these are important water source areas, which deteriorate rapidly, especially under primitive agriculture. In South Africa, it has been shown that water resources may be permanently impaired by such land use. Other marginal areas include the great swamps and the extensive tsetse infested ‘miombo’ areas of Central Africa. Priorities for wilderness areas could be those areas infested by tsetse fly, which are carriers of sleeping sickness.

Wilderness areas could also be considered as components of biosphere reserves and world heritage sites, two umbrella categories
<table>
<thead>
<tr>
<th>Region</th>
<th>Name of Area</th>
<th>Date set aside</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western Cape</td>
<td>Boomsmansbos</td>
<td>1978</td>
<td>14,200</td>
</tr>
<tr>
<td></td>
<td>Sederberg</td>
<td>1973/1976</td>
<td>71,000</td>
</tr>
<tr>
<td>Tsitsikamma</td>
<td>Groendal</td>
<td>1976</td>
<td>25,000</td>
</tr>
<tr>
<td>Natal</td>
<td>Mdeelelelo</td>
<td>1973</td>
<td>29,000</td>
</tr>
<tr>
<td></td>
<td>Mkhomazi</td>
<td>1973</td>
<td>54,000</td>
</tr>
<tr>
<td></td>
<td>Mzimkulu</td>
<td>1979</td>
<td>28,340</td>
</tr>
<tr>
<td>Zululand</td>
<td>Ntendeka</td>
<td>1975</td>
<td>5,500</td>
</tr>
<tr>
<td>Northern Transvaal</td>
<td>Wolkberg</td>
<td>1977</td>
<td>17,500</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>8 Wilderness Areas</strong></td>
<td></td>
<td><strong>244,500</strong></td>
</tr>
</tbody>
</table>

Table 2

suggested by IUCN in 1978 under 'Internationally Recognised Affiliated Designations'.

The objectives cited for a biosphere reserve include conservation of present natural areas for comparative or baseline studies, both within natural and altered environments. Each biosphere reserve can be zoned to delineate a natural or core zone together with a manipulative or buffer zone, a reclamation or restoration zone and a stable cultural zone. The natural or core zone could consist of a dedicated wilderness area or a national park containing a substantial wilderness zone.

World heritage sites are created to protect features considered to be of world significance and will frequently include many previously designated protected areas, which could include dedicated wilderness areas. Wilderness area is fully compatible with this international category.

In South Africa, which was the first African country to establish wilderness areas, such areas may be proclaimed under the Forest Act No 72 of 1968. They are managed by the Directorate of Forestry of the Department of Environment Affairs. Areas declared under the Act enjoy some of the most secure legal status of any natural area in this country. At present, eight areas have been declared in various parts of the Republic, with a combined area of approximately 245,000 ha (see Table 2). A further ten areas are in process of declaration. These will protect a further 215,000 ha and result in a system totalling 460,000 ha.

The largest of the new areas, Baviasanskloof Wilderness Area, will
protect approximately 150,000 ha of Cape Fynbos. This is a South African biome of great ecological importance. The Cape Fynbos stands as one of the world’s six floral kingdoms in its own right. Although the smallest of the six kingdoms, it is estimated to contain over 6,000 endemic species out of a total of approximately 8,500 constituent species. The new wilderness area will play an important role in preserving a portion of this species-rich and diverse vegetation.

The first wilderness areas to be declared in the Republic were in the Natal Drakensberg. These are also to be significantly extended. They conserve the only Afro-alpine vegetation which occurs in South Africa, together with two other Veld Types. Approximately 1,800 species are conserved in the Drakensberg natural areas, of which an estimated 300 are endemics.

The Drakensberg wilderness areas and nature reserves, together with the game reserves managed by the Natal Parks Board, conserve some of the most scenic mountain areas of the country. The area has been described as one of the great natural spectacles of the African continent. This conserved area is considered to be of international significance, and has been proposed as a world heritage site.

In conclusion, I would like to re-emphasise the need for wilderness area to receive international recognition as a conservation category. IUCN should be requested to revise the present classification system for natural areas incorporating a category for wilderness. This would enable international recognition to be given to existing wilderness systems, as well as encouraging the declaration of additional systems. Many countries are in the fortunate position of having extensive wild areas which could be protected. Revision of the international system would encourage them to create further wilderness areas as part of their national system of natural areas. The category wilderness is also particularly suitable for the protection of environmentally sensitive areas.
Ekistics, Ecumenopolis and the Wilderness: Planning for a Global Ecological Balance

Gerald Dix

Cities of one sort or another have always been a part of civilisation, but the need to plan them correctly is now crucial. Tyuoni ruin, New Mexico, built ca. 1400

Amongst all the world’s resources and environments, wilderness areas are probably facing the greatest pressures as humankind struggles to cater for the needs of bigger populations and increasing urbanisation. The resolution of potentially damaging conflicts of interests presupposes more than preservation: it demands instead rational practical policies related to regional and global needs.

The Declaration of the 1972 UN Conference on the Human Environment emphasised the importance of a balanced outlook, noting that "economic and social development is essential for ensuring a favourable living and working environment for man and for creating conditions on earth that are necessary for the improvement of the quality of life." Whilst "international matters concerning the protection and improvement of the environment should be handled in a
cooperative spirit by all countries, big and small on an equal footing,”
environmental policies “should enhance and not adversely affect the
present or future development potential of developing countries, nor
should they hamper the attainment of better living conditions for all,
and appropriate steps should be taken... with a view of reaching agree-
ment on meeting the possible national and international economic con-
sequences resulting from the application of environmental measures.”

It is a long way from the bland but encouraging phraseology of an in-
ternational conference attended by the like-minded of many nations to
the formulation of policies and the preparation of plans that can gain
the acceptance of those most concerned, the people whose homes and
lives will be affected. Too often, since Stockholm, conservation
arguments have been discussed in isolation from one another and fre-
quently quite separately from the considerations not so much of
economic growth but simply of survival.

It has become common practice to think of big cities and
wildernesses as if they were independent of each other and at opposite
ends of the development spectrum. But economic growth and conser-
vation are not necessarily or even generally poles apart and opposed
one to another. It may well be that in the tacit acceptance of the senti-
ment of the Stockholm declaration is to be found the key to the
weakness, almost fragility, of many conservation and planning policies.
This situation can only be remedied by considering the problems of the
environment and of human settlements on a regional and global basis
in order to see that, whilst the lessons of the past are properly taken in-
to account, those countries struggling against adverse social and
economic conditions are not put in a position where they have to pay
the price of earlier errors occasioned by the excusable ignorance, or less
excusable greed, of the first industrial nations. Progress will only be
made when there is a greater understanding both of the possibilities for
conservation and of methods of regulating environments.

There are five major categories of wilderness that can be distinguish-
ed, all still comparatively untouched but all likely candidates for inten-
sive exploitation in the near future. To the extent that the conse-
quences of their use are likely to be inadequately understood ecologically,
they may be regarded as being ‘under threat’. They are the skies,
the polar regions, the major oceans and seas and coasts, the great forest
areas and the deserts. Because they are still comparatively unsullied
they deserve priority in consideration and action, although they may
not all immediately appear equally important in relation to the needs of
our urbanising world.

The skies are increasingly becoming filled with the flotsam and jet-
sam of space exploration and, at a lower altitude, the chemical pollution
of two centuries of industrialisation. There are also a growing number
of communications and spy satellites. That we are alternatively warned
of the world overheating or of suffering a new ice age denotes an area of fairly comprehensive ignorance where there is need for research before it is too late.

The polar regions are already targets of further exploration, not for the reasons that attracted Peary and Amundsen but as possible sources of new mineral wealth in the last fairly unknown land masses.

The oceans and seas have long suffered the depredations of human beings. From time immemorial the sea has been both a source of food for those fortunate enough to live near it and a dumping ground for waste and refuse of all kinds. Until recently the scale of fishing and pollution was so small that no harm was done and the balance of nature hardly disturbed, but now the situation has changed dramatically, so that no part of the oceans is free from the possibility of action of one sort or another on a hitherto unknown scale, be it fishing, mineral extraction or the dumping of waste.

Even more vulnerable is the coastline, which in many instances suffers from pollution found in both sea and land, but which when combined is even more damaging. Special attention must be devoted to this zone of conjunction, as indeed it is in the system discussed later in this paper. There has been some progress over the avoidance of pollution in the seas—the Barcelona Convention, for example, in relation to the Mediterranean—but it has been slow, nations being reluctant to abide by agreements in the face of economic pressures.

Of equal international importance are policies concerning major wilderness areas on land that lie within the national boundaries and jurisdiction of one country or another, in many instances in the intermediate or less developed countries of the world.

Those that have caused greatest concern in terms of preservation in recent years have been the major rain forests, most notably that of the Amazon basin in Brazil. There, it is argued, once the forests have been chopped down, not only will the areas energetically cleared to provide land for farms to grow the food for an increasing population be subject to erosion but, so great is the scale of the exercise, the ecological balance for a whole sub-continent may be changed. This may well be so, in Brazil as well as in many other parts of the world where similar though smaller programmes are being undertaken. It could be serious for the world if it were, but criticism must be related to circumstances and to the way in which the cleared former wilderness is used—whether for financial gain for an individual entrepreneur, to supply timber for homes for the wealthy, or food for the undernourished. The future ecological situation must be carefully considered and weighed against other gains or losses in assessing a proposal of this kind. It may be wrong, though on occasion excusable, that through greed or ignorance areas or habitats of a scientifically particularly valuable kind have been destroyed in the past by countries now wealthy, but it would
surely be morally indefensible to suggest that for that reason all similar surviving areas must necessarily be retained. In their attempts to preserve particular types of habitat, which may be rare or even unique, the world’s ecologists and conservationists should not lightly deprive a poor nation of the opportunity to exploit its mineral or other wealth. This is not, of course, a new problem. At the turn of the century Winston Churchill, recently home from the Sudan, commented in relation to the Aswan Dam being limited in height and thus in capacity in order to save flooding some Pharaonic monuments, that "the State must struggle and people starve in order that professors may exult and tourists find some place in which to scratch their names."

The recent case of the Tasmanian hydro-electric scheme, though not in a developing country, demonstrated the difficulties in contemporary circumstances. The people and government of Australia’s smallest state were trying to make the best use of their own resources to improve their lot in life, but the region proposed for development is reputedly one of only three large temperate wildernesses remaining in the world. Following a Supreme Court decision (on the scope of the Federal powers, not on the validity of the conservation or development arguments) the project has been abandoned, to the evident joy of conservationists the world over. Whether they are right or wrong is beside the point in relation to this paper, which is that Tasmanian industry and prosperity may suffer in the future because they earlier failed to utilise a God-given resource and they have now lost the chance to do so. The world may benefit, but will it compensate Tasmania? Who should pay the price for preservation? There are many other similar examples, often of development which goes ahead when, conceivably, for the general good it should not; and sometimes, no doubt, of development which is delayed or stopped to the detriment of humanity, even though an area of wilderness or a valuable habitat may be saved. Long-term gains and short-term costs are hard to evaluate, and a sublime future is of only academic interest to a society without the wherewithal to live long enough to enjoy it.

The conservation of wildernesses is often interpreted as the preservation of forests, a double confusion of little value. In this respect it may be helpful to accept President John F. Kennedy’s definition of conservation as the wise use of our natural resources, which at least implies the possibility of beneficial change, and to regard preservation as a policy of no deliberate change—although, presumably, accepting that external factors, such as climatic variation, natural disaster or atmospheric pollution may have a moderating influence, however little direct action there may be. Further, it has to be appreciated that the world’s major wildernesses are its deserts, which it is apparently possible to modify without incurring too greatly the wrath of the conservationist lobby, doubtless because whilst many remaining forests ap-
pear to be under threat from human activity, in the arid zones it is this activity and cultivation that is threatened by desertification.

In Africa and Asia in particular, vast deserts are marching relentlessly forward into the cultivated lands of nations that have growing populations but generally too few other resources to enable them properly to engage in the battle with the oncoming sand. Under much of the desert are aquifers, which, with the availability of greater expertise and rather more resources, could be used to supply water for cultivation. So too, in many countries, the sewage effluent of the larger settlements could be used to produce crops and sustain the tree belts necessary to arrest the advance of the desert. The United Nations Environmental Programme gave a lead with its 1977 international conference on desertification, but more research and experimental work is urgently needed, and first there must be a change of heart and an opening of minds about wilderneses and about the need to live in partnership with our environment, of which the wilderneses form but one element.

Our attitude towards wilderneses, as to so much of nature, seems often to be ambivalent, if not hypocritical, guided more by fashion than by any logical argument. But for survival—of nature, including human beings—we must try to clarify attitudes and avoid clashes of interest, for it is a question of balance. First we must agree, nationally or internationally, on policies about population and living standards, for in them lies the key to determining our relationship with our environment.
Consideration of the population factor in this paper has nothing to do with arguments about family planning or birth control but is concerned only with the realities of the anticipated world situation and its impact on areas of wilderness. In many countries populations are growing at annual rates of 3\% or higher, the highest rates frequently being found in countries that are already amongst the poorest. Whatever future national, religious or personal attitudes about family size may be, a continuing growth of population is inevitable, to rather more than 5,000 million by the end of the decade and perhaps a further 1,000 million or so by the end of the century. Even then some of the most populous nations will continue to increase, perhaps for a further century or more. Most of this increase is brought about by reductions in death rates that are significantly greater than the almost universal reduction in birth rates, and as a result of greater life expectancy. It seems inconsistent to argue that birth control is an interference with nature, yet to accept unquestioned the prolongation of life and the consequences of the reduction or even elimination of disease that follow from advances in medical science.

In the long term a more significant and permanent influence on birth rates (and thus on eventual population size) will follow not so much from any family planning programme but from economic and social development and the achievement of reasonable living standards. Living standards, as well as population size, influence outlooks on the necessity for and the practicability of conservation policies. Any worthwhile conservation policy must be based on the fact that nature is not an artifact but a series of relationships, and that any change in one element inevitably produces consequential changes elsewhere in the system. As science is about transformations rather than creation, it is reasonable to look to scientific methods as a starting point in a search for a better basis for realistic policies for preservation, conservation and development. It is by natural evolutionary processes that new species and varieties of plant or animal are developed and old ones lost, as the ecological balance remains. If through preservationist zeal a dying breed is artificially stimulated to prolonged existence, we by our interference may inhibit the emergence of a new plant or animal. And, following a natural disaster, such as fire or flood in a primary forest, if we attempt to restore the \textit{status quo ante}, we would no doubt—and despite our best intentions—upset the development of a new, though different, natural balance. What is important is not so much the recognition that the balance is being changed, but that too often we neither know nor understand the likely effects of our actions. Increasing research will help in this respect, but the world cannot wait until research is complete: it never is, and each new discovery merely exposes a further area of ignorance. Yet facts are better than dreams as a basis for planning, and so to increase our pool of knowledge we should
Ekistic Forces and Elements in the ekistic grid.

The Connection of Elements—internal cohesion of environmental components

Figure 1  Ekistic Forces and Elements in the ekistic grid and showing the way they are connected
monitor rigorously the consequences of all actions and policies, the better to understand their relationships. Ekistics provides a scientific framework for advancing our knowledge in this way.

Ekistics, the science of human settlements, was developed by Constantinos Doxiadis (1913—1975), Greek architect, planner, philosopher and humanist, in an endeavour to establish a system within which all environmental decisions could be taken.

Doxiadis was interested primarily in practicalities—in his case those concerned with human settlements and the relationship between settlements and nature. He accepted that with inadequate information risks would have to be taken and generalisations made, but he was anxious to establish a methodological framework which could be modified and refined in the light of experience and later knowledge.

He advanced the thesis that there are five elements in human settlements and five forces, or groups of forces, acting on them. The elements he identified were nature, the backcloth against which everything takes place; anthropos, the human individual; the society of human beings as a group, often organised but as often not; shells, the buildings and other structures in which we live, work and play; and networks, the roads and railways, air and sea routes, pipe lines, cables, and radio beams that enable us to carry goods and to communicate. The five forces or influencing factors were economic, social, political, technical and cultural. The elements and forces provide a good basis for the orderly examination of the influences on the structure of a town or region. Figure 1 refers.

From empirical study based on a wide international experience, Doxiadis was aware of the confusion caused by the lack of a consistent terminology and of any system to describe human settlements. He thought it necessary first to classify settlements in significant categories, then to build a model relating settlements of different kinds to one another and to their surroundings.

From the smallest community unit, the housegroup, through the neighbourhood, the small and large town, even to the megalopolitan scale and beyond, he found there was a fairly constant size relationship, by a factor of seven, between the different significant categories of size of settlement. Thus a group of six or seven dwellings would have a population of about 35 persons, the next larger group one of about 245, a neighbourhood about 1,700, a small independent town about 12,000 and the next larger one about 48,000. He classified a settlement of 4m population as a metropolis, and one of 200m as a megalopolis. These were fairly broad categories, intended to form the basis of a model that could be adapted to suit particular circumstances. They led directly to the construction of the Ekistic Logarithmic Scale and the Ekistic grid and later, as Doxiadis developed his ‘logical and taxonomic frame for the classification of human settlements’ to the
<table>
<thead>
<tr>
<th>EPS Unit</th>
<th>Persons</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>69 206 436 005</td>
</tr>
<tr>
<td>14</td>
<td>9 886 633 715</td>
</tr>
<tr>
<td>13</td>
<td>1 412 376 245</td>
</tr>
<tr>
<td>12</td>
<td>201 768 035</td>
</tr>
<tr>
<td>11</td>
<td>28 824 005</td>
</tr>
<tr>
<td>10</td>
<td>4 117 715</td>
</tr>
<tr>
<td>9</td>
<td>558 245</td>
</tr>
<tr>
<td>8</td>
<td>84 035</td>
</tr>
<tr>
<td>7</td>
<td>12 005</td>
</tr>
<tr>
<td>6</td>
<td>1 715</td>
</tr>
<tr>
<td>5</td>
<td>245</td>
</tr>
<tr>
<td>4</td>
<td>35</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Ekistic Population Scale—persons in units of different categories.

<table>
<thead>
<tr>
<th>ETS Unit</th>
<th>Square Metres</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>000 000 000 000 000 000</td>
</tr>
<tr>
<td>17</td>
<td>135 750 000 000 000 000</td>
</tr>
<tr>
<td>16</td>
<td>19 392 857 000 000 000</td>
</tr>
<tr>
<td>15</td>
<td>2 770 408 000 000 000</td>
</tr>
<tr>
<td>14</td>
<td>395 772 000 000 000 000</td>
</tr>
<tr>
<td>13</td>
<td>56 538 000 000 000 000</td>
</tr>
<tr>
<td>12</td>
<td>8 077 000 000 000 000</td>
</tr>
<tr>
<td>11</td>
<td>1 153 850 000 000 000</td>
</tr>
<tr>
<td>10</td>
<td>164 836 000 000 000 000</td>
</tr>
<tr>
<td>9</td>
<td>23 548 000 000 000 000</td>
</tr>
<tr>
<td>8</td>
<td>3 364 000 000 000 000</td>
</tr>
<tr>
<td>7</td>
<td>480 570 000 000 000 000</td>
</tr>
<tr>
<td>6</td>
<td>68 650 000 000 000 000</td>
</tr>
<tr>
<td>5</td>
<td>9 800 000 000 000 000</td>
</tr>
<tr>
<td>4</td>
<td>1 400 000 000 000 000</td>
</tr>
<tr>
<td>3</td>
<td>200 000</td>
</tr>
<tr>
<td>2</td>
<td>28 059</td>
</tr>
<tr>
<td>1</td>
<td>4 084</td>
</tr>
</tbody>
</table>

Ekistic Territorial Scale—area for units of different categories.

Figure 2  Ekistic Population Scale and Ekistic Territorial Scale
more sophisticated Ekistic Population Scale, based on the number of inhabitants, the Ekistic Territorial Scale, based on area (Figure 2), and the Anthropocosmos model. These recognised the need for any effective system to include consideration of many other factors and, with later developments, could not only help our understanding of social, political and economic organisation and illumine possible courses of action we might take to improve our environmental situation, but could also be used for identifying gaps in our knowledge.

From his practice as a planner and his concern to understand and explain urbanisation and the system of human settlements, Doxiadis was prompted to enquire into the nature of cities of the future. "Are we going to go on living in the cities of the present which get increasingly worse with every day that passes because of their continuous growth, or are we going to live in those utopian cities which so many people talk about, but which never actually get built?" Being essentially practical, he wanted not only to find out the magnitude of the problem facing the world, but also to discover a realistic way of turning an impending crisis into an opportunity. He was firmly of the view that it was a scientist’s duty to 'solve problems, not merely to grapple with them'. "He did not particularly welcome what he came to call ecumenopolis, the world city, nor yet the large areas of megalopolitan growth of America, Japan and elsewhere, but he regarded them as inevitable" and thought that if they were "it would be better to give them order and coherence, to ensure open space and light and air, to use our energies to care for the quality of life instead of wasting them fighting for the impossible." (1) The ekistic concept of ecumenopolis that emerged from a long-term research programme on the city of the future was not one of a limitless area of concrete and brick with roads and buildings stretching from horizon to horizon and beyond, but of a careful balance between human beings and nature, avoiding both extremes of density in urban areas and the unnecessary settlement of wilderness areas that, without proper policies and plans, might otherwise be imperilled. It was important that within settlements uses should be so arranged as to provide necessary open space and perhaps even areas of wilderness, and that the growth of ecumenopolis would be complemented by the simultaneous development of ecumenekepos, the global garden, to feed people at a better level than is now possible, overall, and also of an ecumenohydor, a global water supply system. This balance between people and their settlements on one hand, and their environment on the other, became of increasing importance to Doxiadis in his later years, for he was concerned to reconcile the needs of conservation and development in a Global Ecological Balance.

Doxiadis analysed prevailing conditions and ways of fulfilling anticipated global requirements under twelve headings, in accordance with their intensity of use and the degree to which nature had been
modified. He defined zones ranging from the virtually untouched, save only for the occasional scientific expedition, to the intensively industrialised, and grouped these into four major areas as shown in Figure 3. This system of zones was applied to the use of the land, the seas, the air, and also, for the reasons touched upon earlier, separately to the coasts.

Figure 3 also shows the percentage of the world’s land area that, as a result of Doxiadis’ researches, it was suggested would be appropriate to consider under each heading. Zone one, classified as Real Wildlife, meeting a need for complete wilderness, comprises 40% of the whole land surface, remaining virtually in its natural state, with access restricted to scientists entering for research purposes. This zone includes many areas with virtually no or only limited animal populations and its title is to that extent misleading. The second category covers, by Doxiadis’ calculations, 17% of the world’s land, and is intended as an area predominantly preserved but available for visits for purposes of scientific observation, though not for commercial tourism. The third zone, Wildlife Embraced, comprising perhaps 10% of the land area, is the location of more but still limited human activity, although it includes areas occupied by a number of primitive tribes. Zone four, Wildlife Invaded, includes areas visited on a regular basis but with strictly limited machine access, and minimal destruction of nature. This area might form an admirable location for ecological education, observation and perhaps experiment, whereas zone five, Wildlife Conquered, comprises land controlled and exploited by human beings for forestry and commercial tourism, with hotels and similar facilities. These five zones, together constituting what Doxiadis called a Naturarea, cover 82% of the world’s land surface.

Most human urban activities would thus be confined to rather less than a fifth of the land, with about a quarter of that for natural cultivation—that is, using evolving traditional methods—and another quarter for capital intensive factory farming and food production which would involve the drastic modification or perhaps even complete elimination of the natural landscape. The application of high technology and scientific discovery in this way should make possible the provision of a proper diet for those for whom such a thing is now an unattainable dream, whilst at the same time permitting the widest possible measure of nature conservation throughout the world.

In this scheme the remaining five zones are directly devoted to needs of urban dwellers, including recreation, low, middle and high density development and a zone for heavy industry and waste disposal. The low density zone would be predominantly residential, and the high density one devoted primarily to traditional town centre functions. It was assumed that the small percentage of land devoted to heavy industry and waste disposal would be arranged in a few large sites, which could
Naturareas
Zone 1  As nearly virgin as possible
Zone 2  Visited by some humans but without permanent human installations
Zone 3  Humans enter and stay but without machines
Zone 4  Similar to Zone 3, but with human settlements
Zone 5  Nature prevails but humans enter with machines and can use the zone

Cultivareas
Zone 6  Natural cultivation in traditional ways
Zone 7  Cultivation but with new methods allowing for higher productivity

Anthropareas
Zone 8  Natural areas used as resorts, for sports, etc.
Zone 9  Inhabited at the lowest reasonable density
Zone 10 Inhabited, but at middle densities
Zone 11 Inhabited at the highest reasonable density

Industrareas
Zone 12 Every possible use for achieving the goal of the best industrialisation

Figure 3  The Twelve Zones for Global Ecological Balance
be used economically, rather than a larger number of less efficient sites. Whilst in our present context our main concern is with the minimally developed areas, their protection will only be made possible if the overall balance is well understood and properly considered.

A similar set of zones has been proposed for inland water areas and rivers, and one for oceans and seas. The same principles apply in each case, differentiating between areas left in their natural state, and decreasing in extent with increasing intensity of human modification of the environment to water surfaces that are more or less completely modified by or from people's needs. While it may be asked how there can be any control over the sea, where pollution is carried by the currents and controlled by forces far beyond our command, in fact experience has shown, although so far only in a limited way, that when there is a sufficient awareness and concern, nations, individually or by agreement amongst groups, will act. When they do so, they must act, as with air zones, in a manner that not only coordinates with their own activities but, more importantly, accords with the demands of nature, harnessing its forces to our benefit.

The coast poses particular problems which can only be resolved in a satisfactory manner by having a special category of coastal zones and areas. For example, land appropriate for natural cultivation (in the Doxiadis classification) may be separated from an expanse of sea of particular ecological value that should be left untouched, unfished and undeveloped, by a coastal strip eminently suitable for recreation use. A coastal classification is needed that will reflect possible coastal uses compatible with adjoining sea and land zones. It should be emphasised, however, that the division of the world's surface between the twelve areas is likely to be markedly different in the various land, coastal and sea zones. Because of the needs of transportation, and the pressures of coastal use for human activities as urbanisation increases and ecumenopolis develops, the proportion of the coast within the seven Naturareas is likely to be lower than the corresponding percentage of the land. This should give no cause for alarm, however, for the system will help achieve a proper balance, and by using more of the coastline for our own purposes, we may be freeing land elsewhere from the possibility of development.

To define zones in the air may be well-nigh impossible at present, but to point to the need for some kind of consideration is surely necessary because of the lack of knowledge and because of the increasing possibility of planting permanent satellites in space. This may or may not be a good thing for the world, but it would in any event be useful to know the likelihood of the advantages or disadvantages to be gained by the invasion of the last great wilderness, in or beyond the biosphere. Nearer to Earth and closer to our own times, we should consider the impact on wildernesses of aircraft routes and of the inter-
continental carriage by air currents of natural materials (such as sand from African deserts to northern Europe or Canada) and of human-created pollutants (such as the over-dramatised but serious phenomenon of acid rain) so we may have a better idea of what is acceptable and what is not, as well as of what is inevitable and what preventable.

Doxiadis emphasised that his work 'does not pretend finally to solve the problem of ecological and ekistic conflict, but rather to start the process (of resolving conflicts) in a logical and scientific way'. He was aware that as circumstances change, so must the allocation of resources and the disposition of effort to achieve what he accepted as a changing, evolving balance. His main point was that there must be such a balance so that our civilisation should not decline irreversibly, through ignorance, under the pressures of unconsidered urbanisation or unbridled preservation. Lacking proper knowledge it was not good enough, in his view, to say "Wait till we learn" and try to stop development, for that would not help anyone, least of all the poor of the third world: rather we must "have the courage to adopt the best approach on the basis of what we do know from science and history (for) we will learn from our experience and can ameliorate the processes for achieving a global ecological balance in the light of that experience."

Many aspects of late twentieth century life have been characterised by extreme and over-reaction to events, apparently as a consequence of the increased speed of communications. An eloquent speech by an historical nonentity whose opinions are momentarily fashionable, an economist's estimate based on the forward projection of false assumptions, a good or bad forecast of production by a major company, or a strike or lockout can all lead to an immediate exaggerated reaction following a 30 second 'analysis' (sic) by one of television's innumerable universal pundits. The situation in relation to the environment may be little different, but for humankind, in the long term, potentially far more serious.

In recent decades we have moved in much of the world from a stage when development almost always meant construction of one sort or another and was automatically equated as being progress, with materials being used as though their supply was unlimited, to almost the direct opposite. Increasingly, cities seem to be regarded as pestilential to our morals, health and liberties, and the use of any natural material is seen as a sin. The surest way of discovering any merit in a broken-down and semi-derelict urban area is to propose its redevelopment, then wait for the chorus of protest. The quickest way to discover that a tract of land has characteristics that are unique or to discover the habitat of a hitherto insignificant insect is to propose that a new motorway or dam or airport should be developed or even, in many countries, that the land be brought under cultivation. It must be appreciated that every piece of land, be it natural wilderness or urban dereliction, is in
some way unique, and our consideration of any change must surely be related to the probable impact of that change.

An environmental impact statement assessing each proposal in isolation is of limited value and may be positively unhelpful. Cost benefit analysis on its own would have precluded the building both of mediaeval cathedrals and the Sydney Opera House: an efficiency study would no doubt favour the cabbage rather than the rose. All major development decisions must be made on the basis not just of anticipated environmental impact, but also of the social, economic and other implications and interactions, locally and regionally, often nationally or globally. In short, a decision must pay heed to the elements and forces of Ekistics that Doxiadis clearly identified. The human element is important, for we are, I think, primarily concerned with a world for humankind. This is our world, and the ecological balance we seek, like the conservation policies we adopt, must surely be governed in the interests of human beings and their surroundings. Consistent beneficial policies are needed: Doxiadis’ intention in developing the science of Ekistics, especially in its relationship with ecology, was to provide a basis for their evolution.

Much remains to be done. In reviewing Ecology and Ekistics, my colleague, Professor A.D. Bradshaw, pointed out that whilst ecology now has an ability to be predictive and thus to become formative of opinions, it is still far easier to predict the outcome of overuse of a sand dune system than of a city, despite the controls that planners can exercise. There is, as he says, a long way to go, for Ekistics does not yet relate closely to ecology as it is currently practised. There is certainly a need for better monitoring of proposals and for more responsive planning systems. Perhaps our first step should be to bring together people from some of the principal disciplines concerned, so that each may form a better understanding of the others’ aims and of the difficulties that have to be overcome. Even more important is the creation of an atmosphere of understanding amongst politicians and people that all environmental issues are related.

Progress has been made since Doxiadis’ ideas were first published, partly no doubt coincidentally, but certainly also partly because of the influence of his work. There are operative proposals for biogenetic reserves, for the reduction of pollution of the sea and for international cooperation. An omission at present, and perhaps one area for immediate cooperation, is the cost. As Doxiadis said, “If in becoming rich a European nation has done away with two-thirds of its wildlife, as it may have, it cannot insist that to maintain a global balance some African countries should retain every single part of their wildlife—and remain poor in consequence.” And to suggest that some urgently needed cultivation to help provide food for starving millions should not take place, but that the site be preserved at ‘any cost’ because of its
ecological value, is equally unrealistic. This is particularly so in cases where, for example, the reduction in regional oxygen production occasioned by consequential forestry operations that may be required can be counterbalanced by oxygen produced from the development and planting for productive use of former desert areas. Which wilderness will contribute most to the future of humanity and the world?

There are other possible and probably more effective long-term ways of saving wildernesses and much else, and of encouraging economic development at the same time. For example, if we were to reduce the 30-60% loss of crops between field and table through insects and other pests, there would be less pressure to chop down trees or to cultivate deserts. The knowledge is readily available, but not generally applied. One stage further removed from commercial application are some ways of upgrading many of what we now regard as waste products. For example, it should be possible to produce clean water, fertiliser and nitrogenous meat analogue from sewage. Investment in bioengineering, to advance these processes to the operational stage and to establish ways of growing animal protein foodstuffs in the developed countries (which could afford to do so), could lead to more home-produced food remaining in the less developed countries for their own consumption. The wise use of advanced technology in this and other ways could contribute significantly to the achievement of a continuing ecological balance, which to be effective must be realistic, scientifically sound and politically acceptable. Only if there is such a balance will it be possible for future generations to enjoy a beneficial urban life, or for there to be a wilderness.

Doxiadis' pioneering work has demonstrated ways of studying this balance and of examining environmental linkages. It has also demonstrated that if the world is to enjoy reasonable living standards and a reasonable environment we have no choice: a proper urban system is dependent on the development of a natural order. It is a future worth working for. For, as Doxiadis often remarked, if we do not try we can only fail; if we try we may fail, but we may succeed.

The wilderness is but one aspect of the world we inhabit. In our search for homeostasis, as we balance proper concerns for the preservation of wildernesses with ways of meeting the needs of humankind, and especially of the deprived, we know that nature goes its way without fear or favour, prejudice or rancour. Those who interfere might well bear in mind that in this, as in other contacts with nature, as they sow so shall they reap.

---

2. John Papadopoulos, Ekistics Volume 50, Number 301, July/August 1983, pp.300-305.

A lone sailboat is dwarfed by the Black Mountains in Arizona/Nevada, USA.

141
Interfering drastically with the nature without creates, of necessity, a disorder of the inner nature.

C.A. Meier
WILDERNESS
Culture, Education and Philosophy
Captions for colour pictures

Abruzzo National Park, Italy

Lake St Lucia, Natal, South Africa

Giraffe browsing in Umfolozi Game Reserve, Natal

Hippopotamus surfacing in an African river

Caledonian Pine, the symbol of wild Scotland

Cross-country skier above Glen Luibeg in January, looking up to Cairn Toul (left) and Ben Macdhui (right)

*Dactylorhiza fuchsii*, a common and sometimes spectacular plant of the hay meadows of the Hebrides

Red-necked phalarope (*Phalaropus lobatus*), Shetland Isles

St Croix National Scenic Waterway, USA

Pybus Bay, Alaska

Weld River rainforest, Tasmania

Puma (*Felix concolor*), in tropical forest of South America

Barrel cactus in bloom, Sonoran Desert, USA

Arches National Park, USA
Whither World Wilderness 2083?
A Look into the Crystal Globe

Ian MacPhail

You may wonder at my audacity in choosing as my title 'Whither World Wilderness 2083?' There is a moral to this: beware of flattery. When Ian Player invited me to speak, he said, "We want one of your provocative papers with an intriguing title." I fell for this and, without realising what I was letting myself in for, said, "My paper will be on World Wilderness 2083." Subsequently I experienced much anxiety until I had the idea of contacting some of the world's experts, asking them to look into their crystal globes. What I have to offer you is, in the words of Montaigne, "A garland of other men's flowers, and nothing but the thread that binds it is my own."

Before we look into the future, it is important to look at the past, so here are some 'other men's flowers':

Pythagoras: For as long as man continues to be the ruthless destroyer of lower living beings, he will never know health or peace. For as long as men massacre animals they will kill each other. Indeed, he sows the seed of murder, and pain cannot reap joy and love.
Leonardo da Vinci: The time will come when men will look on the murder of animals as we now look on the murder of men.

Chief Seattle: There is no quiet place in the white man’s cities. No place to hear the unfurling of leaves in spring, or the rustle of insects’ wings. But perhaps it is because I am a savage and do not understand.

Count Leon Lippens, the Belgian conservationist: The destruction of a wilderness area is like demolishing Chartres Cathedral to grow potatoes on the site.

Sir Frank Fraser Darling: By the time the man-in-the-street fully understands the meaning of ecology it will probably be too late.

Aldo Leopold, American philosopher/conservationist: There is yet no ethic dealing with man’s relation to land and to the animals and plants which grow upon it . . . . The land relation is still strictly economic, entailing privileges but not obligations . . . . Obligations have no meaning without conscience, and the problem we face is the extension of the social conscience from people to land . . . .

No important change in ethics was ever accomplished without an internal change in our intellectual emphasis, loyalties, affections and convictions. The proof that conservation has not yet touched these foundations of conflict lies in the fact that philosophy and religion have not yet heard of it. In our attempt to make conservation easy, we have made it trivial.

Finally, an anonymous flower: Greed will show quicker on a landscape than on a man’s face—and so will kindness.

When we look into the future, it seems that we have two choices where wilderness is concerned. Dr. J. McNeely, in a recent paper formulating certain priorities arising out of the World Conservation Strategy, calls these two options ‘Heaven Forbid’ and ‘The Golden Age’.

‘Heaven Forbid’ is doom-laden and utterly pessimistic. It suggests ‘Wither World Wilderness’ rather than ‘Whither World Wilderness’. The paper on this option would be the shortest in the Congress and would read something like this: “Owing to lack of public support we regret that 2083 has been cancelled. Surviving in the nuclear wilderness will be the cockroach, the rat and the bureaucrat.”

Most natural disasters—earthquakes, typhoons, hurricanes, droughts, famines, pestilence and floods—creep up on us and are unpredictable. I am a born optimist, and I believe that because the ‘Heaven Forbid’ option is predictable, it is also preventable . . . providing we have the determination and courage to do something positive about it. Perhaps the watchword of the 3rd World Wilderness Congress should be: The predictable is preventable.

Just as the predictable is preventable, it is also achievable, and I believe we can and must firmly grasp the ‘Golden Age’ option. Dr. McNeely describes it as follows:

In the ‘Golden Age’ option, everything will turn out well. The human population will stabilise, the best agricultural land will be used intensively,
with pests controlled by biological means and breeds constantly improved by
genes from the wild. Marginal land currently being misused for transitory
agriculture will revert to the wild, and allow wildlife populations to recover.
We will develop alternative means of dealing with the functions of war, nature
will be preserved in its pristine nature in natural parks, wild species will be con-
served wherever they occur, and the urban-dweller will keep in touch with his
wild heritage through travelling and television.

As I have looked into the future and how to achieve the ‘Golden Age’ option, I have been greatly helped by the experts I have con-
sulted. What follows is a garland of these ‘other men’s flowers’, with a
few wild flowers of my own. I invite you now to project your imagina-
tion into the year 2083 . . .

*****

After much heart-trembling tribulation, and a series of perplexing
and at times terrifying world crises, bringing humanity to the brink of
the nuclear holocaust, people came to their senses and created the
United States of the World.

I want you to imagine that my great grand-daughter, an eminent
zoologist and adviser to the International Fund for Animal Welfare, has
been asked to prepare background notes for the President of the USW’s
Keynote Speech at the 32nd World Wilderness Congress. This will be
held during the first week of October 2083, at the Antarctic World
Park Headquarters in Port Stanley in the formerly disputed
Falklands/Malvinas Islands.

The Presidential brief will read like this:

Dear Madam President,

I am deeply touched that you should have chosen for your Keynote
Speech at the 32nd World Wilderness Congress the title ‘Whither
World Wilderness 2183?’ borrowed from my great grandfather’s
paper at the 3rd World Wilderness Congress held in Scotland exactly a
hundred years ago. I remember him saying that in order to look into
the future it is important to look at the past, and with this in mind I
have prepared these background notes.

You will notice they are written on paper, which I have done
deliberately to give you a ‘feel’ of the past. It was indeed a great day for
wilderness when it was decided 60 years ago to give up using paper,
and to use electronics for verbal communication. Although this saved
millions of acres of trees, and paper is now used only for fine books and
musical scores, it did not do very much to deter bureaucracy!

To provide a truly historical perspective, it is necessary to go back
further than a hundred years, to 1871, when Congressman Clagett of
Montana, USA, introduced his famous Park Bill which was adopted by
115 votes to 60, with 60 abstentions, in one of the most formidable
and altruistic lobbying campaigns in US history. President Ulysses S. Grant signed the Bill on March 1st 1872. It read as follows:

That the tract of land in the territories of Montana and Wyoming, lying near the headwaters of the Yellowstone River is hereby reserved and withdrawn from settlement, occupancy or sale under the laws of the United States, and dedicated, set apart as a public park or pleasuring ground for the benefit and enjoyment of the people; and that all persons who shall locate or settle upon, or occupy the same or any part thereof, shall be considered trespassers and be removed therefrom.

Thus was created Yellowstone, the world’s first National Park, and with it a growing awareness of people’s basic need to commune with nature.

I would like to deal, now, with certain specific events nearer to us in time—events which, in spite of the human suffering involved, were to have a long-term beneficial effect on both humankind and wilderness.

Of all the great wilderness areas, the Antarctic was the most contentious, because of its potential mineral wealth. By 1990 what was then the USSR, with its slave satellites, had begun to get a taste of freedom under Olga Trotsky, the first Russian woman Premier. Her regime developed the freedom of the individual, the establishment of free enterprise, and a return to capitalism with free shares for all. Unfortunately this led to a series of World Power squabbles over the mineral spoils under the Antarctic ice, which nearly led to the outbreak of the Third World War and the horrors of the nuclear holocaust. In the nick of time, however, the world’s leaders held an emergency summit meeting in Peking, and conceived the imaginative idea of setting up the United States of the World. Some of the world’s most outstanding men and women were appointed as Governor of America (which absorbed Canada), of Europe (which absorbed Great Britain), of Latin America, and so on. Most appropriately Antarctica was declared a world National Park and peace reigned for some years.

The opening years of the 21st century were haunted by two explosive threats to peace, which hung like a sword of Damocles over the planet and suddenly fused in a horrifying way—the population explosion and the threat of the thermonuclear explosion.

The world population explosion became completely uncontrollable, leading to the Five Year Global Famine. The spectre of malnutrition, starvation, pestilence and death stalked both the industrial states as well as those formerly belonging to what was called the Third World. There were Famine Riots in all the state capitals, and skeletal Famine Marchers swarmed the rural areas in a desperate search for food. As the states began to revert to their old national status, the threat of nuclear war loomed again over the world. But, as has happened so often in the short history of the human race, outstanding men and women emerged from the survivors of the Famine, and common sense, good-
will and vision took control. The unthinkable was averted at the eleventh hour, and nuclear arms were destroyed and outlawed.

Gradually the population was brought under control. The two-child family became law, and the discovery of the male contraceptive pill resulted in a safe and reliable method of birth control. Inspired advocacy of its universal use was given by Her Holiness the Pope, who in her famous Papal Bull decreed that it was the duty of all Catholics to practise family planning.

The production of food was rationalised by strict controls and the prudent use of land. The dust bowls created before the Five Year Famine were returned to wise harvest, and the food resources of the sea were strictly controlled. Food was still in short supply, but nobody starved.

You will recall the experiments in utilisation of human protein. In those days of shortage it was compellingly argued that it was a profligate misuse of potential food to bury or cremate human remains. In spite of the skills of the food technologists and marketing experts, the repugnant idea never caught on. However, the universal revulsion it created was to have a very special effect on both people and wilderness. Slowly but surely people became vegetarians, with beneficial side effects on their health: the end of obesity, heart disease, etc. The billion dollar slimming industry was also ended. Years ago people had begun to find it distasteful in a still unequal world.

Will future generations' only experience of African elephants be through life-sized plastic replicas at Disneyland?
The greatest benefit to wilderness of the dietary revolution was that the large areas of land set aside for meat production were used more prudently. These included areas like the Amazon jungle where thousands of acres had been cleared to grow cattle for hamburgers, or like Botswana, where the semi-desert country was turned into real desert by over-grazing a gross population of introduced domestic cattle. The revolutionary change in people’s diet also ended factory farming, which most people found unacceptable. So out of suffering came some good and positive long-term benefits. It was the beginning of 'reverence for life' and the end of our inhumanity to our fellow animals. It also marked the end of bloodsports—the killing of animals for so-called pleasure.

During the past hundred years a number of animals have gone the way of the dodo. It has been nothing like the numbers so gloomily predicted in the 1980s, but today we mourn the passing, forever, of the grizzly and polar bears, the tiger, the giant panda (ironically the symbol of the World Wildlife Fund) and the bald eagle (proud symbol of the old United States). On the credit side, many hundreds of new plant and bird species have been discovered.

The African elephant populations were seriously depleted, especially during the Global Famine. In some of the popular African parks they are augmented by realistic plastic and micro-circuitry replicas produced and maintained by the Disneyland organisation.

For many years nutritional scientists had pointed out that the world’s population could be fed on soya beans grown in an area the size of Ohio (one of the old states of the USA). A revival of this idea triggered off what became one of the biggest and most challenging engineering projects of the 21st century. The World Corps of Engineers pointed out that Australia was the world’s biggest island, but was surrounded by salt water. The challenge was how to make it into the vegetable garden of the world. A chain of nuclear-powered desalination plants was built around the whole coastline, creating a series of lakes, some as big as France. The desert bloomed, and an abundance of cereals, vegetables and fruits was made available. New wilderness areas were also created for people’s delight and inspiration. The engineers then began an even more daunting and gigantic civil engineering project—to tackle the problem of water supplies which had been seriously depleted by over-population. The river systems of Canada and the former United States of America were diverted into different paths so they did not reach the sea for thousands of miles. Great care, however, was taken also to ensure a flow of water along the old river beds, so that the ecosystems of estuaries and other wetland areas were undisturbed. The success of this scheme resulted in similar engineering projects in the States of Europe, Africa and elsewhere, which provided water for human consumption, irrigation and hydro-
electric power. Water was even piped from the State of Europe to desert areas in what used to be called the Middle East.

The Golden Age began. With it came a return to spiritual values, the unity of the Christian Church and the disbanding of missionaries, and the free worship of all religions. With this Age of Awareness and Enlightenment the four freedoms (first declared in the dark days of the Second World War by President Roosevelt and Winston Churchill) became world law:

- Freedom from Fear
- Freedom from Want
- Freedom of Speech
- Freedom to Worship

Ironically, one of the human problems which remained to be solved was created by the use of robots and microcomputers, which led to the one-day working week. The problem was the rational and enlightened use of leisure, and it became the main subject in the school curriculum. One of the many uses of leisure is to be found in wandering among the wonders of wilderness, pursuing a recreation which is more of a recreation. Our forebears fought to preserve the wilderness, and today we carry the torch they passed on to us. In the wilderness, when we think about them, we might say, “If you seek their monument, look around you.”

Madam President, these are a few background notes for your speech. To end it may I suggest that you reiterate my great grandfather’s words at that other Congress, a hundred years ago:

THE PREDICTABLE IS PREVENTABLE... OR ACHIEVABLE.

* I would like to thank Sir Peter Scott, Sir Peter Kent FRS, Thor Heyerdahl, Professor Peter Jowett and Dr. Keith Eltringham of Cambridge University, Sir Vivian Fuchs FRS, Gerald O. Barney, eminent American researcher on world problems, Dr. J.G. Masley, Director of the Australian Conservation Foundation, Mark Halls and Dr. Thomas E. Lovejoy of the World Wildlife Fund, Eddie Brewer, Director Wildlife Conservation, The Gambia, and Major Ian Grimwood, winner of the Third J. Paul Getty Prize for Wildlife Conservation.
Wilderness is nature in her original condition, undisturbed and unadulterated by human beings. Does that mean Paradise? Ever since the original sin, Paradise has been forbidden to us, but, according to Jewish tradition, God has relocated Paradise to the end of time—which makes it eschatological, a utopia, goal or apokatastasis tôn pantôn (re-establishment of everything). The implication in this is that Paradise—and wilderness—was originally in order, and that human interference has created disorder. How has this come about? Here we are confronted with the age-old problem of the opposites—nature/culture; matter/spirit; evil/good—with humanity placed right between them and having to cope with the tension between them.

In Genesis we are told to make use of everything present and to multiply. We have certainly done so, even to the extent of creating the atom bomb and the population explosion. We have abominably abused the liberty given to us, to the point where we may soon extinguish ourselves by behaving as if we ourselves were the Creator. We are suffering from hubris to an extent that cannot go unpunished.

On the other hand, in humble obedience to that original commandment, we have only made use of the laws of nature, exploring, for instance, physics, chemistry and biology as best we could according to
our limitations. Where then is the mistake or sin? My humble answer, arising from fifty years’ experience with disordered human beings, is that we have become intoxicated with all the frantic ‘progress’ in the outer world, we have become lopsidedly extraverted and have forgotten our soul. Lost in the outer, we are estranged from our soul and our own inner nature.

But we have paid for it. Neurosis has become the plague of our days, the penalty for our hubris. Interfering too drastically with ‘nature without’ of necessity creates disorder of the inner nature, for the two are intimately connected.

To understand this, we need to look briefly at the history of some of the ideas which have preceded today’s concept of wilderness preservation, and to delve into the essence of philosophy, psychology and medicine. The connection between ‘nature without’ and our inner nature has long been part of our philosophical tradition. According to the presocratic Greek philosophers, the universe was one big organism with its many organs functioning in perfect Harmony. Humankind was only one of these organs. For Parmenides, the universe consisted of two components, love and hatred, attraction and repulsion, which cyclically changed from one to the other in due course of time. This view tacitly presupposed the existence of what was later called sympatheia tôn holôn (‘sympathy of all’ or what has been called ‘holism’) and the inter-relatedness of all things in the cosmos, an idea which found its fundamental place in the philosophy of Poseidonius.

This philosophy, in which humanity is peacefully contained in something very much bigger than ourselves, prevailed for many centuries and focused principally on the relationship between the macrocosm and the microcosm. The human being was conceived of as a small cosmos, containing everything in the world right up to the stars—for indeed, if this was not so, how could we ever understand anything out there? Epistemologically, Plotinus taught that our perception is only possible through Sympathy between Subject and Object; while Sextus Empiricus said that perception, cognition and understanding are possible only through an outflowing of the macrocosm into the microcosm (us). Porphyrius taught that the soul, when it encounters the visible, recognises herself in it, as she carries everything within herself and the All of things is nothing else than the soul.

Another aspect of the relationship between the macrocosm and the microcosm which brings us closer to modern psychological problems is the thorny question of the relation between the psyche and the soma, Psyche and Physis, Soul and Body, which to my mind inevitably leads us to the religious question.

Since Poseidonius the macrocosm and the microcosm have never been conceived of as a pair of opposites, but rather as complementary
aspects related by the aforementioned Sympathy. Poseidonius himself saw this relationship including the macrocosm within the human being; while for Iamblichus it was precisely this relationship which justified the operation of the priest:

In all theurgical operations the priest sustains a twofold character; one, indeed, as man, and which preserves the order possessed by our nature in the universe; but the other, which is corroborated by divine signs, and through these is conjoined to more excellent natures and is elevated to their order by an elegant circumduction, this is deservedly capable of being surrounded with the external form of the Gods. Conformably, therefore, to a difference of this kind, the priest very properly invokes, as more excellent natures, the powers derived from the universe, so far as he who invokes is a man; and again, he commands these powers, because through arcane symbols, he, in a certain respect, is invested with the sacred form of the Gods.*

The priest therefore brings the macrocosm (divine actions) down into us, the microcosm. However, in working with this idea we have to be careful not to become inflated and so lose awe and respect for the macrocosm, or nature.

The relationship between the macrocosm and the microcosm became a fundamental notion of Renaissance philosophy. In it the microcosm was seen as the mirror of the macrocosm, to the extent that the perspective was even inverted: the world became a makranthropos, or megas anthropos, and the human being was therefore a concentrate
of everything of importance in the cosmos. This idea increased the danger of self-inflation. Pico encapsulated it thus: "For if man is a small world, then the world is a big man." John Scotus Eriugena (ca. 820) said something similar: "Man is the inclusion (or end) of all, since everything is in him enclosed." And according to the Swiss Paracelsus: "Everything was created in One; macrocosm and man are one." This basic conviction probably accounts for his worldwide success as a medical man, for he always tried to bring about harmony between the macrocosm and the microcosm, the loss of which, according to him, accounted for his patients' sickness.

With the Renaissance came the dawn of the natural sciences, and as we focused more and more on exploring the external world, the harmony and balance between the microcosm and macrocosm began to suffer. In our attempt to discover more about the external objects in our world, we began to analyse and dissect them, sometimes, if they happened to be living creatures, even killing them as a result. As the natural sciences developed, respect for nature as a whole disappeared and we lost our original fear of her. We no longer brought sacrifices to her, and began to see ourselves as dominating her, to the extent that today our knowledge of the laws of nature has led us to the construction of the A-bomb, and to a domination of nature that is in many ways destructive.
But this has not been without effect on our inner nature (microcosm), for in the process we have lost something valuable, healthy and sane, and the price we pay for it is anxiety neurosis. The dangerous aspects of nature which kept our forebears watchful and humble, and which have now almost disappeared, have turned inward, and the whole of Western society is rapidly approaching a physical and mental cracking point as a result of the dangers within.

This is a very serious matter, for if ‘wilderness without’ disappears completely, it will inevitably resurrect powerfully within, whereupon it will immediately become projected, enemies will be created and so forth. Its terrifying aspects will take revenge for our neglect, lack of reverence and ruthless interference with its beautiful order. For wilderness is by no means chaos: it is most admirably ordered and organised, quietly obeying the laws of nature. As long as it is not interfered with too badly, it functions beautifully.

Ostanes, a famous Persian-Egyptian alchemist authority said in the 4th century BC: “Nature enjoys nature; nature vanquishes nature; nature rules nature.” There is a depth of meaning in these few lines, for if we let nature be as she is, she will enjoy herself like a virgin; and so she will always be victorious and self-regulated; and she will religiously obey her own rules.

Modern terminology calls this Cybernetics, meaning self-regulating. But what if nature is no longer left to regulate herself, if she is too badly wounded and interfered with to be able to recover? The repercussions of this sacrilege in the psyche of a single human being are unpredictable, but one thing is certain: as a result of this unrelenting process of destruction, we are in great danger of losing our humanity.

One of the basic laws of physics is that action = reaction. If we interfere with ‘wilderness without’, something will inevitably happen to us as a reaction, ie, to ‘wilderness within’, or vice versa. And if we damage ‘wilderness without’ too badly, ‘wilderness within’ would really go ‘wild’.

This is because there is a dichotomy in human beings: on the one hand we are an intrinsic part of nature, and on the other hand there is something different in us which seeks to understand the One. We have to learn to live with both aspects of ourselves and to cope with the tension between them, respecting the subtle balance. For centuries Christianity has emphasised that a mature person should be freed completely of his or her carnal being. But such a person turns sour, for, like ‘nature without’, our inner nature also does not tolerate too much interference such as repression, askesis and so forth. In order to remain sane we have to keep the balance as best we can.

How is this to be practised? I am a psychologist, and so am not able to give technical advice on matters of conservation, but I can intimate how psychology may help. First, we have to admit frankly that in spite
of our Culture we are still mammals, ie, natural beings. Culture tends to forget this aspect of ourselves and its archaeological and prehistoric existence in our unconscious psyche. However, everything of which we are unconscious in ourselves is automatically projected. To illustrate this we have only to think of our primitive fear of creatures like spiders, mice, snakes or tigers, most of which are perfectly harmless if unmolested.

The powers in the unconscious are so overwhelming that we tend to project them as far away as possible. An example of this is the way in which people today are increasingly turning to secular astrology, projecting their fate on to the stars in this time of growing insecurity on the planet. Scientifically it is inconceivable that specific stars could have extremely personal effects on the lives of Tom, Dick or Harry. But when we look at this from a psychological perspective, a different picture emerges.

We have created constellations out of purely statistically distributed single stars, endowing them with mythological names, such as Andromeda or Orion, and populating the sky with a vast collection of gods and myths. These images are archetypal, which means they correspond to certain pre-existing images and processes in our collective unconscious which we simply project on to the stars. This is not altogether harmless, since projection is a psychological action which consequently has its reaction on us. In this way the archetypal images represented by these benevolent or malevolent stars or constellations affect our behaviour, however unconscious we may be of them, and thus they constitute our ‘fate’. If we remain unconscious enough of them, the archetypes go to work and the boomerang of projection hits back.

Archetypes are frighteningly contagious, as can be seen in many mass movements in history—for instance, the Huns, Vandals, Turks, the French Revolution, Napoleonism, Hitler and the Kremlin. Identifying with an archetype can produce the megalomania that you are the ruler of the world and something close to God Almighty.

The archetypes are within us, and some of them represent the chthonic part of our soul, by which we are linked to this Earth, nature and wilderness. We are fascinated as well as afraid of these archetypal components of nature, and seek to know more about them. We climb mountains, and explore the dangerous and hostile areas of Earth—the Arctic and Antarctic with their icy coldness and darkness, the desert with its heat and dryness, the impenetrable jungle, the sea with its frightening storms and unfathomable dark depths. But these areas can all also be found in the depths of our own unconscious, and the tragedy is that with all our increasing knowledge and domination of ‘wilderness without’, we still cannot tranquillise the inner wilderness.

Some years ago I heard from Richard Wilhelm the story of the rain-
maker of Kiao Chow, an event which he personally witnessed and which beautifully illustrates both the establishment of a harmony between the macrocosm and the microcosm, and also the way in which we, the microcosm, are capable of contributing to this harmony.

Wilhelm lived in a district in China which was experiencing a terrific drought and was threatened with famine. The local rain-makers tried to produce rain, but to no avail, so finally they sent for China’s most famous rain-maker, who lived far away in Kiao Chow. When he came, he asked only to be left by himself in a lonely place in the wilderness, with one person visiting him daily to bring him his meals.

After a few days without rain the local people became impatient and sent a delegation to ask him why there was no success, but he simply sent them away. The next day it started snowing (in mid-summer!) and then the snow turned into pouring rain. When he came back to the village, people asked him why it had taken him so long. He declared: “When I came to this district I immediately realised that it was frighteningly out of Tao, whereby, being here myself, I was naturally also out of Tao. All I could do therefore was to retire into the wilderness (nature) and meditate, so as to get myself back into Tao. But I can tell you it needed hard work.”

With that he returned to Kiao Chow, happy as a lark.

This whole event may of course be dismissed as sheer coincidence, as such outer events described may happen in full accord with the laws of nature once in a blue moon. But from a purely meteorological perspective, snow in mid-summer is highly improbable.

Psychologically, the event can be seen as follows: the magician comes to a place which is physically out of order and thereby becomes out of order himself (being contaminated, introjecting, taking the macrocosm into the microcosm), so that he becomes part of sick nature. He then makes an effort to put himself in order (Tao) again, which is hard work, but eventually he is successful, nature herself is healed and it rains; i.e., the boomerang hits the target.

To sum up, psychology sees us as metaphorically living in the upper floor (consciousness) of a house which is supported by the lower floor and eventually by its foundations, the cellar. The lower floor and cellar represent the unconscious, the Earth, Mother Nature and, when in its original condition, the virgin nature with which we live in a sort of participation mystique, and it is here that the archetypes live.

The archetypes or Instincts are the psychological aspects of the biological facts, the patterns of behaviour by which we live and are lived. Inasmuch as we are unconscious of them, they are projected and experienced as if they were in the macrocosm. Although this part of the psyche strictly belongs to us, the subject or microcosm, we experience it in the form of outside objects, creating, for example, werewolves, weird places filled with demons, wells populated by nymphs.
or djinns, and so forth. In other words, our soul is divided up into many partial ‘souls’ or fragments. In this sense, wilderness is really the original biotope of the soul.

With the development of consciousness in our Western civilisation, these fragments are slowly integrated. But it is important to remember that a total integration—or what Jung called Individuation—is a vain desideratum, for the unconscious is as inexhaustible as nature. This is our ‘wilderness within’.

The correlation of the microcosm and the macrocosm is itself the best justification for wilderness preservation. In order to remain sane and healthy we need to preserve the balance and harmony between the two, and it is ever so much better to preserve ‘wilderness without’ than to negate ‘wilderness within’, which inevitably means that it goes rampant and becomes projected on our fellow beings, friend or foe. Apart from analysis, I know of nothing better for the maintenance of harmony than to keep ‘wilderness without’ alive and unspoiled. Those of you therefore who are working for the preservation of wilderness are not only acting ideistically or ideologically, but are also making a vital and substantial contribution towards the health of humanity globally.