Scoil Dara
Kilcock, Co. Kildare

ALDO PAPONE CASE STUDY 2003

The Travel and Tourism Programme in Ireland

SUSTAINABLE TOURISM

The Wild Beauty of The Irish Bogs

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1 PREFACE

This case study is the result of a presentation made by the students of Scoil Dara, Kilcock for the G.T.T.P. International Student/Teacher Exchange in Frankfurt in November 2003.

In it we introduce our audience to the Irish bog – an example of the last of the great wildernesses of the world.

We invite you to step out of the rat race and into an Irish bog for a holiday you will always treasure in your mind's eye.

We hope to impress upon you that Irish bogs are sustainable as tourist attractions because:

- They contain attractions for a wide variety of types of tourists.
- Bog tourism raises awareness among tourists from Ireland and abroad of their unique value in the Ecosystem of the planet.
- They are a valuable source of employment in areas where other forms of employment are absent.

Hence our title

"The Wild Beauty of the Irish Bogs"

2 WHAT IS SUSTAINABLE TOURISM?

Our understanding of sustainable Tourism is that the Tourist attraction is managed so as not to kill the goose that lays the golden egg.

The alternative is to develop the tourist attraction rapidly for a quick profit. This approach does not involve long-term planning; neither does it incorporate any care for the environment. The result is that large numbers of tourists will be attracted in the initial years but they will degrade the landscape with noise, litter, water and visual pollution. The original attractions of the area are damaged by over-exposure. This has been the case with the Spanish Costas whose tourist numbers have grown from million per year in the 1950's to 62 million per year today. Numbers have now peaked as tourists seek less congested and less polluted destinations elsewhere.

Sustainable tourism involves long-term planning. It means that the landscape has to be loved, respected and cared for if it is to continue to provide locals with a reasonable and ongoing livelihood from tourism. It means that all tourist developments must be in keeping with local culture and local building styles. It involves continuous investment into keeping the attraction in pristine condition. It is not well served by mass tourism. The people of the Swiss Alps have followed this approach since the 19th century. Today the region is as attractive to tourists as it always was and it is self-sustaining.

3 INTRODUCTION

Dia dhiabh a chairde agus fáilte go Portaigh na hÉireann.

We undertook the study of Irish bog land because it is the book which tells the story of the Irish people and the Irish landscape. Every chapter in the evolution of Ireland since the Ice Age is recorded here and is unaltered since the day it was written.

We think it is a story worth telling to ourselves to remind us of our ancient heritage and the richness it contains. It is also a story we want to tell to visitors who come to Ireland because there is no place else in the world where the story of ancient people, ancient animals, ancient vegetation and ancient climates are so perfectly and accurately recorded than here in the simple bog.

We do not invite the mass tourists who flock to the sunspots of the world for an all-over tan. We do invite the discerning tourists who want to break free from the madding crowd into the wilderness of our beautiful land. We invite you to fill your lungs with pure bog air, to feast your eyes on an empty horizon and to open your ears to nature's stillness, broken only by the call of the snipe and the song of the skylark. If you accept our invitation you will discover how

"To see a world in a grain of sand
and a heaven in a wild flower.
Hold infinity in the palm of your hand
And eternity in an hour".
William Blake.

4 A TOURIST TRAIL BACK TO THE DAWN OF HISTORY.

15,000 years ago: The ice age reached its peak.
13,000 years ago: Ireland began to recover from the grip of the retreating ice, which shrank back towards Scandinavia.
12,000 years ago: Ireland was a great tundra grassland. The melting ice had not yet flooded the areas known today as the North Sea and the Irish Sea. So Ireland was part of Great Britain and Mainland Europe. It was by this land bridge that the Giant Irish Deer travelled to Ireland as did the Mesolithic (early stone age) people.

10,600 years ago: A return to severely cold conditions killed off the Giant Irish Deer.
10,000 years ago: The climate improved. Temperatures were 3° warmer on average than today. The climate was wetter also. The wet climate plus the melting of the remaining ice resulted in the post-glacial landscape of Ireland being very watery. Ireland was covered in shallow lakes the largest of which was the Shannon. The lake covered the whole basin drained today by the Shannon and its tributaries.

The landscape was littered with great hummocks and ridges of boulder clay, sand and gravel, all of which had been dumped by the ice. Drainage was impeded by this glacial debris so the water in the shallow lakes could not drain away.

The lakes were rarely deeper than 3m. Sedimentary material was blown by wind and washed by rivers into these lakes. This is the marl in which the remains of the Giant Irish Deer were trapped underneath the bog. The marl was up to 1m thick.

9,000 years ago: The shallow lakes began to turn into Fens.

8,400 – 9,000 years ago: Mesolithic people had arrived in Co. Offaly.

7,000 years ago: The Fens began to change into raised bog. The climate had become wetter. This suited the growth of sphagnum moss.

5,000 years ago: The cold wet conditions caused bog to grow over the farms of the Neolithic settlers of the Céide Fields.

5 WHAT IS A BOG?

FORMATION OF FEN: (APPROX 2M DEEP)

In postglacial Ireland the landscape was very watery (9,000 – 10,000 years ago). This water could not drain away because of the glacial debris in mounds and ridges scattered throughout the region. Marl accumulated on the lake floors. Water plants began to grow on the shallow lake floors. At first open water plants predominated i.e. water lilies. As the lakes got shallower reeds and rushes took hold. The lake slowly filled in from the outside towards the centre until the lake became shallow enough for a person to walk on it. A post glacial rise in land level or fall in sea level caused the marsh plants to consolidate and build a more solid footing as decaying vegetation accumulated. The marsh gradually became fen dominated by black bog rush, Parnassus grass and common butterwort.

In fens circulating ground water filters all the time through replenishing the supply of nutrients. As the fen grew upwards, the plants could not draw on the nutrient-rich water from below so the fen entered a transition period, where heathers and trees spread across the fen. Sphagnum Moss was the catalyst in changing the fen to raised bog. Once these plants got hold and organic debris accumulated rapidly, the fen grew upwards out of the reach of moving ground water.

Approximately 7,000 years ago conditions became much wetter and cooler, accelerating the growth of raised bog.

FORMATION OF RAISED BOG (7.5 – 13M DEEP)

Raised Bog began to take over from fen peat approximately 7,000 years ago.

The plants which could survive when the fen rose above the level of the nutrient-rich ground water were those, which could survive on rain alone. Conditions changed from alkaline to acid. The only source of nutrition for true bog plants are rainwater and
wind-bourne dust.

In the transition period from fen to bog there is "woody fen" peat where the roots, stems and leaves of scots pine, oak, yew and birch display a mosaic of natural regions reflecting the vanishing ecology of the early fen.

As the bogs developed they grew not only upwards but outwards beyond the margins of the original lake basins on to the surrounding mineral soils (limestone glacial drift) where a rich variety of trees grew. Their roots (scots pine, oak, alder, hazel, yew) are still in their original position of growth. The raised bog is dome shaped. Its dominant vegetation, sphagnum moss, is like a great big sponge, sucking up all the water beneath it. Intact bog is over 95% water, more liquid than milk. Eventually the bog swallowed up hummocks and hollows alike, though occasional hillocks of drift did escape as wooded islands surrounded by bog. Some such islands were large i.e. Walshes Island, Lullymore and Lullybeg. Those islands were where some Celtic monastic hermits found refuge between the 5th century and 11th century.

FORMATION OF BLANKET BOG (2.5M DEEP APPROX.)

Blanket Bog is climatic. It develops where summers are cool, humidity is high and there is over 1,250mm of rain, spread throughout the year.

It occurs in the West and on mountains. The word "blanket" means that it follows the shape of the topography. They rarely start in hollows and don't have fen peat at the bottom.

The underlying rock is nutrient-poor (acid rock). The factors which influence their development are:

Rainfall (heavy).
Acid rock (igneous or metamorphic).
Human Influence.

Bogs were absent from the West of Ireland when the first farmers arrived. Clearing of woodland and burning the vegetation encouraged water logging and leaching. This poor land management played a significant part in the spread of blanket bog as it does in its disappearance today. Blanket Bog is divided into two categories:

1. **Lowland Blanket Bog** – below 150m O.D. i.e. lowlands of Galway, Mayo, Kerry, Cork and Donegal.
2. **Upland Blanket Bog** – between 150-300m O.D. i.e. the mountains of Galway, Mayo, Kerry, Cork and Donegal.

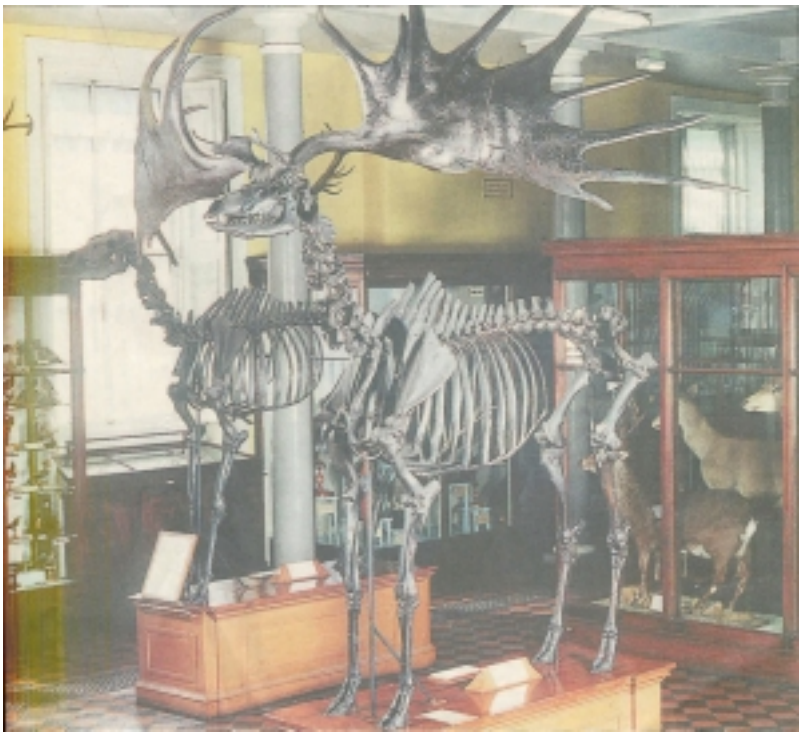
6 BOGS AS LIVING MUSEUMS

BOGS AS ARCHIVES OF THE PAST

The bog is the most ancient history book. One millimetre of undecayed vegetation falls into its acid anaerobic water each year. That is one page of the history book. That page is imprinted with events of that year. Each of these pages, all 9,000 of them lies in the bog undisturbed since the year it was first put there. When the turf cutter slices down into the peat, he is quite literally turning back the pages of history.

THE GIANT IRISH DEER.

The last Ice Age reached its peak around 15,000 years ago. Ireland began to recover from its grip 13,000 years ago. The climate improved rapidly and plant and animal life began to make its way back into the country, the largest animals using the land bridges, which connected Ireland to Great Britain and mainland Europe. Tundra grasses extended across Ireland in front of the retreating ice. The most wondrous spectacle of the Irish landscape of this time must have been the herds of enormous deer, which wandered the vast grasslands between 12,000 and 10,600 years ago. Enormous is not an exaggeration. These deer were huge in every sense. They were up to 2m in height at the shoulders, but their most amazing endowment were the antlers of the stag, which spanned up to 4m and had a dry weight of as much as 35kg. These were the largest deer which ever lived and, although they roamed most of Europe, the densest populations seem to have been in Ireland. At least this is where most of its fossils have been found. So it is appropriately referred to as the Giant Irish Deer.



Fossil Giant Deer have been recovered from the lake marls all over Ireland but one place which has yielded more than any other single locality is the small bog of Ballybetagh in South County Dublin. Thirty giant deer skeletons were found here during a Famine relief scheme in the 1840's when a channel was being dug across the bog. By the end of the century, Ballybetagh had yielded 120 skeletons. Strangely, all belonged to old male animals. There were no females or young. It would appear that the giant deer had similar habits to many living deer today. Males and females congregated together only during the rutting season in the autumn. During winter the stags gathered along sheltered valleys and around lakes while the females and young were out in more open country.

The massive antlers were used for display and to determine social rank among the stags. In spite of their size it appears likely that they were also used in combat.

Having to grow a new set of antlers each year made enormous demands on the animal's resources. The antlers grew at a rate of several inches per day. This could only be done in spring and summer when there was an abundant supply of food. The fawns were born in spring. This gave them plenty of time to build up their strength for the winter. Only the male deer had to carry the burden of the antlers. The female deer was a more graceful animal without the neck muscles needed to hold up the antlered head.

All the Giant Deer remains have come from the lake marls underlying the raised bog. Between 10,600 and 10,000 years ago there was a brief return to intensely cold conditions. It is now believed that the deer which had congregated at the edge of Ballybetagh Lake had died of weakness and hunger. They were unable to survive the rigours of the deteriorating climate. We know they died in winter from the poor condition of their antlers, which were shed each winter. Most of the Giant Irish Deer skeletons are in the National Museum of Ireland today. Tourists visit the National Museum each day to experience the wonder of the Giant Irish Deer for themselves.

POLLEN EVIDENCE

Pollen grains of flowers, cone-bearing plants, fern spores, mosses and fungi are wrapped in a chemical, which resists decay. So every bog contains samples of the spores and pollen grains, which fell on its surface every year throughout its build-up, giving a detailed record of the plants, which grew, on its surface and in its vicinity.

The name of this game is "pollen analysis". It is played by collecting peat samples from known depths. Using strong chemicals, the humified peat is dissolved away leaving the tough grains and spores which, after concentration in a sort of scientific spin-dryer called a centrifuge, are stained, identified and counted.

Pollen analysis of the lake and peat deposits found below, around and above the Giant Irish Deer tell us that the deer fed on lush grass laced with arctic and alpine plants, sedges, docks, sorrels and the leaves of small willows and junipers. There were no large trees around. All these plants arrived before the deer; their light seeds carried by the wind or by birds. From 10,000 years ago the climate improved and trees dominated the landscape for several millennia. This is also known from the pollen spores they yielded up to the bogs. When the Mesolithic people camped at Lough Boora, Co. Offaly between 8,400 and 9,000 years ago, the pollen evidence reveals that temperatures were 5º warmer than today. It was a wet climate so the vegetation of the time consisted of thickly wooded lowlands of oak, elm and alder in the lowlands with pine on the higher ground. These are the trees whose trunks and roots were later swallowed up by the growing bog.

When the Neolithic farmers of the Céide Fields abandoned their farms around 5,000 years ago it was because the climate had become colder and wetter. Climate deterioration is recorded in the disappearance of tree pollens. The cold damp conditions continued. The growth of peat accelerated, swallowing up the fields of the Céide farmers and burying the roots of the great forests, which had covered the landscape since the Ice Age.

EARLY STONE AGE PEOPLE (MESOLITHIC)

Boora bog, Co. Offaly is part of the largest area of raised bog in the midlands. In the mid 1950's a small lake in the middle of the bog was drained to facilitate cutting by Bord Na Móna. By the mid 1970's the fen peat at the eastern edge of the drained lake was starting to erode. As it did, a ridge of cobbles began to appear. It was called the stony corner where geese gathered in winter. Joe Craven, a fieldworker with Bord Na Móna became suspicious. He informed Dúchas. It was identified as a storm beach at the edge of a great lake that covered the area after the Ice Age. Near Crancreagh Bridge, 8km to the west, a single wave eroded mushroom stone marks the position of what must have been the North Western edge of the lake. All this tells us what the landscape looked like after the ice age.

What was startling was the discovery on a promontory jutting into the ancient lake of the remains of 14 hearths. The charcoal from the hearths gave radiocarbon dates between 8,400 and 9,000 before present, establishing the presence of human communities at the heart of Ireland in the early Mesolithic. Around the hearths were 400 blades of chert and flint, chert scrapers, polished stone axes, the remains of meals i.e. burnt bones of deer, pigs, hares, birds, fish and hazel shells. The discovery pushed the date of the colonisation of the Irish Midlands back more than 3 millennia to 500 years after the Ice Age. People came before the bogs in Ireland. Wooden artefacts of the time preserved in bogs include an alder wooden shield found in 1934 at the bottom of a raised bog in Cloonlara, Co. Mayo. Before this discovery, it had been believed that the Mesolithic settlers had been confined to the East and North East coast i.e. Co. Antrim. The Lough Boora and Cloonlara finds tell us that they did penetrate the country. 10,000 Tourists each year visit Lough Boora Parkland, which apart from the Mesolithic Campsite is an excellent example of a cutaway bog, which is regenerating very successfully.

LATE STONE AGE PEOPLE (NEOLITHIC) I.E. THE CÉIDE FIELDS.

Céide Fields was a farming countryside of homes scattered throughout the landscape, surrounded by their garden walls, very similar to the Irish landscape today. The great difference is that this landscape was lived in and worked 5,000 years ago and not since then.

It has been preserved, undisturbed for 5,000 years by 4m of blanket bog.

The simplicity of the fields conceals the fact that here is the most extensive Stone Age monument in the world. It is also the oldest enclosed landscape in Europe, covering an area of more than 1,000 hectares of ordinary farmland trapped in time by the growth of the bog.

The main feature of this site is the simple stone walls, which make up field boundaries. Turf cutting for a few generations has been like a free archaeological excavation, which, by removing the bog, has exposed again the land surface, which has been buried all that time. It is not the stone walls themselves, which are of interest but the evidence they provide of a thriving farming community. This settlement is exactly as it was 5,000 years ago. Not a stone has been touched. Contrast this with anywhere else in Europe, where land has continued in use by farming communities over the millennia. Even though individual monuments from the Stone Age do

survive elsewhere they sit today in a modern landscape with no possibility of knowing what the landscape was like at the time.

Céide Fields is a countryside of regular rectangular fields almost certainly for cattle, though some smaller fields have been found where wheat and barley were grown. The main plan of the Céide Fields shows that the fields were laid out in two sets of parallel field boundaries with some of the walls running for almost 2km.

Perhaps the most interesting way to get the meaning of what we have in this landscape is to step down from the present bog level to where the Stone Age land surface was. Each step represents a thousand years. Each step takes you on to a level, which is made up of plants, which grew a thousand years earlier than the plants in the step above.

The first step leaves you standing on plants, which grew here about 1,000 years ago when the Vikings held sway from Scandinavia to the Black Sea and as far South as the West Coast of Africa.

The second step brings you to stand on the plants, which grew at the time of Christ when the Roman Empire was at its height.

The third step leaves you standing on the plants of 1,000 B.C. when the celtic warriors were coming to power in Europe, north of the Alps. South of the Alps at this time Rome and Athens were little Mediterranean villages.

A fourth step brings you on to the vegetation of 2,000 B.C. Metal working had just been introduced into Ireland. It had been discovered that beer could be made from barley.

The final step brings you on to the mineral soil beside an ordinary stone wall. Except this is no ordinary wall. The field it surrounds was already deserted and the bog had already grown up half the lower step before the Pyramids were built in Egypt.

An oval enclosure with low stone walls was excavated in the mid 1980's. Some domestic materials were discovered including bits of broken pottery vessels, some flint objects and arrowheads. Because the pottery is similar to that found in Stone Age tombs elsewhere in Europe, we know that these people were part of the great community of early European farmers. The most interesting find was the cutting part of a plough. The plough would have been made of wood and would have been drawn by cattle as the horse had not yet been brought to Ireland.

Within the enclosure a number of postholes suggest that a single round house about 6 metres in diameter was constructed inside. This could have accommodated no more than a single family. A radiocarbon date for the hearth indicates that the family lived here a few centuries before 3000 B.C.

The oval enclosure compares in no way with the average stone fort of later Celtic times. The fact that the inhabitants of Céide Fields had no defensive walls is the most eloquent monument to the society of that time. This family dwelling was part of a community which must have numbered hundreds at Céide Fields alone. This sizeable community lived in peaceful conditions. Otherwise, individual families could not have lived in this dispersed pattern scattered throughout the landscape without the semblance of protection to defend themselves. The conclusion must be that the family was under no threat from any of their neighbours living in any other enclosure scattered throughout the Céide Fields. What a lesson this is for modern Ireland where every home must be alarm protected. We believe from our research that Céide Fields offers huge potential for tourist development. We anticipate that within 10 years, it will be second only to Newgrange as a destination for heritage tourists.

BOGWOOD

The bog surface was sometimes dry enough for tree growth. These trees were overwhelmed when conditions became wetter once more. These buried forests are evidence of climate change in the past.

The woods were dominated by pine but oak birch, alder, willow, yew, hazel and ash also occur. Bog yew was so plentiful in Contiglas, Co. Laois that farmers used it for making gate posts and

roof timbers from the 16th century to the 20th century.

Several generations, perhaps 500 – 1000 years, of growth can often be seen on top of each other. The roots are spread out, indicating waterlogged conditions. Trees vary from 30 – 300 years in age. One yew from Contiglas was over 400 years old when the bog entombed it.

Dendrocronology is the study of tree rings. The tree ring calendar is so accurate for bog oak that it is possible to say when a particular bog oak was alive and growing (absolute dating). The oak tree ring calendar now spans a period of 7,500 years, providing an invaluable tool for archaeologists and climatologists. The detective work of Prof. Mike Baillie, Queens University, Belfast suggests that years of restricted growth may have been caused by veils of volcanic dust in the atmosphere. The origin of this volcanic dust has been traced to Iceland. This dust is preserved in the peat as tiny slivers of volcanic glass. A study of bog pines by Tony McNally South East of Edenderry showed that that particular forest had existed for at least 500 yrs. Radiocarbon dating placed it between 2,500 and 1,800 BC. All the trees of that forest died when the water table rose and waterlogged their roots. This occurred around 2,800-1,500 BC when the climate of Northern Europe became wetter. Dendrocronology is the most accurate science in the study of past climate changes.

Bogwood was highly valued by our Irish ancestors from the 16th century to 20th century when timber could be got nowhere outside the landlord estates. The growing bog had engulfed the ancient forests, which had once covered the land. The bog had seasoned and preserved it. It was prized for its beauty and durability. It was used as roof timbers in the cottages of the poor and also in churches. It was shredded to make ropes. Bog yew was particularly prized for making furniture. It was similar to rosewood but superior to it in its beauty, colour and firmness. Bogwood was also used to make kitchen vessels, butter churns and feeding troughs.

The method used to find tree trunks in intact bogs in the past is fascinating. People would search for areas wherever early morning dew, frost or snow disappeared first. A long metal probe was then used to confirm the presence of the timber.

The ebony colour of bog oak distinguishes it from pine. It is due to the combination of the gallic acid in the wood with the iron held in solution in the water of the bog. A real black dye is thus produced. Pine and yew present only a light fawn to brown colour, simply because they contain less gallic acid.

All bogwood, being saturated with iron from the bog water, is perfectly preserved. The presence of iron increases the weight of the wood and converts it to a kind of stone. When the timbers are first brought to the surface from the airless depths of the bog, they are pliable. It is essential that carving is undertaken immediately because when full petrifaction takes place, the wood becomes steel-hard. Irish bog oak has therefore been compared to Whitby jet which is more polishable but more easily chipped than the Irish bog oak. Celtic roots studio, near Athlone is a bogwood workshop worth visiting. It is visited by 25,000 tourists each year and that number is growing.

BOG BUTTER

One of the most widespread archaeological objects found in bogs is butter because the bog was the nearest functional equivalent to a refrigerator in early Ireland.

In order to preserve butter, 5% or more salt was added to it. If salt was scarce or unaffordable, the cold anaerobic antiseptic peat offered an alternative way to preserve butter through autumn and winter (when milk supplies were low). The butter was wrapped in cloth or skin containers, in baskets made from wicker, in wooden casks made from a single piece of wood or in barrels made of staves.

Butter was buried in bogs until the end of the 17th century, reflecting the fact that milk and milk products were the main food of the Gaelic Irish until the collapse of the Gaelic order around this time.

Bog butter deteriorates in appearance and flavour with time as the fat in the butter is altered by microbial action. It is a hard yellowish – white substance. Hygiene being of a different nature in those days, it usually contains plenty of cow's hairs. Bog butter was offered for sale in Tralee as late as 1853.

Traditionally, butter was thrown into bogs as votive offerings even up to modern times.

As late as the 1940's, butter was always thrown into the bog lake at Bella, Co. Mayo as thanksgiving for the cure of a horse or a cow.

BOG BODIES

We are aware of the ritual dimension of the Bronze Age hoards found in bogs. There is clear evidence of another type of ritual associated with bogs. Bog bodies are the most fascinating of the archaeological objects found in bogs. Approximately 80 bodies have been found in Irish bogs in the past 2_ centuries, most of them in raised bogs.

Some are the remains of people who died of natural causes and were buried in the bog. Others were murdered and hidden in the bog to avoid discovery. But a small number were people who suffered ritual execution in the Iron Age, a practice know across Europe in Celtic times but much better documented elsewhere i.e. in Denmark where Tollund Man and many other victims have won immortality in the modern Hall of Fame.

One of the oldest such bodies in Ireland, and also the first properly documented account of a bog body, was the body of a woman found in 1781 at the bottom of Drumkeragh bog, Co. Down. There was a large stone at each end of the skeleton, which was accompanied by numerous garments whose quality suggested a woman of high rank.

Another female body aged 25-35 was found by turf cutters in 1978 under 1 metre of blanket bog at Meenybradden, Inver, Co. Donegal. Radiocarbon dating indicates a date between 1050 AD and 1410 AD. There is no evidence of the cause of death.

The earliest skeletal remains date from the Neolithic period and come from Castleblakeney, East Galway, **namely the Gallagh man**. He was uncovered under 10 feet of peat by the O'Kelly family while they were cutting turf in 1821. The O'Kelly family used to resurrect him for a small fee for any visitors who came to see him and then re-bury him. News of this spread to Dublin so scientists and reporters from the national newspapers went to see him. The newspapers reported "a body with handsome features and a foreign aspect, dressed in a light cloak which covered his body to his knees. He had black hair and was bearded. His flesh appeared fresh and, apart from a hole in his stomach, he was perfectly preserved. He was around six feet tall". He was removed to the National Museum where for 100 years they thought he was a medieval man. But time brings knowledge. Recent technology has revealed that Gallagh Man had met a grisly end, ritually strangled, similar to Tollund Man in Denmark. He has been radiocarbon dated and given a CAT scan to see if his body will give up more of its secrets.

It appears Gallagh Man was naked except for his cloak that he had broken the law and was slain and his body left staked to the ground so his soul could not break free. His hair had been cropped and his clothes removed as part of the public execution. Public executions, than and now, have their own ritual.

Gallagh man is visited by tourists each day in Ireland's National Museum. He is still earning his keep as he did with the O'Kelly family.

TOGHERS

In the centuries after 1000 BC, Ireland was becoming a focus of interest to bands of aggressive iron-using Celtic warriors.

At the same time as the Celtic language of the Iron Age warriors was replacing the languages of the Bronze Age, the climate began to become wetter. Sphagnum became dominant on raised bogs and grew more rapidly.

The Celts were equally good farmers as they were warriors. The needed to provide communication between their farmsteads and distant fields, perhaps between settlements separated by bog. They did this by laying down tree trunks side by side across the bog surface to make tracks called toghers. All of these toghers were sooner or later abandoned to the bog and several millennia of sphagnum accumulated over them, preserving them in almost their original condition. Their discovery puts us in touch with every day lives of the past in a way few other aspects of archaeology do so poignantly.

There are over 60 toghers in the Corlea complex. The toghers in Corlea range in date from the 4th millennium BC to the 6th century AD. More than 1000 toghers exist in Ireland but the Corlea toghers are the most impressive. The oak trees used to make them were felled 148BC. They consist of close-fitting split oak sleepers, 3-4 m long and up to 60cm wide, supported on pairs of long straight runners. The sleepers were mortised and pegged down with hazel, birch or oak pegs. Part of it ran from the west to an island in the bog. Another part of it ran from the South East to the same island. What keeps the timbers of the toghers together is the water they contain. To excavate part of the Corlea track and relocate it in Corlea Exhibition Centre, the water had to be replaced by a liquid wax. It was soaked in a warm wax solution for seven months to achieve this. It was then brought to Portsmouth, England and freeze-dried. This stabilised the internal structure of the timbers and enabled them to be placed in the exhibition centre in the exact position in which they lay beneath the peat.

Toghers were used as military bottlenecks by the native Irish against invading English armies in later centuries, particularly when they provided the only means of access to a settlement, castle or monastery. Trenches were dug across toghers or the toghers were broken up altogether as a method of stalling the enemy. i.e. it took Lord Mountjoy two years to cross the midland bogs into Ulster in pursuit of Hugh O'Neill after the battle of Kinsale in 1601 because he did not know the togher routes.

7 BOGS IN IRISH ECONOMY
PAST:

The bogs were the last wilderness to take shape in the Irish landscape in the wake of the Ice Age. During the first millennia little could be done to reclaim these barren wet deserts and replace them with fields as had been done with most of the forest wilderness in other parts of the world. This relationship between humans and bogs in Ireland changed for two reasons:

1. The increasing scarcity of wood as a domestic fuel.
2. An increasing population.

Turf was found not to be an inferior fuel. It burnt low and evenly and there was little chance of burning splinters setting fire to the house, as with wood.

The old Irish law text, "The Seanchas Mór" dates from the 7th & 8th centuries. It refers to "the ditch of a turf cutting" as among the seven ditches which are exempt from liability in the case of accidental drowning.

Beneath the hill of Goig Castleconnell, Co. Limerick a togher was found in the 19th century and beside this, under at least 20 spit of turf, there were ancient bog holes and the remains of wooden sleáns. In the Annals of Standish O'Grady there is a reference to a 7th century King of Connaught being killed at the hands of a party of turf cutters. "And this their design they verily executed with the turf spades that were in their hands". From these references it is clear that turf was an important resource in Gaelic Ireland.

In the 12th Century the bog and its traditions were adopted by the Anglo-Normans The right of its Norman Lord to demand a certain number of days' work on the bog each year from his tenants can be found in medieval documents i.e. The Red book of Ormond "they also say it was customary for each tenant to give five days to his Lord drawing turf and so on".

In medieval times turf was burnt in monastery, manor and tenant cottage alike. People became more familiar with the edges of bogs where they could drain them easily. But they hadn't the technology to drain the bog interior.

By the 18th century and 19th century and until after W.W. II, when turf was the only fuel people had, 5 million tons of turf were cut each year. At this rate of consumption, it was thought there was enough turf in Irish bogs to last 700 years. The production of hand cut turf peaked at over 6 million tons in 1926.

During the 18th & 19th centuries there was no alternative fuel as all the forests were in the hands of the landlords who used it for hunting or felled it to build the ships of the British Empire.

During the 18th & 19th centuries the growing Irish cities and towns turned to the bogs for fuel. This market was facilitated by the construction of the Grand Canal and Royal Canal through the Bog of Allen. In the early 19th century 30,000 tons of turf were being shipped to Dublin by canal from the Bog of Allen each year.

In the 18th & 19th centuries large amounts of turf were cut in Connemara and transported by Galway hookers to the Aran Islands and the Burren in Clare where there was no turf. The trade continued until after W.W. II. The annual "cruinniú na mbád" festival in Kinvara each year commemorates this chapter in Irish history. In the 19th century turf was a vital and strategic resource. During the Land League disturbances people took care to pay their turbary (turf cutting) dues even though they withheld their rent. This was because people depended so much on it.

During W.W. II British & Polish coal supplies to Ireland were cut off. The bogs were called on to replace the 2 million tons of imported coal – the entire fuel needs of the country. The Cork T.D., Hugo Flynn was appointed "Turf Controller" by the Government. He empowered the County Councils to take over and work the bogs. As a result of his efforts, the country was self sufficient in fuel needs during the war. This affinity with the bogs gave the Irish people a great sense of unity and pride in themselves. They recognised that the bog was a means of self-sufficiency and something that could bring the nation into the modern age.

The traditional tool used for cutting turf is the sleán. It's pronunciation and its design varies from one part of the country to another. The sleán has to be as light as possible due to the heavy weight of the sod it lifts. It is usually made from a light wood like elm or larch. The freshly cut turf is spread on the ground where the wind reduces its moisture content by 25% - 30%.

The turf cish is a basket with four light wooden handles used to carry the semi dry sods away from the turf bank to another area of the bog for further drying. The bog barrow can be used for the same purpose. It too is made from a light wood.

The turf is then footed. This entails placing 5 – 6 sods on their ends with a few on top to form a stack. After 5 – 6 weeks the footings are built into clamps. Clamps are larger versions of footings.

The clamps are taken home from the bog by donkey and cart. Sometimes, creels are used. Creels are baskets suspended on either side of the donkey. The donkey with creels often travels more easily on the bog surface.

Once home, the turf is either stored for winter in a shed or built into a rick. A rick is specially designed so that rain water runs off its surface sods, while those inside the rick remain perfectly dry.

The traditional skills associated with "saving the turf" are diminishing as machinery is being increasingly used. So is the language associated with saving the turf by hand.

THE MODERN ERA:

Up until the mid 20th century, Ireland lacked industrial development. One reason for this was that we had no native source of energy.

During W.W. II, the Irish discovered that the bogs could sustain the fuel needs of the whole country.

This led the Government into considering commercial exploitation of the bogs using modern technology developed to harvest the bogs in Russia and Germany.

Bord Na Móna was set up in 1946 to revolutionise the cutting of the bogs. Up until then, the use of hand tools meant that large-scale cutting was impossible so the bogs were basically intact until this time.

Irish engineers went to Germany & Russia to learn their technology. German & Russian engineers came here to teach Bórd Na Móna the technology.

This assault on the bogs was directed mainly towards the raised bogs of the Midlands which are deep and flat and easy to work on with machinery. The blanket bogs of the west coast presented difficulties, as they are shallow and hilly, meaning that machines operated with great difficulty. The mechanical cutting of the bog consists of 4 stages:

1. Preparation:

A. A **ditcher** is used to cut channels into the bog surface. Since the bog is 95% water it cannot be worked on until the bulk of the water is drained off. The ditcher has wide tracks, which distributes its weight over a large area so it will not sink. After cutting the channels, it takes 5 – 7 years for the bog surface to dry sufficiently to bring other machines on to it.

B. **Graders** are brought in to level the surface of the bog. These are like bulldozers.

C. **Light railway** tracks are laid down as a means of transporting the turf when it is cut.

2. Harvesting:

Most turf is harvested as milled peat.

A. A miller scrapes off approximately _ cm of turf and shreds it.

B. While it dries for a few days, it is turned several times by a harrow to speed up the drying process.

C. A **ridger** arranges it into ridges for easy collection by train. It is then collected by the bog trains. The tracks are light and can easily be moved when cutting moves to another section of the bog. The trains transport it to power stations or briquette factories.

D. A small proportion is cut into sods by a machine called a bagger. It is dried in the sun for approximately 6 weeks and sold as a domestic fuel.

3. <u>Marketing:</u>

*50% of the turf is sold as domestic fuel.

- Most of this is in the form of briquettes, which are made by compressing the milled peat into a solid block. The briquette factories are at Littleton, Derrinlough & Croghan. These are sold countrywide.
- A smaller proportion is sold as sod peat in areas close to the bogs.

*40% is sold to the E.S.B. to make Electricity in its power stations at Shannonbridge, Lanesboro and Edenderry. This accounts for 18% of the total energy needs in Ireland.

*10% is sold as Mosspeat (soil conditioner); Biocycle units and fire packs etc. This 10% is the soft sphagnum moss from the surface, which is removed by the grader before the milling begins.

The use of technology has undoubtedly speeded up the loss of a natural resource with its unique ecosystem. Only 4% of our original bogs now remain intact as a result of 60 years cutting by Bord Na Móna and private cutting.

But it must be remembered that this was 60 years of prosperity for the Irish Midlands. The last half of the 20th Century was a time of massive emigration from Ireland. Bord na Móna employs over 20,000 people in the Midlands. This number was higher in the past. Each employee was part of a family which could stay and grow up in it own locality. Each employee spent money in local shops, cinemas, restaurants etc. so the multiplier effect spread throughout the whole community in small Midland towns i.e. Ferbane and Allenwood. The people of these towns developed a culture around the Bord Na Móna factory. Bord Na Móna built some of the towns i.e. Coill Dubh. So rather that moaning about the damage done, a balance needs to be kept between the damage done and the livelihoods provided.

FUTURE

"Where would the world be once bereft
Of wet and of wildness? Let them be left
O Let them be left, wildness and wet
Long live the weeds and the wilderness yet"

G. M. Hopkins.

The global extent of conservation-worthy raised bogs is only 46,522 ha, and 51% of this resource occurs in Ireland – an area of 23,527 ha. A few decades from now most raised bogs will be exhausted of their peat reserves unless we now choose otherwise. In time the burning of peat may be little more than a ritual, like the May bush outside the door celebrating the fertility of the first fields.

We may see sectional interests seeking to acquire land badly needed for agriculture or forestry.

The need for a government body with representatives from many interest groups will be vital. Bord Na Móna had pledged that "every acre of Bord Na Móna cutaway bog land will be utilised in the national interest." It may not be so easy to decide what the national interest is. And there is a real danger of accepting short-sighted answers. Part of this shortsightedness is the assumption that wild landscape is less productive than such options as coniferous forest. 100,000ha of cutaway is now available for reclamation. Its development will be one of the great reclamation schemes of Europe – as big as the Zuider Zee project in the Netherlands.

The critical factor in determining the future of cutaway is the depth of peat remaining when the bog has been worked out.

To reclaim it for agriculture is very difficult and expensive as soil nutrients (nitrogen, potassium, phosphorous and calcium) are lacking. It was assumed in the early years that Coillte (the state forestry board) would plant conifers on whatever cutaway bog was made available to them. However, in terms of output and employment this has been a less attractive option than agriculture. Part of the problem was that native broad leaved species were not considered.

The most interesting option for the future is to allow cutaway bog to colonise naturally and develop a new mosaic of natural ecosystems which are adapted to the changed conditions. Some parts of this mosaic could be used for amenity and recreation. The hollows between the moraines and drumlins will flood naturally, or could be flooded artificially, giving back to the landscape something of the atmosphere it had when the Mesolithic people hunted, gathered and fished here 8,500 years ago. Over 10,000 ha of Bord Na Móna bogs in the Shannon catchment, when flooded, could add to the area of semi-natural wetland in the Shannon basin. This would add to the water storage capacity of the flood plain, which would alleviate winter flooding on farmland.

New forests of native broad leaved trees displaced by the growth of bog 9,000 years ago can again become dominant.

Crops which are at home on peat like cranberry and blueberry are compatible with other uses such as wildlife conservation and recreation. Dr. Bellamy argues for the cultivation of reeds and willows for use in furniture and basket making etc. Another possibility is the cultivation of sphagnum (for packaging, medical dressings, insulation etc.)

Other concepts include the development of constructed wetlands, which exploit the filtering and purifying capacities of aquatic ecosystems in the treatment of such waste products as town sewage, while developing naturally diverse habitats.

CONSERVATION?

A century ago the bogs covered 17% of Ireland. It now covers 4%. They were regarded as a wet desert, a tragic waste of land. In time this desert began to be viewed as the country's most valuable natural resource whose commercial exploitation has contributed to Ireland's economy.

For centuries the bogs played a crucial role in the economy of the farm. The turf harvest was more than a laborious task to lay up supplies of fuel for the winter. The days on the bog were hard work but they were enjoyed because there was knowledge that there was something more here, a knowledge that winter was gone. Part of the unique atmosphere was a sensuous awareness of summer, the fruitfulness of the harvest and underlying this, the excitement of contact with the natural world. Here nature was sensed more richly than anywhere else and even if not articulated, time spent on the bog was much more than an economic exercise. It was an aesthetic experience, a cultural ritual which added richness to the fabric of life.

The remaining Irish bogs must be preserved as the last wild places. They must be preserved because of their natural diversity, because of the record they contain of how the landscape has changed in the millenia since the Ice Age and as living museums and libraries of our own human past. Deep in the peat, steadily accumulating over the centuries since people first settled in Ireland and for millenia before, there is an incomparable archive of information about how the landscape has changed and about how successive communities played a role in directing that evolution since the Ice Age.

During the second half of the 20th Century the war between conservation and development was waged while the largest of the Raised Bogs (Bog of Allen) disappeared. We are now coming to the end of that chapter, much wiser than at the start.

What both sides forgot was to consult the people who live beside and make their living from the bogs. The conservationists and the developers were "outsiders". This rekindled the suspicion, so long prevalent in rural Ireland, that heritage is for the elite with nothing better to do than study flowers & ruins. This suspicion seriously damages the growth of awareness that the heritage of the bogs is the heritage of all, primarily the heritage of those who live and work on the bogs.

We are now at the point where the debate is not between two opposite sides but one, which takes place in the heart and mind of the bog community.

Why should we bother to conserve bogs at all? Who are we conserving them for?

1. The Irish bog plants and animals are genetically different from those elsewhere, subtly adapted after thousands of years to Irish conditions. They are a significant part of the genetic pool of Europe as a whole. The bogs therefore belong to the whole community of Europeans.
2. The Irish bogs are hydrogeologically important. They store water in flood times. They produce water in dry times. We don't know how their removal would affect Ireland's hydrology (water cycles).
3. They constitute a continuing record of climate change.
4. They are the main reserve of ecological diversity in the Irish landscape.
5. They are important carbon sinks.
6. They are rich in archaeological heritage.
7. At the most basic level they are part of ourselves. In a very true sense, when we remove the bogs we are selling our birthright for urgent economic reasons just as our Celtic ancestors sold their birthright of the ancient forests.

80% - 90% of Ireland's blanket and raised bog has been destroyed already. In a European context, the value placed on these ecosystems can be gauged by the fact that the Dutch Government has purchased Scragh Bog to preserve its environmental heritage for Europeans. In contrast, an E.U. directive to conserve the remaining Irish bogs has been ignored by Irish authorities. Only 10% of the bogs earmarked for conservation have been acquired by the state. The remaining intact bogs are small and scattered. They await future generations of Irish and visitors to Ireland to enjoy. They hold the future for the communities who live around them, economically and culturally. Therefore it falls to local communities to take ownership of their own landscape.

The bogs are a response to topography, changing climate and human activities. The first people arrived here before the bog and lived alongside it as it grew and changed. Humans had as much to do with the growth of bogs in the first place as in its retreat now.
But the cutting of the bogs has brought a new wilderness into being – the cutaway with all its variety, which can often be richer than the bog it replaces. Old cutaways (turbaries) are the most important areas of peatland regeneration. They comprise a complex mosaic of habitats. These new fens are a floristic paradise, their splendour reflected in the variety of their orchids and insects. Their range of aquatic life is great. Vast expanses of birchwood intersperse with the fens. The natural regeneration in such a short time span is amazing.

In Ireland we are close to the maximum mean annual temperature at which bogs can form (11°c). Warmer climate changes in the past slowed or even killed bog growth for periods of time. It is impossible to predict how future climate change will affect our bogs. It is all the more important that we should not therefore confine our conservation to the isolated intact wet bogs but that we should conserve the regenerated cutaway bog also. The cutaway has the potential to become the new Midlands wilderness. Places like Lough Boora and Turraun illustrate the rich diversity of bog regeneration where in the drier cutaway, fens and birch have become established but in the wetter bog holes and drains, sphagnum has begun to regenerate. The regenerated bogs will not be the same as the old bogs but they will be living, ecologically viable and rich, growing alongside the ancient mature bogs which may be struggling against a climate change to which the new bogs have adapted.

8 THE PERFECT HOLIDAY FOR THE BOTANIST AND ZOOLOGIST.

UNIQUE FLORA

Plants get all the nutrients they need from the atmosphere (carbon, hydrogen and oxygen) and from soil (nitrogen, potassium, phosphorous and calcium). These nutrients are recycled when the plant dies and is available for use by other living plants.

Therefore bogs are extremely difficult places for plants. The nutrients they need from soil are deep beneath the peat out of their reach. The peaty soil is waterlogged and devoid of oxygen, which is why undecayed plants accumulate in the first place – fungi and bacteria responsible for decay of plant matter need oxygen.

The surface of an undisturbed bog is made up of an almost unbroken carpet of liverworts and mosses, mostly sphagnum, all of which are specially adapted to cope with the harsh conditions of nutrient "rationing". Each has its own strategy for coping with the problem and this is one reason why natural history of bogs is so interesting.

Bogs are the richest areas of natural vegetation in Ireland. The plants are all competing for the same limited pool of resources but like the shops in a town, all seeking to extract money from the customers pockets, they go about it in different ways. So, although there is an element of competition, there is little direct conflict. Four strategies are used by bog plants to solve the problem of the nutrient budget.

1. Enlist the help of fungi to gain nutrients.
2. Collaborate with nitrogen-fixing bacteria.
3. Use the nutrient reserves in the bodies of bogland insects.
4. Make use of what little nutrients the rain brings in.

1. Help from fungi: Plant-Fungi associations are called "mycorrhizae". Mycorrhizal associations are particularly important to bog plants. The fungi help the plant to obtain essential nutrients, especially phosphorous. In return, the plant gives the fungi a share in the carbohydrate it produces. Orchids have a special mycorrhizal association. Bog orchids are involved with their fungal partners from an early age. Their tiny seeds carry no food reserves for germination. They depend on the fungus to foster them through germination, seeding and sometimes their entire life.

Other bog plants which rely on mycorrhizal include bog asphodel and crowberry as was willows and birches, deergrass and purple moorgrass.

2. **Help from nitrogen-fixing bacteria:** Among living organisms, the only creatures which can fix atmospheric nitrogen are certain groups of bacteria, those which possess the critical nitrogenous enzyme. These bacteria dwell in special nodules in the roots of their host plant. Fixing nitrogen is a very costly process in energy terms and this energy is provided by the host plant in the form of carbohydrate. In return the plant is supplied with organic nitrogen. The best-known nitrogen-fixing bacteria are the rhizobium species, which live in the root nodules of the furze and bog myrtle. Bog myrtle is a deciduous bush with a fragrant scent produced by glistening golden-bead glands, which cover the leaves. Much of the nitrogen present in the leaves during the growing season is salvaged before the leaves are shed in autumn and stored over winter in the rhizomes.

3. **Using the nutrients from the bodies of bog insects.**

(a)Sundews: The leaves of sundews are covered with tentacles, around 200 per leaf. These tentacles secrete a very thick glue which glistens like dew in the sun and turns the leaf into an efficient fly trap. The insects are attracted not just by the colour and glistening appearance of the leaves but also the scent. When an insect alights on the leaf, the tentacles closest bend towards the centre, gradually followed by those further away. Entrapment by the tentacles is assisted by the folding movement of the leaf blade itself. The smaller creatures may be killed in as little as _ hour because the sticky secretion blocks their tracheae. The tentacle glands also secrete a range of enzymes that dissolve all but the skeleton of the victim. The process of digestion usually takes several hours depending on how much protein the digestive enzymes have to break down. When the job is done, the leaves open out again and the secretion slows down so that the leaves can dry out. This means that the skeleton can be blown away by the wind before the leaf starts to secrete its deceptive dew again.

(b) <u>Butterworts:</u> The strategy of the butterwort is akin to the old-fashioned fly trap technique. Butterworts are fibrous rooted perennials. They have rosettes of yellowish-green leaves, which are curled up at the edges and give off a faint fungus-like scent. The leaves are covered with tiny stalked glands which secrete a glue so sticky that it can be drawn out into threads nearly _ metre long. These glands give the leaves a greasy sheen. The digestive fluid is produced by different unstalked glands. These are sunk in shallow pits in the surface. Between the two kinds, there are 25,000 glands to the sq. centimetre. Only the margins of the leaves move, curling slowly over small insects and other creatures trapped near the edge. Prey which is trapped near the centre is digested there. The incurved edges help prevent trapped prey from being washed off the edge by rain or wind. It eventually falls into the centre to be digested.

(c) **<u>Bladderworts:</u>** These are perennials, though they have no roots. The plant consists of branching hair-like leaves on which the tiny bladders are produced. The bladders are the most fascinating part of the plant. They are among the most intricate structures found anywhere in the plant kingdom. They are a translucent green colour with walls only two cells thick. Each bladder has an opening, which is normally closed off by a transparent one-way flap (valve). This is flanked by two antennae, each bearing several bristles. The bristles are arranged in a cone-like fashion and serve to direct small animals foraging in the vicinity towards the entrance to the bladder. The valve is very transparent and flexible. It can only open inwards. The surface of the valve and the bladder is abundantly lined with glands, which produce mucilage and sugar, which attract the prey. The prey consists of small insect larvae, fresh water worms and other minute creatures. When the creature touches the bristles on the outside of the valve it opens and the walls of the bladder are triggered so as to distend by as much as 80% of its volume, sucking water into the bladder along with the prey which triggered the response. This all happens in 10 thousandths of a second. Once inside, there is no way out. The creature inside eventually runs out of oxygen and is digested by enzymes and acids secreted by the four-armed glands. These glands pump water out of the bladder and absorb the products of decomposition after decay. The two-armed glands keep prisoners away from the entrance where they might disturb the trap's delicate balance. The trap is ready for action again _ hour – 2 hours after it has been sprung.

4.Making use of what little nutrients the rain brings in: Sphagnum moss is the main component of the upper layers of a raised bog. As the bog surface is above the level of the groundwater, the stem of the sphagnum acts like a wick drawing up water with it. The stems and leaves of the moss contain large dead cells, which have pores in their outer walls to hold water. Sphagnum moss can absorb 20 times its own weight in water, which it stores in these dead cells.

Sphagnum moss is very well adapted to the nutrient-poor conditions on the bog surface. The main water supply is rain, which is slightly acidic (PH 5-6) and low in nutrients. Special compounds in the sphagnum cell walls exchange the few nutrients in the rain water for hydrogen ions by a complex ion-exchange mechanism. The hydrogen ions are released into the bog water and increase its acidity to Ph 3 or 4. The soil microorganisms that break down plant material cannot survive in these acid conditions. Thus the dead plants accumulate as an increasingly thick layer of peat.

UNIQUE FAUNA

The bog is an austere world and only those plants and animals which can meet the terms it lays down can live there. The most demanding of these restrictions are the high acidity and low nutrient status of the peat and fluctuations in weather conditions – at one time dry and warm, at other times wet and cold. Since green plants are at the base of the food chains which mesh together to spin the web of life, only animals which can feed on bog plants and the carnivores which in turn feed on these herbivores can find a place for themselves on the bog. These true bog specialists have learned to cope with the harsh physical and biochemical demands imposed by the bog environment.

The Irish Hare: The only mammal which truly belongs to the bog is the Irish hare. For the hare, the bog is not just another habitat. It is the perfect habitat.

The diet of the hare consists of heather, cotton grass and other bog plants. It makes its nest or "form" in a sheltered place among the heather. The hare will only leave the bog when it is very wet in winter and if it is running short of food. The most characteristic density is one hare per Km2 of bog.

The skylark: The bird which is most at home on the bog is the skylark. The skylark loves open treeless country. It is found in all bogs but in the most extensive and wildest bogs of the West, it may sometimes be the only bird in residence. The singing of the skylark fills the bog in spring and summer, especially after rain, and it is the most immediately noticeable of all bog sounds. The lark always greets the sunrise. It rises off its nest and hovers in the sky and sings for approximately one hour. When it drops back down, it never lands near its nest. It lands approximately 100 yards from its nest and crouches down while running back to its nest. It repeats this ritual several times each day. It is the most protective bird of its nest and its young. Its song is the most beautiful of all songbirds. Skylarks are seldom seen on the bog over winter. They form migratory flocks in autumn and wander further afield, returning to the bog to establish breeding territories in spring.

The Snipe and Curlew: The snipe and curlew are common species in bogs, although the snipe more especially favours the marshy rush-infested grassland which surrounds many bogs where it feeds on worms and other invertebrates it extracts from the wet soil with its long beak. During the breeding season between March and July the bleating or drumming of the snipe – the strange un-bird-sound it makes with its wings as it dives or swoops through the air over the bog, is unforgettable. In winter it is one of the few birds, which can be found even on the most open, inhospitable bogs. The snipe gives its name to a sudden fast diversionary movement. This sudden turn of the snipe is a defensive strategy in the open bogland where it has little cover to hide it from predators.

Grassy and rushy oases in bogs are the principal nesting areas of the curlew. Curlews move to the river estuaries with their new families later in the summer and spend the winter feeding there. In hard and frosty winters they sometimes return to their summer haunts in the bogs. The cry of the curlew is associated with the arrival of rain.

The Red Grouse:-

The red grouse is the only bird which is found only on peatland. It was once the most characteristic bird of Irish bogs. Before Irish Independence the vast areas of bog controlled by the landlord estates were managed for red grouse hunting through controlled and regular burning of heather. The adults feed almost entirely on the young shoots, flowers and fruits of heather, although the chicks supplement this diet with large quantities of insect food. Grouse populations declined after 1918. A research programme carried out in 1966 found that the decline in heather burning accounted for the decline in red grouse.

The Greenland white-fronted goose:

Special winter visitors to Irish bogs include the Greenland white-fronted goose. A generation or two ago, when the large bogs were still intact, the white-fronted goose made much greater use of them for feeding and roosting. It was known as the bog goose, an apt name in view of its adapt ion for probing in the soft peat for underground storage organs of plants such as common cottongrass, white beak-sedge and arrowgrass. With the reduction in the large wet bog areas favoured in the past, the goose has come to rely more extensively on the river callows, (flood plains) but its numbers don't appear to have suffered in consequence. The goose breeds on the treeless tundra and open marches of Greenland, migrating south to Ireland for the winter.

The Dragonfly: Dragonflies are the most magnificent and fascinating of all the creatures of the bogland. There are two groups of dragonflies. One comprises beautifully slender insects whose flight resembles butter-flies and which rest with their two pairs of similar wings folded above their backs. These are the damselflies. The other group, the anisoptera, includes the stouter and more powerful looking fast-flying insects, much taken to hovering – and when they come to rest they do so with their wings outstretched. These larger dragonflies have two pairs of dissimilar wings. No other group of bog insects surpasses them for grace and beauty and the large size of many allows the beauty of their structure to be appreciated. Adult dragonflies are aerial predators but they spend their nymphal lives in the water. They are the most ferocious carnivores of the bog pools. They owe their ferocity to the extraordinary structure of their feeding apparatus, which is called the mask. The mask is kept folded back under the head when not in use, but is shot forward quickly to grasp passing prey.

On the bog, when the weather is right, as many as 6 or 7 different species of these magnificent creatures can be seen at the same time in the same place.

One of the first things to strike you in a face-to-face encounter with a dragonfly is its enormous eyes, which seem to take up the whole head. Each eye is made up of as many as 10,000 individual lenses, each of which responds separately to light or shade. It can spot its prey from a distance of 20 meters.

Damselfly nymphs are slender insects, and are very easy to recognize because of three prominent gills at the end of their tails. They crawl about slowly on plants, waiting for prey to come within reach of their ferocious jaws, which are shot out to impale the unfortunate victim. The anisopterous nymphs on the other hand are usually bottom dwellers, and their dull colouring makes them almost invisible against the mud or sediment. They are much stouter and lack the prominent protruding gills of damselflies.

Dragonflies are great fliers. Their wings move independently. They can hover and dart back and forth and make 90° turns.

Dragonfly legs are spiky and hold on to slippery surfaces while it grips its food. Its body is flexible to help it maintain balance.

Adult dragonflies have only a brief month of life. They spend 1-2 years as nymphs. When the nymph is ready to enter adult life it crawls up along a plant until it is outside the water. Here it rests and then the skin on the thorax splits down the middle and the adult hauls itself out of its obsolete wet suit. It takes 1-2 hours for the body to develop its full glorious gloss. It then takes to the air for its final month of life.

POLLARDSTOWN FEN

Pollardstown Fen is situated on the northern the end of Curragh, approximately three kilometres west north west of Newbridge, of Co. Kildare. The area of the fen is 220 hectares, 60% of which is state owned. This fen is unique in Ireland, as it is the only remaining intact post-glacial fen of its type in the country. This means Pollardstown Fen has an enticing deep historical background with an uninterrupted pollen record and a prehistoric burial ground at the edge of the fen on the esker ridge.

The drastic effects of turf cutting domestically and mechanically can also be seen in this beautifully scenic fen. At one time, the fen was almost three times its present size.

Pollardstown Fen contains a wide diversity of habitats because of the large variety of soil types present throughout the fen and its surrounding areas. These include reed and saw sedge swamps and damp grassland.

As you look out over the picturesque lake, the scene is alive and buzzing with nature with rare fauna hiding in the colourful array of flora, which thrive in this naturalistic area. Birds such as the mute swan, teal, coot, water rail and little grebe inhabit the lake. Migrants such as the pintail, mallard, widgeon, shoveler, gadwall and the tufted duck arrive during the winter months. The common birds of Irish boglands are also seen in Pollardstown fen such as the snipe and the distinctive call of the skylark breaks the silence of the peaceful bogland plains.

The more unusual visitors and inhabitants include reed buntings, sedge warbler and the savi's warbler who is a very rare visitor to Ireland. The rare cetti's warbler, reed warbler and marsh harrier, which is extremely threatened in Kildare have been recorded in Pollardstown Fen. Mammals living on the fen include otters, hares and pygmy shrews, which are becoming rare in Europe. A colourful variety of invertebrates can be seen fluttering on the fen. An outstanding 150 species of butterfly and moth and some other rare invertebrates have been recorded on the fen. Species such as the vibrant orange tip, the green veined white, tortoise shell, speckled wood and common blue. The most common butterflies on this fen include the fox moth; the cinnabar and six-spot bunted moths. The very rare and unusual invertebrates found on Pollardstown Fen include the rare caddis fly (Liptocenus tineiformis) and rare semi-aquatic snail (vertigo geyeri). The animal species on the fen which are protected by E.U. law are the marsh fritillary butterfly, brook lamprey and otter.

There are numerous varieties and species of flora growing in the fen. Many of these are very rare due to the hydrology of the fen. Each area has several different species of vegetation. For example, the lake and old drainage ditches consists of aquatic plants like water mint, and water horsetail. The fen is also important for the rare and threatened plants it contains; the fly orchid, pugsley's marsh orchid, fen bedstraw, slender sedge, blunt flowered rush and a rare arctic-alpine moss.

The dominant plant on the fen is saw sedge (caladium mariscum), a plant which grows to 1.5m tall. Pollardstown is the largest stand of saw sedge in Western Europe. The most unusual plant combinations are found around the seepage zones of the fen. Many rare orchids of bright and beautiful colours can be seen flowering in full bloom amongst the vegetation throughout the summer. Such species include the lesser butterfly orchid, fragrant orchid, twayblade and the distinctive spotted orchids and the unusual and very rare Fly orchid. The insect eating plants on the fen such as the common butterwort and western bladderwort can be found in the lake and ditches along with the round leaved sundew. Several plants found in Pollardstown Fen such as sphagnum moss indicate that parts of the fen are acidic in nature, which is unusual because fens are alkaline. This is an indication that the fen will transform into its next state, a bog, with the formation of acidic peat. The office of Public Works manages Pollardstown Fen. There is an information board and bird hide present on one area of the fen. This historic unique natural and untouched feature is waiting to be discovered by tourists and in our opinion would make a wonderful attraction for tourists of every kind, age and nationality.

This fen failed to transform to bogland as other fens did because of the constant inflow of calcium-rich groundwater from the Curragh aquifer. The water enters the fen via 40 landsprings and some seepage zones also. The water table is always at or near the surface of the fen. Water flows out from the fen naturally but the pattern of outflow has been altered over the years. This is now the main water supply for the Grand Canal.

SCRAGH BOG

Scragh Bog is situates 10kilometres north-west of Mullingar. This 16ha site is one of Ireland's premier nature reserves. Many of the rare species, which are present in Scragh Bog today, were common in the Irish Midlands during the time period immediately after the end of the Ice Age from 10,000 to 7,000 years ago. With the development of raised bogs, these species, which thrived in fen-like conditions, were displaced and became extinct in most of the areas where they were once in abundance. Therefore Scragh Bog is seen as an extremely rare, unique and precious site because of the number of relic species, which have survived there.

But why did they survive here?

Like most other bogs, it was discovered that the basin did contain a lake at one stage. But in contrast to the normal stages of a reedswamp, fen, and finally a raised bog, this sequence of stages did not occur in the formation of Scragh Bog. It wasn't until the early Christian period (200AD) that a scraw began to form on the lake surface. Therefore Scragh Bog is technically not a bog but in strict scientific sense, should be classed as fen. Because of the unusual state of this bog, the flora and fauna which inhabited the lakes in the early fen stage thousands of years ago can live in Scragh Bog as it is at this stage at present.

The bog is highly rated as s site of International scientific importance. The name "Scragh Bog" comes from the Irish "scraith" meaning scraw or mat and "bog" meaning soft. This captures an essential feature of the site with its quaking scraw surface.

It is mainly for its rare flora that this bog is justly famous. The most important plant species in Scragh Bog is most definitely the wintergreen (Pyrola rotundifolia). This plant with fresh evergreen leaves flowers in mid summer. Its dainty white flower adds a spot of colour to the base of the willow and Birch trees where it blooms most frequently.

The most important group of plants is the sedges of Scragh Bog. Several species, which are extremely rare throughout our country, are thriving in abundance at Scragh Bog. The most common in this bog is the slender sedge (carex lasiocarpa). This plant has an unusual appearance with its height and its array of fine leaves. Another distinctive feature of this sedge is the short hairs on the fruit (utricles). An even rarer species, which displaces the widespread slender sedge in a thin strip around the margin of the bog, is the fibrous tussock sedge. And finally, the mud sedge. This graceful form holds its position among the frequent sphagnum moss, which covers the central area of the bog. The mud sedge provides a focal point amongst the sphagnum moss with its distinct but unusual features.

It consists of a rare blue-green coloured leaf and pendant female spike. In the southeastern half of the bog the rare, soft and endangered slender cotton grass can be found. This species is actually protected under the wildlife act 1976 because of its rarity in Europe in general. The exquisite orchids flower and bloom in summer providing a rich splash of light water colours in this uniquely picturesque bogland scene. Such orchids include the marsh spotted orchid with its abundance of

bright white flowers, which have a gentle and delicate appearance. The rare narrow-leaved marsh orchid, which is another species among the rarest and endangered flora that
Inhabit this bogland.

In our opinion, this beautifully scenic bog would be an excellent attraction for tourists. We have discovered the enchanting flora and fauna of this bog
During our research and it offer tourists with a wonderful opportunity to
experience the magic of our boglands.

We owe the conservation of Scragh Bog to the people of the Netherlands who bought it in honour of the Dutch bogs, which have all been cut away and are now just a memory.

9 THE ROLE OF THE BOG IN ETHNIC TOURISM.

BOGS IN THE IRISH PSYCHE.

You can take the man out of the bog but you can't take the bog out of the man.

We, the Irish, are bog people. The bog water runs in our veins. The bog represents our collective unconsciousness. The bog is a symbol of our Irishness. It awakens our ancient race memory of pain and suffering, poverty and famine when we were deprived of everything except the bog. This hurts us deeply and makes us uncomfortable and ashamed. To escape this shame we refer to the bog in derisory terms i.e. "He's only a bogman". But, painful as the past has been, we cannot forget it. Neither do we want to forget it because our past is part of what we are.

To the Irish, the bog is also a very beautiful and benign place. We associate quietness, stillness, reflection and otherness with the bog. The bog represents the mystery inside us. When we go there as children, we go with older people. It is the place where age barriers break down. Games are played, stories are told and songs are sung in spite of the back-breaking work. Grown men light fires and make tea, normally women's work. The simple bread and butter tastes like heavenly food. We stay there all day and it is usually summer. There is a sense of being in migration. The place is physically beautiful. The air is fragrant with heather. The song of the lark is the only music we need. The ground is springy above the deep museum of our past under our feet. The bog is the memory of our landscape and ancestors. It remembers everything that happens in it and to it. Irish children are told to stay away from bogholes because they have no bottoms. As adults, they understand the true meaning of this.

That is why the Irish abroad pine for the smell of turf fire. That is why when the Irish exiles return here as tourists they head for the Bog Village in Kerry or the Bog Train in Clonmacnoise – to get in touch with their roots. That is why twice in the mid 1990's, a bank of turf was engineered into sealed containers and transported to Yonkers in New York state where old emigrants took out the sleáns and escaped for a few hours to the bog.

In our parish of Kilcock we have a bog road, once a togher but now tarred, winding through the beautiful Cappagh bog. In the 19th Century our local poet, Teresa Brayton, wrote a song of Emigration called "The Old Bog Road". It is full of the sadness and pathos of Ireland at the time. It goes like this:

"My feet are here in Broadway,
This blessed harvest morn
And o! the ache that's in them,
For the spot where I was born.

My weary hands are blistered
From work in cold and heat
And o! to swing a scythe today
Through fields of Irish wheat
Had I the chance to wander back
Or own a king's abode
T'is soon I'd see the hawthorn tree
By the Old Bog Road."

THE BOGS AS AN INSPIRATION TO OUR ARTISTS AND WRITERS.

The wild landscape, rugged beauty and colouration of our bogs have been and continue to be a source of inspiration to artists.

Maurice McGonigal's "Early Morning, Connemara" is almost entirely absorbed with the bog landscape, with the human and animal presence playing a minor role. Like other contemporary modern Irish painting, the bog is painted for itself. The painting shows the artist clearly absorbed by the vast, panoramic, unspoilt landscape of Connemara, with Mannin Bay in the distance. Only by careful examination can a man be seen with a dog and some sheep, together with the outline of white cottages on the seashore. While the smoothly executed sky sets the mood of the picture, the landscape in contrast has been freely painted in a rapid, energetic manner with brushstrokes clearly visible creating the effect of a breathtaking scene.

Paul Henry's "Lake side Cottage" depicts a blanket bog scene on Achill Island. The island and its inhabitants fascinated him. He uses a simple sparse style to tell the story of the hard working west of Ireland people involved in every day activities such as saving turf. He believed that the rugged beauty and harsh lifestyle of the western bogs represented the real essence of Ireland. The essential features of this painting – the cottages, the mountain, the ricks of turf are combined with an awareness of the special light peculiar to the west of Ireland. The overall effect is therefore simple and timeless with a vision that is quite unique.

"With a rushing sound and the noise of a thousand waters falling, the whole bog swept in waves of gathering size and with a hideous writhing, down the mountainside to the entrance of Slí na Nathar, struck the portals with a sound like thunder and piled up to a vast height. And then millions of tons of slime and ooze and bog and earth and broken rock swept thro' the pass and into the sea". This is not a descriptions of the September 2003 bog slide at Poll a Thomais in Co. Mayo. It is actually one of the most dramatic descriptions in literature of the phenomenon of bog bursts and occurs in the novel "The Snake's Pass" (1890) written by none other than Bram Stoker, the Dublin born author of 'Dracula'. This fascination with the moving bog is shared by such celebrated annalists as The Four Masters who in 1488A.D describe "a fairy wind (sídhe gaoithe) which struck a party of turf cutters while they were at work on a turf bank. One was killed and "the faces of the others were caused to swell up".

Our bogs are said to contain "the shadows and echoes of our comings and goings thro' history and prehistory" It is little wonder then that Irish writers have found creative energy and inspiration in our bogs these great reservoirs of natural diversity. Seamus Heaney, winner of the Nobel Prize for Literature 1995 gives us some information about the genesis of his poem 'BOGLAND' and the significance of bog for him. "I had been vaguely wishing to write a poem about bogland because it is a landscape that has a strange assuaging effect on me….. I began to get the idea of bog as the memory of the landscape or as a landscape that remembered everything that happened to it:

Bogland

For T. P. Flanagan

We have no prairies
To slice a big sun at evening –
Everywhere the eye concedes to
Encroaching horizon,

Is wooed into the Cyclops' eye
Of a tarn. Our unfenced country
Is bog that keeps crushing
Between the sights of the sun.

They've taken the skeleton
Of the Great Irish elk
Out of the peat, set it up
An astounding crate full of air.

Butter sunk under
More than a hundred years
Was recovered salty and white.
The ground itself is kind, black butter

Melting and opening under foot,
Missing its last definition
By millions of years.
They'll never dig coal here.

Only the waterlogged trunks
Of great firs, soft as pulp.
Our pioneers keep striking
Inwards and downwards,

Every layer they strip
Seems camped on before.
The bogholes might be Atlantic seepage.
The wet centre is bottomless.

Seamus Heaney

10 BOG MYSTICISM REFRESHES THE SOUL AND SPIRIT.

Bogs are approx 95% water. They are very dangerous and mysterious places. They are places of isolation and solitude. They are wildernesses in a true sense. In 1825 two men were trenching potatoes at Dowris on the shore of Lough Coura and 8km. S.W. of Birr, when their spades unearthed a fantastic hoard of gold coloured bronze objects, hundreds of axe and spear heads, oval-shaped bronze pendants, horns of bronze, a bronze cauldron. The hoard which the men unearthed had been given up to the clear water at the edge of a shrinking lake in the 8th century B.C. The Dowris hoard would be astonishing enough if it were unique but more than 50 bronze age hoards have been found in similar landscape – laid to rest in bog lakes all over the country in the late bronze age.

Why were valuable objects thrown into lakes in the bog? More than likely, because these lonely bodies of water were regarded as sacred and looked upon with veneration in these early times, that the collections represent not a single act of hoarding but the accumulation over years and centuries of an annual votive offering, made in good times to give thanks to the gods and in bad times to ward off evil. The 19th century & 20th century veneration of holy wells at Crancreagh and at Lug on the same lake may be an echo of the Bronze Age tradition spectacularly demonstrated by the Dowris Hoard.

Bogs played an important role in the story of Early Christian Ireland from the 5th century to the 11th century. Early Irish monasteries were founded by men seeking to escape from the world, to find God in the wilderness. In central Ireland, the seclusion of bogs offered such a wilderness as the desert had done for the early hermits in Egypt. Bog island monasteries are the most interesting of these "Desert" sites. The island is a hummock of glacial drift or a drumlin surrounded by bog. The name "Cluain" means a fertile clearing, surrounded by bog. The word "Doire" sometimes refers to bog islands. The Lemanaghan Croizier, the staff of St. Manchan who founded Lemanaghan Abbey, Co. Offaly in the 9th century, was found by two B.N.M. workers in 1977. This may be an example of a valuable object hidden in a bog, rather than lost. The Derrynaflan chalice is an example of a spiritual treasure being hidden in the same way.

These monastic islands were reached by toghers. Monasteries deliberately sought the solitude of these bog islands but they were also selected for strategic reasons because they could easily be defended against marauding Vikings and native Celtic raiders. A failure in the defence system may have resulted in the Lemanaghan crozier and the Derrynaflan chalice being buried in bog where the anaerobic conditions and acid water would preserve them.

During the construction of the Grand Canal in the 19th century a togher connecting Clonfert and Clonmacnoise monasteries was uncovered. In modern Ireland the bogs continue to provide a source of spiritual renewal and reflection as it did for our ancient ancestors.

The ancient bogwood buried deep in our bogs reminds us of the timelessness of eternity. It stretches our imagination and forces us to meditate on the eternal.

Craftspeople who unearth from our bogs oak and yew and pine which span a timescale of up to 7,000 years are inspired by it. At their fingertips, works of art have been created in praise of the creator.

The oratory in Ferbane is a monastic cell-like structure reminding us of our human need to make sense of our own identity in the world. There are decent times in our lives and there are wastelands within. The massive roots of the yew tree enfolding Christ’s risen presence reach out to embrace and invite embrace, opening up a new way of life in them. The yew is the symbol of eternity.

The alter table at Pullough church was crafted from bog yew in 1991 by Michael Casey. The artist himself reflects on its making:

"I would take it out on my trolley into the garden and allow the winter sun to light it up, and as the figures began to emerge in the fusion of sunlight and instinct, there were moments when it was no longer a piece of wood but a celebration of life. There indeed was an epiphany, revelation of some part of that transcendental reality, that "whole" which every creative artist must consciously or unconsciously pursue"

In Boora church a sculpture in bog yew commemorates the blessing and rededication of the churchof St. Oliver Plunket and the arrival of the Mesolithic people to the area approx. 6,800 B.C.

In the village of high street, the baptismal font, the Pascal candleholder and the baptismal jug are crafted from bog yew found in the locality and sculpted by local artists. The figures on the font pulling themselves upwards speak of the journey from darkness and slavery towards light and freedom. In baptism we are freed from the power of darkness by Christ's death and resurrection.

The stained glass window in Ferbane church tells the story of generations of local people who toiled on the bogs to make a living. Theirs is a humble life but a noble one, close to the earth, close to nature and in tune with the universe because every time they cut a sod of turf they are reminded of how ancient the place on which they stand is.

The village of Ballinahown is the home of bogwood workshop. The workshop completed a commission in bog yew for the millennium celebrations, which has become a central feature in the village where local people pause for thought:

"It pulls me out of the fast lane, the soothing sound of the falling water saying to me:

"Nurture the gentle side of nature
Nurture the gentle side of life.

A material world can be a very lonely place. The life-giving fountain lifts me. The water gushing through the bog wood nurtures my parched roots.

I thirst.

But the heron points to the heavens. There is so much in human life that can only be experienced by sacrificing. A cluster of bog yew roots, continually emptying to receive, bring me to love's source".

Tourists seeking a retreat from the hectic pace of modern life will be refreshed and re-grounded by following the footsteps of the Celtic monks into the seclusion of the Midland bogs whose solitude is broken only by its little villages, themselves steeped in bog spirituality.

11 BOG THERAPY RELIEVES THE STRESS OF MODERN LIVING.

1. Spagnum Moss:

The first medicinal use of bogs was discovered during World War I. There was a huge shortage of sterile dressings in the field hospitals behind the front lines. Irish soldiers fighting in the war knew of the curative properties of sphagnum moss from their boyhood experiences.

It was used on a trial basis at first, out of desperation more than any other reason. Doctors and nurses serving in the field hospitals were amazed at its success.

Scientific studies were then carried out on it, which showed that it had antiseptic qualities, which kept infection at bay. It has disinfectant properties due to the phenol compounds in its structure. It also had the ability to draw out infection from a wound, just as in the bog it draws water into its pores like a sponge in the bog.

Many soldiers' lives were saved by it and they lived to tell the tale.

2. Balneology:

Peat contains bio-stimulators. People suffering from a variety of physical ailments are beginning to find relief for their condition from a new kind of therapy. Even the multinational drug companies are beginning to pay close attention to it. Peat in its natural condition consists of 95% water. This very liquid peat is heated and the patient takes a bath in the hot peat-mix. The bio-stimulators work on the ailing part of the body, prompting it back to better health. The patient feels weak for a few days after the hot peat bath, but improves thereafter. Not enough research has yet been done to determine whether the effects are long term or short term. Nevertheless, a series of hot peat baths can only have a therapeutic effect on somebody in pain.

3. Peat Heat:

A therapist called Ita Rafter has invented a new pain relief pack, called Peat-Heat. The pack is flexible and is filled with liquid peat. This is placed in the microwave oven and heated. It is then wrapped around the injured joint or muscle and it gives instant pain relief. The basic principal of peat acting as a bio-stimulator applies here except that the pack is more manageable and more accessible to the general public.

4. Sundew Sap:

Multi national drug companies have discovered that a substance derived by pressing the sundew and extracting the sap is a valuable ingredient in the mixture used to treat catarrh, coughs, inflamed throats and mild bronchial conditions. Although only small quantities are needed, there is a danger that unless sundews can be grown successfully under laboratory conditions, their unique place in the bogland flora could be jeopardised, if too many are harvested for medical purposes.

5. Aromatherapy:

The sense of smell is a powerful instinct. It is now scientifically proven that certain smells have an amazing trigger effect in healing the body and mind. Bog incense is proving to be a very successful form of aromatherapy, for Irish people at least.

The turf is put smouldering on a tiny burner. As the smell of burning turf wafts through the air, nostalgia may be the psychological healing trigger. The person is immediately brought back to his/her youth, mentally. Images of summer days spent on the bog and story telling on winter nights around the turf fire flash across the mind and renew it. Whatever the cause, the effect is very positive for Irish people at home and abroad.

6. Bog Snorkelling:

This is a new and growing form of bog therapy. It is very similar to balneology except that it is practiced out on the bog itself.

The person is immersed totally into the bog. The snorkel enables air to be breathed in from above the surface of the bog. The bio-stimulators in the peat act on the ailing part of the body. Whereas, the bog snorkeller lacks the warmth and comfort of the indoor bath, the background bog sounds compensate and are therapeutic in themselves. The bog-snorkler can relate to the singing of the skylark and the cries of the snipe and the curlew. Even the silence and the great open expanse of bog wilderness are bound to have a healing effect.

7. <u>Cosmetics:</u>

The mud deposits underneath the bog is highly prized as a base used in the manufacture of cosmetics.

The acid bog water is soft water with a low P.H. value. This is much friendlier to human skin and hair that alkaline water from the tap. Bog water is used in the manufacture of soaps and shampoos.

An extract from the bog myrtle is used in the manufacture of insect repellents. It is especially effective in repelling midges.

12 SUGGESTIONS FOR BOGS AS TOURIST DESTINATIONS IN THE FUTURE

It is our opinion that the following suggestions should be considered to enhance the role of Irish bogs in Irish tourism and secure the future of the bogs for generations of tourists yet to be born.

1. The Irish Electricity Supply Board should discontinue using peat to generate 18% of Ireland's electricity. This figure should be reduced gradually to %. Meanwhile Ireland is in the happy position of possessing the best location in the world to generate wind energy. The technology for wind energy generation is now advanced. There is no reason why wind cannot replace peat as a source of energy.

2. We would like to see the therapeutic side of bogs being developed. There is a growing interest world wide in the "Health Holiday". The Swiss have tapped into this market best of all. The range of therapies which the bog can provide is wide and varied. As yet, the Irish tourism sector has not tapped into this potential.

3. Bogs have always been places of fun and enjoyment for the native Irish. There are small bog festivals at local level for example "Tír Na Mona" Festival in our own locality. We would like this expanded to a much larger scale. We would like to see Bog Summer Schools being conducted to celebrate the glory of the bog in mid summer.

These schools would engage the attendants in Art, Literature, Music, Dance, Flora, Fauna, Archaeology; turf cutting etc. The list is endless such a school would pull together all the strands of bog culture and would deepen awareness and appreciation of this wonderful ecosystem. Good advertising would ensure that participants would have a good international mix.

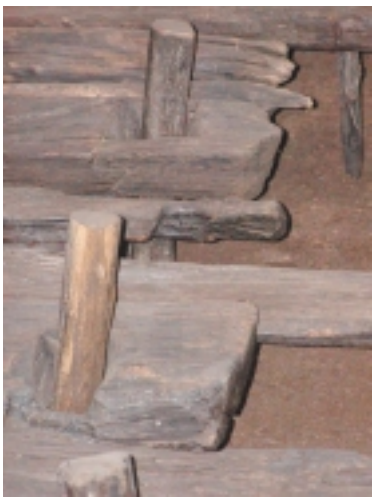
13 FINDINGS AND CONCLUSIONS

We have spent several months immersed in bogs. Bogs have occupied our every sleeping and waking moment. We understand now for the first time what it means to be bogged down.

We had alternating feelings of confusion and clarity, frustration and vision. In the midst of all this frenzy, one fact began to emerge and become increasingly dominant as our study advanced - that is that the Irish bogs are the perfect setting for Eco-Tourism. No place else on the planet will the tourist be able to observe so overwhelmingly the harmonious co-existence of the natural and the human environment.

The future of Irish bogs lies in conserving what remains of the intact bogs and regenerating the cutaway bogs so that the people of the world will have a wilderness to retreat to when other wildernesses have been destroyed. Our bogs can sustain themselves through Eco-Tourism as the following figures show;

1. Corlea Track Exhibition Centre, Co. Longford has a local guide, an interpretative centre, and a boardwalk and is visited by 16,000 visitors per year. Its themes are archaeology and conservation. It employs 10 people.



2. The Céide Fields Co. Mayo has a local guide, an interpretative centre and a boardwalk. It is visited by 43,300 visitors per year. Its themes are archaeology, conservation and wildlife. It employs 20 people.

3. The Clonmacnoise Bog Train, Co Offaly has a local guide, an interpretative centre and an Educational train tour into the bog to inform the tourists about the details of bog formation, turf cutting, bog flora and fauna. It is visited by 30,000 tourists per year and its themes are turf in the Irish economy and wildlife. It employs 12 people.

4. Peatland world, Co. Kildare has a local guide anD interpretative centre. It is visited by 8,000 tourists each year. Its themes are conservation, turf in the Irish economy; museum artefacts and wildlife.

5. "A Day in the Bog" Tralee, Co. Kerry has a local guide, an interpretative centre and a museum. It is visited by 4,000 people per year and it employs 7 people.

The above 5 centres are typical of 20 other such centres all are centres of employment in places where there is no other source of income. None of these centres existed before the 1990's. This illustrates the huge growth curve in sustainable bog Tourism.

The National Museum of Ireland has three branches housing bog archive material:

1. The National Museum of Archaeology and History, Dublin, is home to Gallagh Man and the Bronze Age hoards. It was visited by 255,000 tourists in 2002 and employs 20-30 people.
2. The National Museum of Natural History Dublin, is the home of the 120 Giant Irish Deer skeletons. It was visited by 110,000 tourists in 2002 and employs 6-8 people.
3. The National Museum of Country Living, Co. Mayo, has a wide range of traditional turf-cutting implements on display. It employs 5-6 people and was visited by 135,000 tourists in 2002.

Our Irish bogs are sanctuaries, sacred places where the relics of Ireland are stored.

We invite the discerning tourist to join us in the celebration of that wealth. We invite the photographers environmentalists, the climatologists, the botanists, the zoologists, the historians, the artists, the geographers, the archaeologists, the students of life, young and old, who want to know more about this wonderful planet which we inhabit.

Mass tourism would kill our bogs. We discovered that it takes three years for a human footprint to disappear from the bog surface. That is why the boardwalks are needed for visitors. So we encourage the sun seekers to go to the Mediterranean sunspots and to leave the tranquility of the bogs to the Eco-tourists.

Our bogs are special places and those who visit them leave as special people with a deep sense of awe and mystery and respect for Mother Earth.

Our bogs are alive and breathing. They are the only physical feature that are alive and breathing. Our bogs rise in winter when saturated and sink down in summer when dry. That is why neighbours separated by a bog cannot see each other's houses in winter. They grow upwards by 1mm per year. A vertical cutting 8 metres deep into a bog takes you back 8,000 years and in that cutting, everything has been preserved and nothing has decayed. This is a very good way for us to put our own brief lives into perspective but also to remind us of the immense damage that our modern technology is capable of doing in a short space of time.

Our artists are creating beautiful bogwood sculpture. Our craftspeople are making living history pages from slices of turf. If emigrants took turf sods from their home bogs when they went to settle in the far corners of the globe, their descendants who return to find their roots should not be denied the possibility to do the same. The spores of potato blight from the Great Famine when the starving people tried in vain to grow potatoes on the peat are still in the bogs. That surely has deep meaning for over 1oo million people worldwide with Irish roots. Small vials of bog butter must be worth more than axle grease and even golden coloured bog water can be marketed for what it is, the humic essence of history.

Having produced the first whiskey in the world, the Irish should be proud of the fact that the water which puts life into their "uisce beatha" is an infusion of their history for it passed through peat-covered catchments on its way to the maltings and distilleries. Much more could be done to open the eyes the hearts and the minds of the world's tourists to the Irish bogs.

We conducted a survey with 50 tourists leaving Dublin Airport on Sept 17th 2003, having holidayed in Ireland.

The following is the analysis of the questions we asked them:

1. What is your country of origin?
   40% U.S; 30% U.K.; 15% France; 10% Germany; 3% Italy
   2% Sweden
2. Were you aware of the existence of Irish bogs before you came to Ireland?
   60% Yes; 40% No
3. Did you visit a bog while in Ireland?
   20% Yes; 80% No
4. If not, why not?
   40% Lack of Information
   30% did not realise the unique value of bogs.
   25% Intended to but did not get time.
   5% Weather was too wet.
5. If you did visit a bog, was it a worthwhile experience?
   95% Yes
   5% Not sure.
6. If Irish bogs were better marketed and more geared to tourists, would you visit one on a return trip?
   100% Yes

From the survey it is easy to conclude that:

A The potential to develop bog tourism is there.

B Better marketing of bog as tourist destinations is called for.

C Those tourists visiting bogs are very happy with the experience, so very little needs to be done apart from improving tourist facilities in bogs.

Tourism is one of the world's largest growth industries. It now ranks third behind energy and the motor industry: 25% of tourists are now taking a rural holiday. The Irish bogs fit into that category.

Tourism is of major importance to the Irish economy. It employs 8% of our workforce and earns 6.5% of our G.D.P.

In 2002 5.9 million tourists visited Ireland bringing 3.98 million into our economy. One in every three of these tourists has Irish roots. Their instinct draws them to the bogs. The other two are looking for someplace special, someplace unique which will leave a lasting imprint on their souls and minds. We suggest that the bog of Ireland is that place.

Tá súil againn gur bhain sibh taitneamh as an aistir seo tri Tír na Móna. Tá súil againn go dtiocfaidh sibh ar chuairt chugainn.

Nuair a thiocfaidh sibh, tá fhios againn nach dteastóidh uaibh dul abhaile. Go raibh maith agaibh.

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Scoil Dara
Kilcock, Co. Kildare

ALDO PAPONE CASE STUDY 2003

The Travel and Tourism Programme in Ireland

Instructions for Teachers

15 INSTRUCTIONS FOR TEACHERS

INTRODUCTION:

Through our participation in the Aldo Papone International Conference we have the opportunity to share our insights into "The Wild Beauty of Irish Bogs" with the world at large. The local can now become universal. This surely is the essence of global education.

THE AIM OF OUR CASE STUDY:;

- To investigate the sustainability of Irish bogs as tourist attractions.
- To provide material for the Global Travel and Tourism web page.
- To provide students and teachers with additional study material.
- To facilitate trans-national understanding and co-operation.

OUR RESEARCH METHODS:

- We surveyed by questionnaire 20 local people to tap into the local knowledge of our subject.
- We surveyed 50 tourists leaving Ireland to assess international tourist knowledge of and satisfaction rating with Irish Bog Tourism.
- We conducted separate taped interviews with 3 experts on Irish bogs.
- We visited a bog on 4 occasions during our study to collect samples and data and experience our subject matter first hand.
- We read a wide range of material written on Irish bogs.
- We researched and downloaded data from bog-related websites.

MISTAKES MADE:

- We spent several months doing our research. This was extremely enjoyable, interesting and valuable but a lot of it was not used subsequently in our case study.
- We sacrificed time to the research, which could have been spent on perfecting our presentation skills.

ACHIEVEMENTS

- We developed our I.T. skills
- We developed our communication skills
- We developed our research skills
- We broadened our educational base
- The most valuable outcome of our study is that it has enabled us to see the modern era in which we live as part of the continuum of the Natural and Man-made environment over the part 10,000 years. It has given up a better perspective of time and a greater respect for our planet. The Travel and Tourism Programme has given us the opportunity to do this in our own locality, which is part of the great Bog of Allen.

The Bog of Allen has served our ancestors well by providing them with fuel. We envisage that it will serve our descendants equally well by providing them with a wilderness landscape into which they can escape.

We hope our children can earn a good living from the bog by conserving it to show it to your children.

GLOSSARY

Anglo-Normans:	Came from France. Conquered Ireland on behalf of the English king in the 12th Century.
B.N.M.:	Bord Na Móna which is the state turf-cutting company.
Bog of Allen:	Large raised bog in the Irish Midlands.
Co. Dublin:	A county on Ireland's east coast.
Co. Kildare:	A county in the Irish Midlands.
Co. Laois:	A county in the Irish Midlands.
Co. Longford:	A county in the Irish Midlands.
Co. Mayo:	A county on Ireland's west coast.
Co. Offaly:	A county in Irish Midlands.
Cutaway:	What remains at the bottom of the bog where commercial cutting has ceased.
Dublin:	Ireland's capital city.
E.S.B.:	The Electricity Supply Board of Ireland.
Esker:	A ridge of sand deposited under melting ice.
Famine Relief Scheme:	A means of providing people with a basic income during the great Irish Famine 1845-1849.
Hugh O'Neill:	A gaelic Irish clan leader of the 17th Century.
Ireland:	The most westerly country in Europe.
Irish Independence:	Ireland became Independent of England in 1921.
Lord Mountjoy:	The leader of the English troops in the battle against the native Irish at the Battle of Kinsale in 1601.
Newgrange:	A Stone Age Passage Tomb in Co. Meath.
T.D.:	Teachta Dála (A member of the Irish Parliament).
The Curragh:	A flat plain of glacial sands in South Kildare.
The Grand Canal:	Links Dublin in the east with the Shannon River in the west.
The Royal Canal:	Links Dublin in the east with the Shannon River in the west.
The Shannon:	Irelands longest river.
Uisce beatha:	The Irish for "the water of life". It is the work from which the English word "whiskey" is derived.
Ulster:	A Northern Province in Ireland.