SHERKIN COMMENT

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INSIDE

The glass house at the National Botanic Gardens
Photograph by Con Brogan,
Dúchas - The Heritage Service *(see centre pages)*

National Botanic Gardens Glasnevin, Dublin

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Editorial

Protecting Our Quality of Life

By Matt Murphy

RECENTLY we at Sherkin Island Marine Station chose "Infrastructure Development: Can the Environment be Protected?" as the title for our annual environmental conference at Carrigaline, Co. Cork. The conference came about because I have been convinced that the transportation infrastructure development of the past 30 years, while in many ways wonderful for the motorist, has been achieved with much damage to the environment and many unforeseen consequences which continue to unfold. Furthermore, I am very uneasy that the huge investment in infrastructure development over the coming six years will commit Ireland to additional actions that have many unappreciated downsides where the environment is concerned.

Highway infrastructure development will not solve Ireland's transportation problems in the long term. In the short term they may reduce certain bottlenecks but with over 160,000 new vehicles coming on to Irish roads annually, at the end of ten years we could have an extra 1 million vehicle owners jostling for road space. That figure is conservative. I have allowed that 60,000 vehicles annually will be replaced.

Some day in the near future, some government will have to bite the bullet and tell us what they already know; cars are not the best means of moving the public. Today, there are too many cars on our roads. Car numbers entering large towns and cities are growing and traffic during "rush hour" is delaying the efficient movement of people and goods. Everywhere one looks for examples, we see that simple upgrading and expansion of roads leads to more, single occupant automobiles, creating more traffic. Better roads are one thing, but they should be environmentally compatible and balanced by increases in dependable, environmentally more friendly, mass transportation. Car sharing and use of mass transportation must be encouraged. Park-and-ride lot locations, with access to public transport, must be the first priority. They allow people transport choice and could lessen the constant morning and evening time traffic jams in and around cities and towns. But, the real solution is a huge increase in public transport throughout Ireland. That transport must not be limited to one service a day but regular and throughout the day, and it must also be subsidised. Taxes pay for roads, why shouldn't they pay for efficient railroads? If these choices are brought into being, we may not then need constant expansion of our infrastructure.

A question I pose - Are we obligated to make the same infrastructure mistakes as other nations? (see page 9 - *The Failure of Success* by Robert De Santo)

"Highway infrastructure development will not solve Ireland's transportation problems in the long term."

Road improvement is removing many miles of hedgerows and is changing the character of the countryside, which results in the destruction of wild habitats for the flora and fauna. All too often the replacement for our hedgerows is concrete fencing, which lacks habitat value and any sense of history. Why, I ask, is there not an insistence by Dúchas that hedgerows be recreated through proper banking and then replanting? Wetlands are being destroyed. In the US these must be recreated as near as possible to the site and have a replacement ratio of more than two for one. Again this is an issue for Dúchas to address. One must laud the NRA and Dúchas for the employment of over 20 archaeologists under the new national development plans. What is needed now are a similar number of botanists and zoologists to ensure that the flora and fauna of the roadside is maintained. Taking a little extra time now and making our highway infrastructure fit the environment will save us from problems with more costly solutions in the future.

A Code of Practice on Archaeology and the National Roads Programme was agreed in 2000 between the NRA and the Minister for Arts, Heritage, Gaeltacht and the Islands. The code is founded on a number of mutually agreed principles which include:

- Recognition by both parties of their respective statutory responsibilities;
- Acceptance that development of the national road network has considerable archaeological implications;
- Acceptance of the developer pays principle;
- A right to appeal decisions by Dúchas on archaeological licence applications;
- A commitment to deal with archaeology in a balanced and cost effective manner;
- Both parties to co-operate to ensure, as far as possible, that archaeological investigation is carried out prior to the commencement of road construction, and
- A commitment to monitor and review the operation of the Code.

However, what we need immediately is a code of practice on flora and fauna and the National Roads programme. It is ludicrous that this had not been included in the original plan. We must see that proper care and protection is given to the countryside that will be disturbed by this massive development of Ireland's infrastructure over the coming six years.

Prof. Frank Convery, Director, Environmental Institute, University College Dublin, gave a most interesting paper at our conference. The core idea of the paper was that local authorities should become the "Tribune of the People". They should largely get out of infrastructure provision and concentrate on helping citizens protect their quality of life and fund their potential? The rationale is that central government is taking over infrastructure provision anyway, so let them get on with it.

In future issues of *Sherkin Comment* we will publish some thought provoking articles on infrastructure development issues.

Proceedings for the conference: "Infrastructure Development: Can the Environment be Protected?" are available from Sherkin Island Marine Station, Sherkin Island, Co. Cork, for £30.00 (inc. postage).

SUBSCRIPTION FORM

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Ireland's Underworld

By Tim & Pam Fogg

VIRTUALLY every county in Ireland has caves, from Antrim to Cork to Donegal. Caves are defined as "natural underground openings in rock which are large enough to allow human entry" and the reason we are so well endowed with these 'holes in the ground' is that approximately two thirds of Ireland is covered with a layer of limestone. It is in limestone that the biggest and deepest caves of the world form, created by the action of water on the natural fissure systems in this calcium carbonate based rock, etching passages, chambers and shafts which combine into cave systems.

The most extensive cave systems in Ireland are in County Clare and on the South West Fermanagh/ Cavan border. In these areas, show caves like Aillwee and the Marble Arch give everybody a chance to glimpse an electrically lit underworld during guided tours on concrete paths or in boats. However, there are many kilometres of cave passage which are only visited by a few enthusiasts, who descend ropes or swim dark lakes to explore.

In the Fermanagh/Cavan region there are nine major cave systems which have a combined mapped length of approximately 35 kilometres. Every year this is added to as new passages are entered and for the first time light falls on passage walls, stalactites and stalagmites which have formed over aeons.

A short extract from a caver's diary gives a feel of the thrill of cave exploration:

"I lay flat out, peering into the dark space. The boulder we had just pulled aside had revealed a tantalising black hole beyond. I tried to squeeze my head into the rift to see if there was a way on. It was too narrow. I couldn't shine my light in and look at the same time. I pushed another small boulder aside, the gap was wider and now I could just about see that my light was shining into darkness. I was sure I could hear the deep enticing music of flowing water far ahead, but maybe my over active imagination was playing tricks on me. One thing I was sure of, there was a howling draught blowing in my face. It made the flame of my carbide light flicker and hiss. If anything hinted of passage ahead, it was this wind. My companions waiting behind me were getting bored and cold. "Can you see anything, is there a way on?" I squeezed in, then backed out to make sure I wouldn't get stuck. I then launched in again, this time pushing my foot against the cave wall behind. With an undignified sprawl, I landed on the far side. I was through. I sat up and looked around. The walls of the passage were smooth and beautifully etched, with huge scallop shaped marks. Looking ahead, I could see that the passage was getting bigger. In the distance, almost at the limit of my beam of light, I could just make out the velvety shimmer of water. I scrambled to my feet, calling back through the rift, 'We've found it, we're into new passage, we've found the river.... ' "The earth has been photographed from space, its surface has been mapped in detail, its highest mountains have been scaled and its remotest deserts scrutinised. There are even footprints on the moon. Where else on this crowded planet, apart from the deep oceans, are there natural places remaining which offer the potential for true, original exploration and study, other than caves? We will know when the last mountain has been climbed but we can never say, for certain, that the last cave has been found.

However, there are deep dilemmas for the adventurers as their first footprint in the mud causes irreversible change to the cave environment.

The level of environmental awareness in the cavers of Ireland is high and is sustained by the national caving body, the Speleological Union of Ireland via newsletters, a journal, website, an annual conference and training schemes. A strong cave conservation message reaches the majority of the caving community through the S.U.I.'s efforts.

The message needs to reach a much wider audience as the external threats to caves are numerous. These range from quarrying, to unsympathetic development for tourism, to pollution of the cave water.

Our caves are fragile places. Their features take hundreds and more often, many thousands of years to form. Their inhabitants, the bats and tiny insects, are vulnerable and easily disturbed.

Irreparable damage can be done, often unwittingly, by people who enter without first learning about caves and their conservation. A stalactite, once broken, may never regrow; it has no beauty or worth outside a cave. Cave sediments are storehouses of information which, if disturbed, are no longer of value. Cave life once upset, may never recover. With one careless movement, something unique can be lost forever.

STATISTICS

Ireland's Longest Cave:
Pollnagollum - Poul Elva System Co. Clare
- 14.5 kilometres

Ireland's Deepest Pothole:
Noon's, Co. Fermanagh
- 92 metres

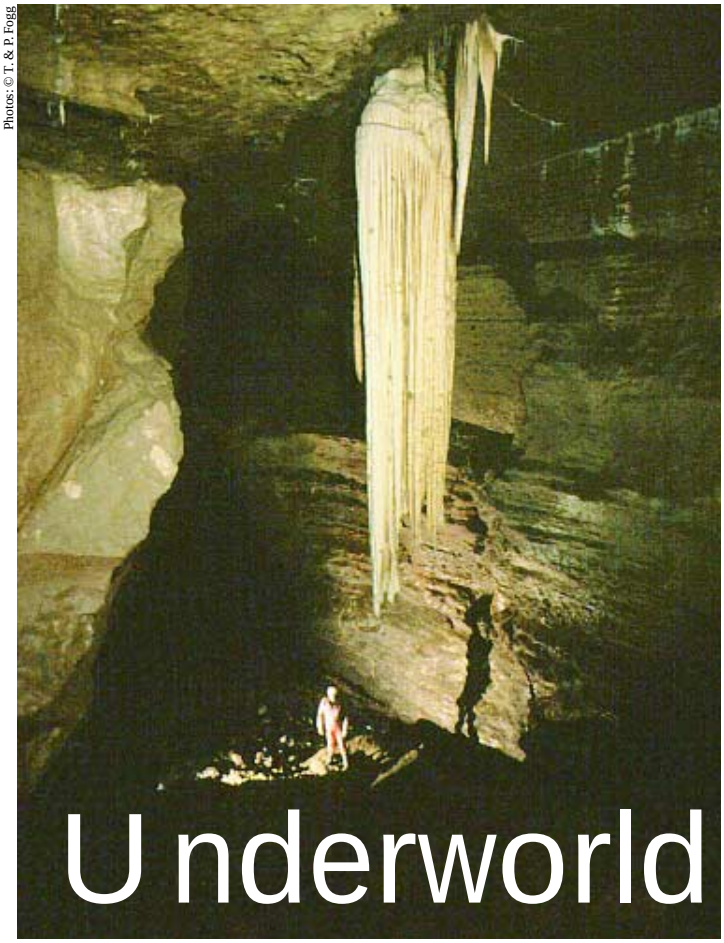
Longest cave in the world:
Mammoth Cave System, Kentucky, USA
- 530 kilometres

Deepest cave in the world:
Voranja, Georgia
- 1710 metres

The longest known stalactite in the world is 28 metres. It hangs from the roof of a cave in Brazil. In Ireland, the stalactite in Pol-an-Ionain in County Clare is still one of the longest in the world at 6.5 metres.

Cautionary Note: Caves are hostile places for humans. Exploration of them should only be undertaken by those who are properly experienced and equipped. For the foolhardy, ill-informed and poorly equipped, caves present hazards which are potentially life threatening.

Photos: © T. & P. Fogg



The big stalactite, Pol-an-Ionain, Clare.

Some Further Information

www.caving/ireland.org

Burns, G., Fogg, T., Jones, G Ll., & Kelly, J. G. (1997). The Caves of Fermanagh and Cavan. ISBN No. 0-9531602-2-3.

Self, C. (1981). Caves of County Clare. University of Bristol Spelæological Society, Bristol.

Coleman, J.C. (1965). The Caves of Ireland. Anvil Books, Tralee.

Fogg, P. and Fogg, T. (2001). Beneath our feet: the caves and limestone scenery of the north of Ireland. ISBN No. 1- 84123 - 3471.

Tim and Pam Fogg, Newtate, Enniskillen, Fermanagh, BT92 1FW, N. Ireland.

Cave decorations in Watson's Way, Reyfad, Fermanagh.

Rock sculpture in the Tomeens, Clare

ALCOHOL

More than just a drink

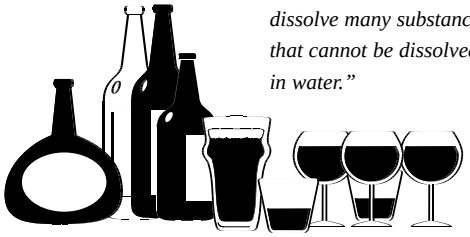
By Anthony Toole

HAVING been widely used for more than 2000 years, alcohol is one of the few drugs that can be made, bought and sold without fear of criminal prosecution, as long as certain clearly defined rules are adhered to.

Whether it is made as wine, beer, cider, or in any other form, its method of production is essentially the same. A carbohydrate, such as starch or sugar, is broken down into glucose,. This is then mixed with yeast and allowed to ferment for weeks or even months. Catalysts, called enzymes, within the yeast, convert the glucose into alcohol and carbon dioxide, releasing the energy that the yeast needs in order to survive and grow,

Under normal circumstances, the yeast can only tolerate a concentration of about 12% of what is, in effect, a waste product of its energy generation. If the concentration exceeds this, the yeast becomes inactive. This puts an upper limit on the alcohol content of wine or beer. To increase this, the fermented liquor needs to be distilled. As the boiling point of alcohol is 78°C, compared with 100 °C for water, the liquid that distils over contains a higher proportion of alcohol than the original wine or beer. This is how spirits such as whiskey, brandy, vodka etc. are made.

"They are widely used as solvents, being able to dissolve many substances that cannot be dissolved in water."



The alcohol content of a drink is sometimes given as a percentage, but often in terms of a rather indefinite measure known as 'proof'. This concept goes back to a time when sailors, suspicious of innkeepers who might have watered down their rum, discovered that a small quantity of gunpowder soaked in the drink would ignite only if the alcohol content were high enough. Ignition was accepted as proof that the drink had not been diluted with water. 100° proof means approximately 40% alcohol. Drinks containing less than this would not allow gunpowder to ignite.

In chemistry, the word 'alcohol' has a much broader meaning than that in relation to alcoholic drinks. It refers to a very large number of distinct compounds, only one of which is present in drinks. In their molecular structure, the alcohols bear a similarity with water. Indeed, water could be thought of as the simplest of the alcohols.

A water molecule consists of two hydrogen atoms joined to one atom of oxygen. In the alcohols, the place of one of these hydrogens is taken by a collection of carbon and hydrogen atoms known as a hydrocarbon group. The difference between one alcohol and another lies in the number of carbon atoms in this group.

A molecule of the drinking alcohol contains two carbon atoms, and is specifically named ethanol, or ethyl alcohol. Methanol (methyl alcohol), which contains only one carbon atom, is much more toxic than ethanol, and must not be drunk. It is obtained by heating wood chippings and is often referred to as wood alcohol. Even small quantities can cause blindness. Together with colouring agents, it is added to pure ethanol to make the latter undrinkable, the mixture formed being known as methylated spirits.

The uses of alcohols are extensive and varied, and make them among the most important compounds in chemistry. They are widely used as solvents, being able to dissolve many substances that cannot be dissolved in water. Methanol was once used as anti-freeze, to prevent water from freezing in car radiators. It has now been replaced by another alcohol, ethylene glycol. The sweet tasting glycerine is an alcohol, made as a by-product of the manufacture of soap from fats or oils.

Ethanol has a boiling point similar to that of petrol. It burns very well with a clean flame and can therefore be used as a fuel. In countries like Brazil, which have a large sugar cane industry, ethanol, made by fermentation of the sugar is added to petrol. The reliance of those countries on imported petroleum is thus significantly reduced.

The oxygen in the ethanol helps the fuel to burn more completely than it normally would so that fewer pollutants like carbon monoxide and unburned hydrocarbons are produced. As ethanol contains none of the sulphur compounds found in petrol, the sulphur dioxide that is responsible for acid rain is not formed when it burns.

The USA also makes upwards of a billion gallons of ethanol from maize, for addition to petrol. Fuels containing ethanol are known as biofuels. Some car engines are designed to run on 100% ethanol, while others use various mixtures of ethanol and petrol, the commonest containing 20% of the alcohol.

As oil becomes scarcer and more expensive, ethanol production is likely to be stepped up. Research is at present being focussed on bacteria that may be able to convert carbohydrate waste like the cellulose in woodchip and paper directly into alcohol. If this research is successful then ethanol will become a renewable energy source for the future.

If the stopper is left off a bottle of wine or spirits for a few days the drink turns sour. This is caused by oxygen in the air, which oxidises the ethanol to ethanoic, or acetic acid, known more commonly as vinegar.

Oxidation of alcohols to organic acids like vinegar is a two-stage process, the intermediate compound being an aldehyde. Methanol, for example, is oxidised to formaldehyde, which is used to preserve dead biological specimens and organs for use in scientific research. The oxidation of formaldehyde produces formic acid, the compound responsible for the stings of ants and nettles.

Alcohols react with organic acids to form substances called esters, which are found in all living organisms. Animal fats and vegetable oils are examples of such esters. Many esters are sweet-smelling chemicals, widely distributed among fruits. It is these that give a fruit its characteristic smell and flavour. Many esters are manufactured for use as food flavourings, while others are used as solvents. Ethyl acetate, for example, made from ethanol and ethanoic acid, is a common solvent for paints, glues and nail varnish.

In the many different wines, while the main constituent remains the ethanol, it is the mixture of aldehydes and esters, carried through from the original fruits, that give each individual wine, even the most exotic, its own unique taste and smell.

M.A. Toole, 65, Cheswick Drive, Gosforth, Newcastle upon Tyne, NE3 5DW, U.K.

SAVING YOUR ENERGY

10 Simple Things You Can Do

1. Use your desktop lamp; why light a tennis court to read a sheet of paper.
2. Use compact fluorescent lamps to save energy and cut pollution.
3. For three copies or less, use the printer; for more, use the copier.
4. Laser printers use 300 watts; inkjets use only 10, for similar quality.
5. Using the "stand-by" button on your copier will lighten your energy load by 70%.
6. A computer monitor uses 60 watts of power; turn it off if you leave for more than 10 minutes.
7. Recycling paper reduces water use by 60%, energy by 70%, and cuts pollution in half.
8. Relax and take public transport; use 25 times less energy.
9. Burn carbohydrates not hydrocarbons; ride your bike to work.
10. Airplanes burn 70 gallons of fuel a minute. Travel by a real super-saver: teleconference.

Pollution Prevention New

Environmental Impacts of Fishing

By Michael Ludwig

SINCE the beginning of time, humans have turned to the sea for food. Who first caught what and how they did it, is lost in time. It probably started with spears when someone decided that saber-toothed tiger was too tough. Today, seafood harvesting often relies on large nets (trawls) sweeping the seafloor or hanging in the water column (purse seines and gill nets). As the need for food has grown, so has harvesting skill and the, resulting, landed volume. Trawling dominates the fishing practices now used. Technology improvements have enabled trawl fishing to expand into virtually all types of seafloor conditions. We have long known that such fishing practices were relatively efficient but carried hidden environmental costs[1]. The two most serious costs are that species and the sizes captured cannot be easily or fully controlled.

In the last two decades, trawling technology has advanced to allow harvesting over rocky and uneven seafloors. Assessments of the more recent gear technology advances have revealed a second, unintended, consequence of trawl fishing: disruption of the seafloor habitat. With these two adverse impacts being experienced by areas where trawling occurs, coastal nations are faced with the realization that the harder they fish an area, the longer it takes to return the stocks to a natural condition.

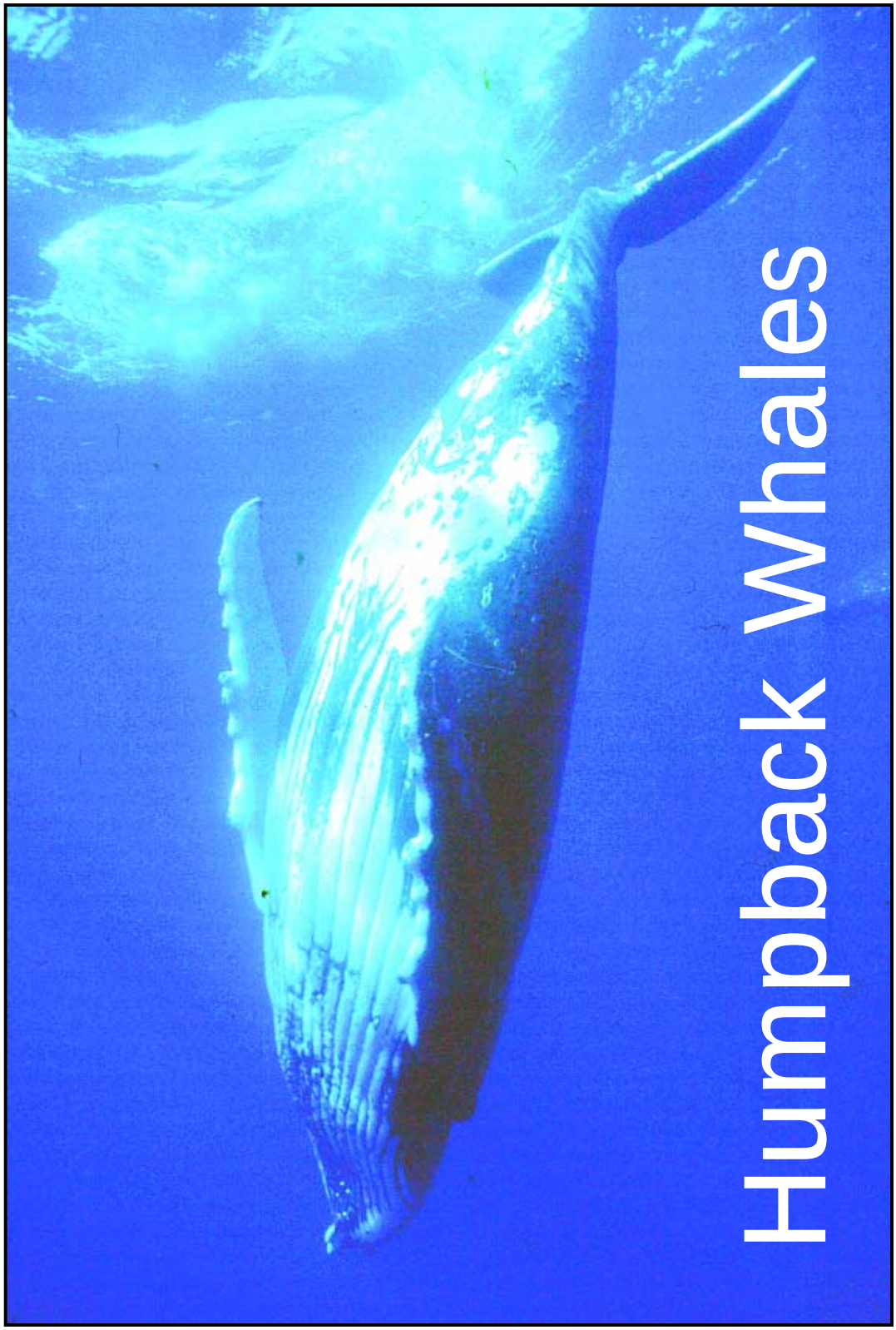
Bycatch is the volume of species and sizes incidentally caught during a harvesting effort. When combined with gear impacts from devices dragged across the seafloor, they can accelerate the rate of resource depletion and prolong the recovery period needed to re-establish desired fishery stock levels. Bycatch is usually discarded at sea because it has little value or is composed of managed species that are closely regulated. Unfortunately, in virtually all cases, the individuals are injured or dead. Bycatch varies in extent and consequences depending on the species being targeted for harvest. For instance, shrimp fishermen often discard more than nine pounds of Bycatch for every pound of shrimp they retain when harvesting along the Gulf and Southern Atlantic coastlines. In Sea scallop harvesting, the Bycatch is primarily yellowtail flounder. Yellowtail flounder is a depleted fishery and its presence in the sea scallop catch is closely monitored and severely limited. Sea scallop fishing can be stopped if the yellowtail Bycatch is too high!

Trawl gear impacts are a threat to habitat well-being. We fish where fish congregate because that is the best place to harvest them. If we are reducing the habitat value of these sites, then they may be progressively less able to be the best habitats and support the same number of individuals. A decade ago, a group of researchers were looking at scars left by dragging trawl nets across the seafloor. They wondered how much area was covered during the annual harvesting. That number can be determined by assuming a standard size of the trawl used in an area and then multiplying by the length of time a trawl was dragged. Trawling time is recorded by trawler crews. When they completed their calculations, the researchers were amazed to discover that an area equal in size to the entire Northeastern US Continental Shelf was swept by Northeastern fishermen trawling, every year. When they looked at specific areas on the Continental Shelf, they found areas being swept by more than twenty trawl nets per year. Damage to these areas could be extensive. Curiously, the level of impact to habitats from mobile gear is related to the seafloor type. While sandy seafloor habitats appear best able to sustain trawling, muddy habitats do not recover nearly as quickly and rocky habitats recover the slowest. Studies performed around the world show similar results. Fish species that either congregate by species, rather than age, or move only modest amounts during their life are at risk of extinction.

In 1996, the US Government was charged with determining the consequences of bycatch and gear impacts and taking steps to reduce those impacts. Curiously, there is a sector of the fishing industry that likes certain gear impacts. American lobster landings have grown to unheard of levels in some parts of their range. When the situation was investigated, it was found that the number of lobster traps being used had a similar growth. It wasn't long before a relationship between gear and lobster numbers was proposed. Lobster traps are baited every two to five days with about a pound of fish. Additionally, lobsters burrow into the bottom for protection from predation. Lobster traps are about four square feet and create a ready made burrow site. In the mid-1970s, researchers discovered that lobsters can climb in and out of traps with relative ease. Because lobster traps provide free room and board they could be helping more lobsters survive and the landings have increased! Are traps really enhancing the lobster population? We just don't know. We do know that gear impacts, bycatch and lobster traps, all change the environment. We are just learning how that happens and what it means. Whatever the answer, all are tied to our growing need for seafood.

Michael Ludwig,
NOAA/NMFS, Milford, CT
USA 06460-6499

[1] Not all the fish chased by a trawler are caught. Fish tend to swim directly in front of the net and are captured only when they "fall back" or swim into the net. Other fish escape by swimming in any direction where the net isn't.



Humpback Whales

By Pete Atkinson

SIX miles off the north coast of Moorea in French Polynesia, I look over the side of the dinghy. A group of melonhead whales swim by, one turning on its side to look at me as they pass. The water is the indigo of the open ocean. The pair of humpback whales surface again, and I slip silently into the water. The clarity is breathtaking. The sea is full of animals. Apart from the two adult humpbacks there must be a hundred melonhead whales and many roughtooth dolphins with their strange plesiosaur heads. A convention of cetaceans.

I fin towards the humpbacks, my eyes glued to the viewfinder of my camera, the motor-drive chattering away. Out of the side-window of my mask I catch a glimpse of a shark, instantly recognisable as an oceanic whitetip shark. Beige, broad pectorals, big rounded dorsal, looking as though its features belong to a bigger animal. But these animals are outside my experience. Alone, six miles offshore didn't seem the best time to get familiar with them so I jumped back into the dinghy.

Since that encounter I have had the opportunity to photograph humpbacks on many occasions in the South Pacific. Humpbacks visit the islands of the tropical South Pacific between July to October to mate and give birth. Gestation lasts 10-12 months. They migrate to Antarctic waters for the southern summer to feed on various species of krill.

The southern hemisphere Pacific humpbacks are a distinct population from the North Pacific animals, most of which breed in Hawaii and feed in Alaska. For photography, the southern whales have several advantages.

Hawaiian humpbacks are drab, tending to be grey all over, whereas the southern ones have a lot of white on their undersides which contrasts well with blue water, and makes focusing much easier.

Hawaiian humpbacks are rigorously protected; you can't approach closer than 100 yards (about 92m) without the risk of a $20 000 fine and a year in prison. You can get in the water and hope the whale will swim towards you, but you might need to pay a lawyer $200 an hour to explain this to the judge.

And frankly, the islands of the South Pacific are just much nicer places with better diving.

Photographing whales is a bit like surfing, a lot of waiting around for a few seconds of excitement. So when it happens, and there is a whale coming towards you and you don't have time to think, everything must happen almost instinctively. The exposure will have been set already so with a housing all you'll have to do is focus and compose. With a Nikonos and "15"mm lens you can just preset the focus.

Each encounter is usually too short for me to shoot a whole roll. It is useful to have a second camera loaded because the next encounter may be with the same whales only a couple of minutes later. Last year in one unforgettable encounter, I shot three rolls on a pair of whales which simply wouldn't go away.

I use two techniques for getting close to whales. *Vigia*, my 44' aluminium yacht has a diesel engine which rarely disturbs humpbacks. On occasion they will lie on the surface 10m from *Vigia* with the engine going. Often a mother and calf will rest at the surface and by approaching slowly and discreetly, you can often get close. Then I slip in the water on the side away from the whales, and fin slowly towards them. If you just rush towards them, they will be perturbed and swim away. If you relax and go slowly, or even stay still and pretend to be a jellyfish, often they will come to inspect you. The calves are particularly curious about snorkellers. Mothers with calves are also easy to photograph because the calves cannot stay submerged for long. If the mother doesn't come up too, she is probably just 30m down, resting. I think the calves are probably buoyant. In Tonga I came across a mother 20m below me, with the calf wedged across under her chin, as though being held down by the mother was the only way the calf could rest while submerged. Other people have seen the mother "protecting" a calf with her pectoral. Perhaps it's just another way of keeping a buoyant calf submerged.

Vigia drifts slowly enough that I have several minutes before I have to swim after her. I try to leave *Vigia* upwind of the whales, so at least we are going in the same direction. At other times I will use a 3.5m RIB with an 15HP outboard motor. Humpbacks are much more wary of this noise and I can only get close if I go very slowly. If they are diving they may be submerged for 20 minutes. I sit in the dinghy and hope they will surface nearby. If you just race up in the dinghy and jump into the water they will take fright and you will be lucky to take any pictures at all. And this is simply rude behaviour. The dinghy drifts fast if it is windy, so I use a bucket as a sea anchor to slow it down to give me longer with the

whales. Ideally, someone drives you around in the dinghy but such people are hard to find!

Tonga is possibly one of the best places to see humpback whales. The water is generally clear and sheltered, and there are enough animals that you can usually find several each day, sometimes as many as 20 a day. In 1997, guidelines were introduced intending to control the behaviour of people around whales. A Hawaii based non-profit organisation, Whales Alive were involved as "facilitators" when the guidelines were dreamt up. The Tonga guidelines are loosely based on the legislation of other countries. The rules of interest to photographers are those which stipulate 100m as the closest approach for a boat, and 30m for the closest approach for a swimmer. Dr Roger Payne (who has more experience with whales than anyone) thinks 100m is of no benefit to the whales, it has no scientific basis but is sufficiently far to wreck the experience for whale watchers.

A swimmer, particularly a photographer who is dependent on impeccable behaviour for any pictures at all, cannot harass a whale; if the whale doesn't like the intrusion, it simply swims away. You can redefine "harass" to mean actions which cause any change in behaviour, but apart from crucifying the language you end up with absurdities like bow-riding dolphins are being harassed because their behaviour is changed by the boat.

Idiots can't be legislated for - they ignore the laws. Others may need guidelines to put their behaviour on the right track when they encounter whales for the first time, but legislation in a place where it is unpoliceable and damaging to a fledgling industry needs careful thought. Currently Tonga has the absurd situation that there is no restriction of the number of boats which can operate under each whale watching license. At present there are not many boats, but the skippers are under pressure to get their clients in the water with whales, even if this disturbs the whales. Even a glimpse of a whale can be a life-changing experience for some people. I hate regulations of any kind, but advertising "swimming with whales" raises expectations which can often only be met by disturbing the whales. Another problem arises when more than one boat is attending a group of whales. A single boat can easily be evaded by disinterested whales but two boats are harder to track and can easily box whales in against the coast. Generally the whale skippers in Tonga are experienced and behave reasonably well, but the pressure on them to deliver by special "swim with whales" groups from Australasia is immense.

One future problem may be Japanese interest in a limited whale catch each year. Japan has the resources to match foreign aid from New Zealand and Australia, which is the main lever by which they can coerce Tonga to protect whales. Some of the Tongan government are sympathetic to the idea of lots of cash in their pockets in exchange for a few whales each year.

Many researchers are keen on legislation for others, with permits for themselves to do what they like. In Tonga this includes shooting crossbow darts into whales to get DNA samples and chasing after whales to get fluke shots. Some in Hawaii take out photographers (expensively) under the umbrella of their permits. Others argue that permits in Vava'u for photographers would put some money back into the economy. This is naive. Permits will send photographers to other countries, and since they tend to spend long periods in Tonga they leave behind a lot of money with the local people. Permit money would disappear into government coffers at best and the permits would possibly take an age to come through, if at all.

Vava'u has a steady stream of world-renowned photographers and film-makers each year, precisely because it has what few countries offer: clear sheltered water, humpbacks and few regulations.

If divers behave responsibly with whales in those countries without legislation, perhaps we can avoid the imposition of regulations for a few more years. Meeting these magnificent animals in their own environment is an experience never forgotten and creates instant ambassadors for whales.

Whales Alive take it one step further; through them you can sponsor a whale in Japan, Hawaii, British Columbia, Australia... No doubt one day you will be able to send your tax-deductable check to sponsor a whale in Tonga too. If whales could think human thoughts, I wonder what they would think of this?

Photos: © Pete Atkinson

Photographing whales is a bit like surfing, a lot of waiting around for a few seconds of excitement.

Pete Atkinson, a former volunteer at Sherkin Island has sailed all over Polynesia in the last sixteen years, in a quest for underwater photos and material for articles. He lives aboard his boat, VIGIA, in the South Pacific.

MUTE SWANS

By Oscar Merne

Photos: © Robbie Murphy

Once they reach maturity, having overcome the hazards of naive youth, Mute Swans can live to the ripe old age of twenty years.

IN Bray, Co. Wicklow, I have noted with interest the build-up of Mute Swans at Bray Harbour, at the mouth of the Dargle river. In the early years only one or two swans could be seen very occasionally but soon after a new sewage works was installed a few years ago there was a dramatic improvement in water quality, and Mute Swans became a regular feature of the harbour. Now the water is clean and clear, and green algae grow profusely in the shallow sheltered waters and on the tidal sand and mudflats. Once the swans became established as a result of this improvement in habitat the people of Bray began to take their stale bread down to the harbour to feed them, and now they are probably the best fed swans in Ireland. Over the winter months numbers are usually between forty-five and sixty birds, but in the latter half of the summer a moulting "herd" builds up and now just over one hundred Mute Swans are present. The moulting birds are flightless for several weeks when they shed their primary and secondary flight feathers and replace them with brand new ones. This annual feather renewal provides those with a mind to an opportunity to collect the moulted quills and, with a penknife, fashion the shafts into writing implements.

During the breeding season the adult Mute Swans are fiercely territorial.

Mute Swans are among our most familiar birds, on account of their very large size, snow-white plumage and tameness (at least where they are in close contact with humans). They feature often in myths and legends and in literature. Most people will be familiar with the Children of Lír, and with Hans Christian Anderson's tale of the "ugly duckling" which turned into a beautiful swan. Yeats, too, wrote of the wild swans of Coole, which were clearly Mute Swans and not the true wild swans which come to Ireland in the winter: Whooper Swans from Iceland and Bewick's Swans from Siberia. These birds have silent wing beat - not the bell-like beat, trod with a lighter tread of the Coole swans. The name Mute Swan derives from the fact that the species is relatively quiet vocally compared with the Whooper and Bewick's Swans, which both have loud trumpeting calls. The Mute Swan, when angry or excited, hisses or utters low snorting sounds.

Although now widespread and numerous throughout the country (in areas below 300m and where there are lakes, ponds and rivers suitable to support them), the Mute Swan is not actually a native species. Ussher and Warren, writing in 1990, refer to the species as having been introduced "long ago" (possibly in the 16th or 17th century). Numbers seem to have increased and the range to have expanded during the 19th and early 20th centuries. While we now have very good information on the surveys in 1968-72 and 1988-91, the population size is far from clear. There are certainly at least 7,000 individuals in Ireland and it seems likely the true figure is closer to 10,000. The difficulty in getting more accurate information arises from the fact that large numbers of immature Mute Swans congregate in late summer for the moult and then disperse widely afterwards. A full national census would need to take account of the breeding adults, their cygnets or juveniles, and the flocks of immature birds.

During the breeding season (usually April to June), the adult Mute Swans are fiercely territorial, and prolonged and vigorous against predators (and even humans who venture too close) the males will hold their ground, hiss menacingly, and strike sharp blows with "wrist" or carpal joint of the wing. The belief that they can break a person's limb with these blows seems to be a myth, but it can certainly be bruising. Mute Swan's bills are blunt and relatively soft, and pecks do little harm.

Now that they are well-established in Ireland, Mute Swans have settled down and are generally fairly sedentary. But there are cases of ringed birds moving between Dublin, Wicklow, Wexford and Cork, and even between Ireland and Britain. Once they reach maturity, having overcome the hazards of naive youth, Mute Swans can live to the ripe old age of twenty years. A large number of immature birds come to grief blundering into power lines. In some areas lead shot or angling weights can cause lead poisoning in birds which ingest the lead in mistake for grit, while discarded fishing lines can also be a problem as swans are entangled in it.

Oscar J. Merne is head of the Bird Research Section of Dúchas - The Heritage Service, 7 Ely Place, Dublin 2.

The Failure of Success

Success in building highways can bring failure in protecting a society and its environment. Overall success requires that highway networks have a purpose and must be carefully planned and coordinated at all levels of government and with full community involvement. The United States has learned many lessons to share by example since it launched its Interstate Highway System construction in 1956.

By Robert S. De Santo, Ph.D.

Safe and efficient highways provide expanded capacity that, in the absence of control, is filled by expanded traffic in an ever-increasing spiral.

Freedom and independence in the movement of people and goods in the United States is the direct and short term result of its well designed and well constructed national highway network. That highway system is a marvellous success story and, has been described as the "largest public works program since the Pyramids." It was paid by Federal investment of 90% and state investment of 10% with Federal revenues collected through gasoline taxes. The tax monies were managed by its federal Highway Trust Fund and, driven by the Federal-Aid Highway Act of 1956, the country launched an aggressive road building campaign that produced 42,800 miles (68,878 kilometres) of interstate highways within a 40-year period. The impact of that national campaign altered the structure and culture of the nation. The lessons learned are among the most important dividends the US can offer other nations now seeking to answer the same daunting questions about mobility and its many levels of cost.

As with the magical powers the "Sorcerer's Apprentice" unleashed to serve his wishes, highway planners in the US expected that the magic of its new super highway network would save its cities' central business districts and prevent automobile congestion. They expected the system would give every driver a safe and efficient road network they could freely use to travel where and when they wanted throughout the nation. Those wishes were initially granted, but they did not anticipate some of the most significant long-term costs that ultimately surprised some and dismayed most planners.

That magic the highways brought the US has grown since 1956 and now its consequence seems to be that our servant of mobility has become our master of development. The growing network of highways, and especially the interstate system, has helped foster the hypnotic dominance of the automobile as an archelement in the fabric of American society. The "American Dream" of the late 1940's was to own a home and a car. America's love affair with the automobile is more than a cliché – it is a cultural state of mind and you must decide for yourself which parts of that automobile loving culture are desirable and which are not.

What was heralded as a system of highways to relieve traffic congestion and give people the freedom of travel — "coast-to-coast without a traffic light," — matured in the US to reveal the alter ego of an irresistible force for development and cultural change. Freedom of mobility is hypnotic and in the US it fostered the use of ever increasing numbers of private vehicles. That mobility gave highways a luster of economic value as site specific catalysts for economic growth. Highways are irresistible magnets to landuse change. They attract chains of land development. In the US, they enabled the development of a postwar suburbia that was second to none. That growth continues today as the secondary consequence that transportation infrastructure attracts. It includes increasing traffic, housing, shopping malls, industrial parks, and office parks.

After the Second World War in the US, highways beckoned people and businesses out of the central business districts of cities, draining vitality from those cities. Development spread that drain on the countryside in what some have labelled "urban blight." The spread was unanticipated by many and is considered undesirable by most.

A principle sponsor of the interstate highway system in the US was Dwight D. Eisenhower, after whom this monumental system is now named — The Dwight D. Eisenhower System of Interstate and Defense Highways (1990). As a Lieutenant Colonel in the US Army, he experienced the frustrations of cross-country travel firsthand when he joined the US Army's transcontinental motor convoy in 1919. It travelled the 3,000 miles from Washington, DC on the East Coast to San Francisco, California, on the West Coast in 62 days. It encountered mud, sand, failing infrastructure, mechanical difficulties and traffic snarls. Years later, as Supreme Allied Commander in Europe during World War II, General Eisenhower saw all the advantages for travel on the German autobahn, 4,500 miles of Reichsautobahnen. These two experiences thereafter shaped his thinking on highways — "The old convoy had started me thinking about good, two-lane highways, but Germany had made me see the wisdom of broader ribbons across the land." As 34th President of the US, he signed into law the Federal-Aid Highway Act and Highway Revenue Act of 1956, creating the Highway Trust Fund and providing the mechanism for the US republic to finance the Interstate Highway System. The rest is history.

America's love affair with the automobile is a cultural state of mind passed on from one generation to the next.

This major interchange in the US is a recent example of engineering excellence and cultural impact. Choices are defined and made through planning at a federal, regional, and local level.

An efficient highway network blankets and binds a society together in ways no other modern technology can bring about. Yet there can be very high and often unforeseen costs that such technology extracts from the society that buys its benefits in the first place.

Balancing costs and benefits must be considered before the Genie of Mobility is let loose from its bottle. Once free, no one can return that powerful Genie to the confines of its original bottle. Highways grant positive and negative impacts as a consequence of increased vehicular traffic and increased freedom of travel. The complex transport corridors and infrastructure that are an unavoidable investment of a society's natural and human "capital" is the substance from which transportation modes are built. Therefore, our goal of freely choosing where and when to travel must be carefully planned because our human and natural capital is a limited and precious commodity. It defines our culture.

Planners in the US did not foresee at least six facets of the evolving culture that would influence, or be influenced by, highways. These included: (1) the Post-War Baby Boom; (2) multiple income households; (3) the two, three, or more, car household; (4) the shift of industrial capacity out of the US; (5) the decentralization of the inner city and the movement into the countryside of malls, industrial parks, and office parks; and (6) the attacks of civil rights activists on urban interstate highway construction as "building white men's roads through black men's homes."

The planning needed to manage this Genie's power rests with education and the practice of good Environmental Stewardship (ES). ES brings to bear a positive and proactive strategy that educates and involves managers and the public in the history and technological tools that are used to plan, review, and implement transportation infrastructure. Narrow thinking about the broad benefits and costs of transportation leads to failure. Success is based on Context Sensitive Design and Community Involvement at all levels of planning, design, construction, and operation/maintenance. Only a strong partnership between federal, regional, and local interests will work to safely manage the magic that highways and their development can bring the Republic of Ireland.

By Robert S. De Santo, Ph.D, Vice President, Chief Scientist, and Director of Environmental Planning, Parsons Transportation Group, Inc., 655 Winding Brook Drive, Glastonbury, Connecticut 06033, USA.

A Different View of the Skelligs

By Daphne Pochin Mould

THREE peaks rise from the sea and the drowned landscape of south-west Ireland, whose flooded valleys are Dingle Bay, the Kenmare River and Bantry Bay. The wave washed Carraig Lomain Samhna ("The Lemon"), the Little Skellig with one of the world's largest gannet colonies, and the Great Skelllig or Skellig Michael, with its lighthouses and early monastic remains.

Thousands come to climb the stairs, to wonder at the dry-stone beehive houses and chapels set in a sheltered fold of land at 500 feet above the sea; in the past, hundreds made pilgrimage here and finished with the steep climb to the highest peak, at 700ft or so above the sea. But the typical Celtic island monastery was on more comfortable islands, with arable land and much easier access. So, was Skellig the ultimate hermit experience?

Take another view, and come aboard a Viking ship on an exploratory trip around Ireland, looking for profit and knowledge of the potential of the land. Yes, the Vikings raided the Skellig monastery, and on occasion carried off an abbot, who fasted against them and died, very much a wasting asset, for such people might bring a useful ransom. But my feeling is that no crew would bother with a few poor huts on a rock, the word that passed around was not "monks" but "dinner". For the Skelligs are a vast larder, fat, young gannets taken from the nest, puffins (one of the nicest sea birds to eat, though here it is illegal to do so), eggs galore, and valuable feathers. As late as the 19th century, the Little Skellig was rented for its birds and feathers, and a guard set there - a guard who, on at least one occasion, the Blasket islanders bloodily overpowered and went off with a load of young birds, each "as heavy as a fat goose" (Thomas O'Crohan). Right into our own time, the world's bird cliffs have been harvested, dangerous climbs and voyages not withstanding, and I wonder... Those Skellig "hermits" - were they in charge of the bird, egg and feather harvests of the islands, and then going back to the land base at Ballinskelligs for the winter months?

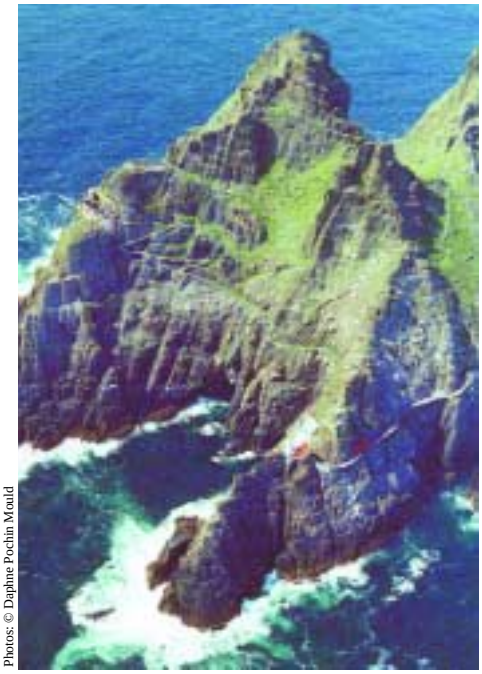
"But for me, the real glory and achievement of the Great Skellig are its lighthouses."

But for me, the real glory and achievement of the Great Skellig are its lighthouses. True, dry stone work is a learned craft, but any good dry stone worker could construct the Skellig huts. But the building of lighthouses on the world's most dangerous and wave washed rocks and islets, is a far greater work. And on Skellig, two were built and worked, and all with ships powered only with sail and oar, men with picks and shovels, and dangerous charges of gunpowder for blasting, primitive cranes and derricks. As well as the landing place the lighthouse builders made, Skellig has two others, north and south, none of them easy, and all of them impossible in any sort of rough sea.

However ships were being wrecked, men and cargoes lost. The Knight of Kerry (of Glanleam and its gardens) was among those agitating for a Skellig light in 1820. Loop Head, at the mouth of the Shannon had had an ancient beacon light which had been re-established in 1770, and got a new tower in 1802. On the heights of Cape Clear, the lighthouse had been built and lit in 1818. It closed in 1854, when the first lighthouse was finished on the Fastnet Rock, a far more useful location.

In those days, the lights did not flash a recognised signal but shone steadily. To close the dark gap between Cape Clear and Loop Head with a clear signal, two lights were set on Skellig, one high up, at 372 ft, visible for 25 miles, and one low down, at 175 ft, visible for 18 miles. And the work went ahead fast. Approved in 1820, both lights were lit in 1826. Think of the men and the work, the blasting of the rock for a road, the building of the lighthouses and the houses (for the keepers wives and children lived there too), the bringing in of granite slabs for the lighthouse structure, the cast iron slating against the driving rain, all the gear for the actual lights and their maintenance. It is the unknown, unsung workmen who sailed the ships to the rocks, unloaded the cargoes, and built the lighthouse complex, who are th real master builders of Skellig, not the makers of the drystone huts.

Today, the automated, helicopter serviced lower lighthouse is the only one in operation. The upper light was shut down in 1870 when the new lighthouse on Tearaght in the Blasket Islands, was lit in 1870.



Photos: © Daphne Pochin Mould

The Skellig LIghts. The lower and upper (disused) lighthouses and connecting road. 700ft summit to which the pilgrims used to climb. Fog signal operated manually from ledge below and to left of disused lighthouses, for many years.

The Little Skellig where some 20,000 pairs of gannets (solan geese) nest. White with birds and their droppings in winter, when the gannets have long gone south, it reverts to its normal dark rock colour.

The lower lighthouse, the one in use today, demanned and fully automated. Once men, wives and children lived on the rock. Two young children are buried at the monastic site. Some died falling off the cliffs. (Photo before automation)

"Endangered Species"

By Daphne Pochin Mould

"No time to stand beneath the boughs
And stare as long as sheep or cows.
No time to see, when woods we pass,
Where squirrels hide their nuts in grass.
A poor life this, if, full of care,
We have no time to stand and stare."

W. DAVIES' well known poem sums up how naturalists are made. These days they are an endangered species, indeed in danger of becoming extinct. For who has time to stand and stare, and what child is allowed to discover real life and the world around him or her? From crèche to nursery school and on to the hell of the Leaving Certificate, youth is conditioned, driven, brain washed. What does getting high scores in the Leaving Certificate actually test? Control of exam nerves and a good memory, no more. It tells nothing of the skills of human living, ability to judge people and situations, take and estimate risks, have time to explore nature, stand and stare, watch and wait, poke and pry. True, we are now much more environmentally aware and informed, but much is second hand, by television and books, organised expeditions and conferences.

Your genuine old style naturalist was a self made person, with or without academic qualifications, who explored the world out of curiosity and love. Charles Darwin, who gave us the first account of evolution, was one such. He was not a "good student", he would have stood no chance in the Leaving Certificate, and he went off, round the world in the Beagle as a "geologist" for which he certainly was not qualified. What he saw and thought about on that voyage, and the poor man was sea-sick, produced the theory of evolution which changed the whole of the way in which we regard living nature and the origins of man.

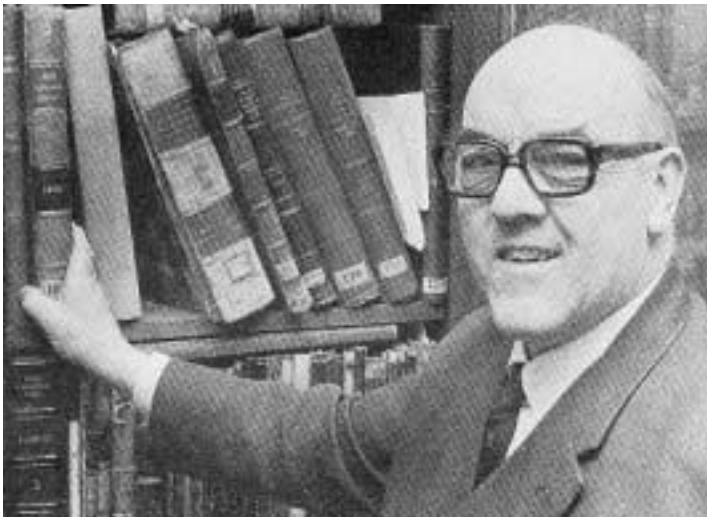
Professor Frank Mitchell, who died recently, is another example of a real naturalist, in his case one with a good academic record. His famous "Reading the Irish Landscape" has gone through several editions, and reveals a man able to handle geology, archaeology, plant and animal life, human history, in a single vision. He told how this came about, lucky meetings, and opportunities, in his autobiographical "The Way that I followed" (Dublin 1990)! Mitchell's title was inspired by that of another, older naturalist of the same sort, Robert Lloyd Praeger (1865-1953) whose "The Way that I went" is a classic exploration of Ireland. For both these men, meeting with the right people at the right time, who guided and interested them, was important.

If I am a naturalist too, I began life that way, for my family were interested in history, archaeology, plant and animal life, gardening, dogs, cats and horses. We picniced at Stonehenge and an official stopped my rock climbing there; my aunt walked me round the ruins of Old Sarum Cathedral, swinging the dog's collar for censor. Red squirrels there were in the woods, and you could watch them easily. But I have no formal schooling, no School Certificate which, at that time in England, had the same function and veneration as the Leaving Certificate. Education by private teaching and "do it yourself" techniques leaves time to stand and stare, explore, not go with the crowd. My only real formal education are my degrees (in geology) at the University of Edinburgh. Where Dr. Campbell, then Reader in Petrology, constantly attacked "spoon feeding" of students. Robert Campbell was no coward or carrier of insurance: researching the high, dangerous cliffs around Stonehaven, he judged for himself. If I go down, and slip, will I be killed. If the answer was "yes", he refrained, but if the answer was a mere broken leg or arm, he climbed down. Old style naturalists are like that, we take the risks and make the discoveries. And have become an endangered species.

Daphne Pochin Mould

A brief encounter with Fisheries Research and Development

By Dr. F.A. Gibson



Dr. Arthur E.J. Went, the undisputed "father" of salmon research.

"They walk on the Shoulders of Giants". That was the theme phrase chosen by the ex-Director of Irish Fisheries Research and Development, D. Griffith, at his retirement and that of five other long standing members of staff, in November 1999. He was pointing out to the new generation of Researchers that they owe so much to the past and have an obligation to carry on and maintain those standards of excellence. It is somewhat amazing that such a small country as Ireland, with its very low dependency on Fish in its G.N.P., has produced or at least been closely associated with a proportionately large share of the giants of Fisheries R/D worldwide.

Fisheries Research became a popular amateur occupation towards the close of the 19th Century. Nevertheless amongst the most enthusiastic of the amateurs were the Dunlop sisters from Valentia Island and the Rev. Spottiswoode Green. These individuals (and there were others) by the very dint of their enormous output of basic research, attracted some of the great names in the academic ranks of Fisheries R/D to come and work in Ireland. For example Tattersdall and Holt.

A Limnological Laboratory was set up on L. Ree and a research vessel serviced it travelling to and from Dublin via the Royal Canal. Amongst the famous researchers who worked there were Hillas and Southern.

Irish Universities were quick to follow suit. U. C. Cork at Lough Ine; U. C. Dublin at Coliemore Harbour; U. C. Galway at Carna; Queens University at Strangford Lough, New University of Ulster at L. Neagh, Sherkin Island Marine Station and so on.

The setting up of An Bord Iascaigh Mhara in the 1930s led to the improved exploitation of our seafish resources. This in turn demanded a greater understanding of fish stock biology. Those who contributed so much to Irish fish R/D included names of high standing at national and international levels. G. P. Farren (Herrings); E. Toner (Herrings); D. O'Driscoll (Salmon and Trout) A. E. J. Went (Salmon); F. A. Gibson (Escallops and Lobsters); D. Griffith (Plaice); J. Molloy (Herrings); J. Browne (Salmon); M. Crowley (Mussels); C. Moriarty (Eels); E. Fahy (Sea-Trout); Jacqueline Doyle (Environment, Toxicity and Aquaculture); J. McArdle (Fish/Shellfish Pathology); P. Hillis (Nephrops and Fisheries Economics); C. Duggan (Oysters) D. Minchin (Marine Environmental Biology) and so on.

To this day the research of G. P. Farren (1930-1947) on herrings is quoted. Arthur Went (1937 - 1974) is still the undisputed "father" of salmon research. Both were directors of Irish Fish R/D. Their reins were taken over by Gibson (1974-1988) and Griffith, (1988 - 1999) who used, extensively, mathematical models for the description of the stocks which they studied. Much of this was pioneering work.

The International Council for the Exploration of the Sea (I.C.E.S.) is the most prodigious organisation in the northern hemisphere for fisheries research and development. Arthur Went held Committee Chairs in Salmon and Consultative. He became Vice-President and President. F. A. Gibson was a member of the Finance Committee, Chair of Shellfish Committee and twice Vice-President. D. Griffith became President in 1990. He had served on secondment from Dublin as Statistician to I.C.E.S. Therefore it came as no great surprise when in 1999 he was elected to be the Secretary General of I.C.E.S.- a post he now holds with distinction.

It has not only been the Directors of Fisheries who have contributed to international fisheries R/D. The back-up research staff were recruited in considerable numbers from 1960-1964. Their achievements deserve emphasising particularly in such areas as fish/shellfish stock assessment and management; aquaculture; environmental/pollution studies and fisheries economics. The last mentioned study includes novel approaches to fish stock management which have yet to bear fruit but which must become reality when biology and investment "lock horns", not just dance around each other which they have done for far too long.

By the year 2004 all the "old guard" (recruited in the sixties) will have retired. We trust that the "new guard", bearing in mind the record of their forerunners, will maintain this inheritance and even improve upon it.

What does the future hold for those who are now "walking on the shoulders of giants"? For sure they must avoid the trap of becoming publicists because nothing can replace the management tools which are provided by accurate observation/measurement and facts. The opportunity is there, they have the back up. History will judge the success which they make of their inherited obligations.

This new generation of Fish R/D people should be aware of the genesis of the Marine Institute and cultivate an empathy with those who struggled so that they could enjoy today's working environment.

The idea of a National Fisheries Research Centre was inaugurated by this writer in August 1974 and resulted in the Fisheries Research Centre at Abbotstown, Dublin, in 1978, which was to become the Marine Institute. It had a gestation period as long as some of the modern deadly diseases. It was mooted throughout the 1970's, kicked about, bounced from one group to another and generally messed around. Nevertheless, the mills had been grinding away, so that, in November 1985 (yes 1985) a TASK FORCE was set up to create The Marine Institute. The surprise at that time and to this day is the fact that the Minister for Industry and Commerce instigated the Task Force. It operated under the aegis of the former "National Board for Science and Technology". It was not the Department of the Marine, which took those final steps to set an Institute in motion. We must feel grateful it did put its "shoulder to the wheel" as did the Departments of Defence, Education and Research, Energy, Environment and Public Works. The work of the Task Force was ably assisted by the Danish Academy of Technical Sciences (A.T.V.)

The members of the Task Force were; Chairman Mr M. Manahan; Mr F. Cahill; Prof. S. Doonan; Mr N. Emerson; Dr F. A. Gibson; Mr P. Gorman; Dr M. Guiry; Dr T. Higgins; Dr R. Keary; Dr F. O'Brien; Mr J. O'Dea and Commdt. M. Walsh.

The report of the Task Force was completed by March 1987 and transmitted to all Departments immediately. It was a very complete Report. The present Marine Institute, which was set up twelve years later, incorporates virtually all its recommendations. This writer retired from active duty in July 1988 and so has no simple explanation to offer as to why it took the infant, born in 1987, so many years to be confirmed (let alone baptised). However, it is urged on the Marine Institute to get on with its remit and make the difference for Irish Fisheries. The ghosts of their predecessors over the past 100+ years are willing them to succeed, but will haunt them if they do not.

Dr. F. A. Gibson is a former Director of Fisheries, Department of the Marine, Dublin, Ireland.

Opah in Irish Waters

Photo: © Declan Quigley

Opah (Lampris guttatus) captured W Slyne Head, August 1995

By Declan T. Quigley

The opah (*Lampris guttatus*) is regarded as one of the most beautiful fish in the sea. Its unusual shape and anatomical features, together with its exquisite colouration, are so striking that it has always attracted the attention of both fishermen and ichthyologists. The opah is known by several different names in different parts of the world, including Gudlax (God's Salmon) in Iceland, Gotteslacks in Germany, Glansfisk (Glittering Fish) in Denmark, as well as Kingfish, Moonfish, Sunfish, Jerusalem Haddock, Mariposa etc. The body is deep and compressed, the fins long and curved (the pectoral is unusual in that it is set horizontally), and the mouth is protrusible and toothless. The colour is dark blue on the back and silver below and the whole body is covered in irregular rounded milky white spots, the fins are deep scarlet and the eye golden.

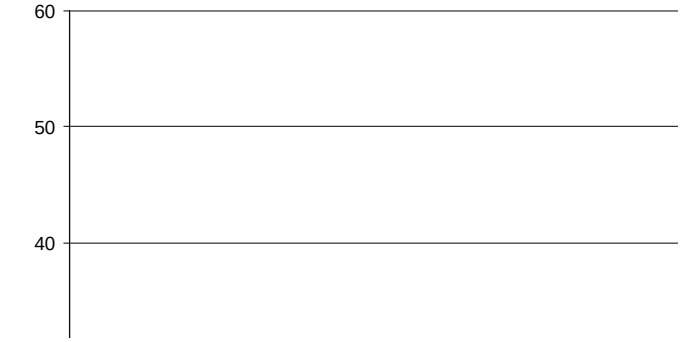
Although the opah is widely distributed in tropical, temperate and sometimes cold waters of all oceans, including the North & South Atlantic, North & South Pacific and Indian Ocean, in most regions it is relatively uncommon and capture records only appear sporadically. A closely related species, *L. immaculata*, appears to have a circumglobal distribution in the sub-antarctic zone and the distribution of both species overlap in the temperate waters of the southern hemisphere.

The opah normally inhabits offshore oceanic waters from the surface (epi-pelagic zone) down to depths of about 400m (meso-pelagic zone) and rarely occurs in inshore waters (i.e. within the 200m bathymetric limit). In Scottish waters, most specimens have been taken from an area along the edge of the continental shelf, near the 200m line.

Although the opah is regarded as scarce in Irish inshore waters (16 inshore records since 1802), it is has only recently been discovered that the species is more frequent in its occurrence in offshore waters (26 records). Over the last two decades, the opah has been recorded more frequently than previously, albeit individual records have usually been separated by intervals of several years (Figure 1). The species has been relatively frequent in its occurrence during some years (e.g. 1973 and 1995), and over certain periods (e.g. 1849-1851 and 1977-1979). However, since the mid-1990's, relatively large numbers of opah have been taken as a by-catch in the newly developed deep-water fisheries off the west coast. Most of these specimens were taken in demersal and mid-water trawls. Many of the specimens recorded from inshore waters have been either stranded or appear to have been incapacitated in some way. It is thought that lower salinities and/or higher water temperatures in shallow waters may have disorientated these fish.

Figure 1: Annual Numl

Figure 2: % Monthly Frequency



The monthly frequency occurrence of opah records in Irish waters is shown in Figure 2. Opah records appear to gradually increase over the summer months, peaking in August, and declining thereafter during the winter months. Although no specimens have been recorded in Irish waters between December and April inclusively, it is not unusual to find opah in the North Sea during the winter and spring. It seems likely that several factors such as water temperature and food availability have a significant influence on the relative frequency of opah recordings. Although opah have been recorded from all around the Irish coast, the majority of specimens have been taken off the west coast (Table 1).

Little is known about reproduction in the opah. Although females containing ripe eggs have been recorded from time to time, neither eggs, which are thought to be pelagic, nor the newly hatched larvae have been found in the ocean's plankton. Indeed, juveniles less than 40cm T.L. are exceedingly rare. Only when they approach a length of 76cm or so do they venture over the continental shelf.

Coastal Area	Number	%
West	22	55.0
South-West	5	12.5
North-West	5	12.5
North	1	2.5
North-East	1	2.5
East	2	5.0
South-East	3	7.5
South	1	2.5
Total	40	100.0

Table 1: Maritime Distribution of Opah

Although the opah is nowhere abundant enough to support a commercial fishery, it is an excellent food fish as well as a hard fighting fish when it is captured, albeit rarely, by anglers. The largest specimen captured on rod and line in U.K. waters weighed 58.057kg and was taken off Mounts Bay, Penzance, Cornwall, in July 1973. While no specimens have been captured on rod and line in Irish waters, it is interesting to note that the largest specimen, which was taken by a commercial fishing boat off Killybegs in August 1973, weighed 52.6kg. However, most of the specimens taken in Irish waters appear to have been relatively small sub-adult fish, averaging 13.0kg (Table 2). Nevertheless, specimens weighing up to 272kg have been reported from other parts of the world.

	T.L. (cm)	F.L. (cm)	Wt (kg)
Mean	68.1	56.6	13.0
S.D.	20.4	15.3	14.6
N	27.0	19.0	24.0
Range	40-118	49-111	4.66-52.60

Table 2: Size Analysis of Opah

For many years the opah was considered to be a relatively solitary species as most of the records consisted of only individual fish. While this may be correct in the case of adult fish, it would appear that sub-adult fish might hunt in shoals. For example, 15 specimens, weighing between 4.66 and 6.68kg, were taken in a single haul at a depth of 280m west of Slyne Head, Co Galway in August 1995. These fish were found to be feeding exclusively on blue whiting (*Micromesistus poutassou*). Furthermore, in September 1996, a group of 5 specimens, weighing about 6kg each, were taken in a pair of mid-water trawlers while fishing for scad (*Trachurus trachurus*) off the Mayo coast. Opah are known to feed on a wide range of pelagic prey, including squid, fish, crustacea and scyphomedusae. It has been suggested that the opah may undertake annual feeding migrations along the edge of the European continental shelf as far north as Norway, particularly in pursuit of cuttlefish.

At first glance the opah does not appear to be a very speedy or manoeuvrable fish, yet the pelagic cuttlefish that form its usual food are among the swiftest and most agile of all sea-creatures. However, over millions of years during which the opah has existed in the sea almost unchanged (as evidenced from fossil records), this unusual species of fish has obviously adapted well to successfully catching these "artful dodgers".

Declan T. Quigley, Hibernor Atlantic Salmon Ltd, Derryclare Hatchery, Recess, Co Galway

Waste Permitting System

By Katherine Walshe

The Waste Management Act, 1996 introduced the requirement for a person disposing or recovering waste at a facility to hold a licence. The Waste Management (Licensing) Regulations, 1997 together with the Waste Management (Licensing)(Amendment) Regulations, 1998 (both replaced by the Waste Management (Licensing) Regulations, 2000), provided for the commencement and continued operation of the system of licensing by the Environmental Protection Agency for specified classes of waste disposal and recovery for the larger type of facilities such as landfills, high-volume transfer stations, large-scale composting and hazardous waste facilities. The Waste Management (Permit) Regulations, 1998 provided for the granting of waste permits by local authorities in respect of specified waste disposal and recovery activities in lieu of a licence by the Environmental Protection Agency. The First Schedule to the Permit Regulations is entitled 'Activities to be Permitted or Registered'. Part I outlines the 'Activities Subject to a Waste Permit' and these are:

- The incineration of waste (other than hazardous or hospital waste) at a facility the capacity of which is equal or less than 1 tonne per hour;
- The recovery of scrap metal or other metal waste;
- The dismantling or recovery of vehicles;
- The recovery of waste which is composed of or contains mercury or its compounds (including electric lamps, light bulbs and fluorescent tubes);
- The recovery of waste (other than hazardous waste) at a facility (other than a facility for the composting of waste where the amount of compost and waste held at the facility exceeds 1,000 cubic metres at any time);
- The disposal of waste (other than hazardous waste) at a facility (other than a landfill facility) where the annual intake does not exceed 5,000 tonnes per annum.

An applicant for a waste permit must specify the class or classes of activity concerned and must choose from the 13 Waste Disposal Activities in the Third Schedule and the 13 Waste Recovery Activities in the Fourth Schedule of the Waste Management Act, 1996 as amended.

Not more than two weeks before lodging an application for a waste permit, the applicant is required to publish a notice of intention in a newspaper circulating in the district in which the activity is or will be located. Erection of a notice is also required at the facility or premises concerned. Details to be displayed in both newspaper and site notices are specified in the permit regulations. Application for a waste permit must be made on a prescribed form. A waste permit application must be accompanied by the following information: site location map; detailed plans of the premises and facilities on site; copy of text of site notice; copy of newspaper in which notice appeared; and fee.

Following the receipt of all required information from the applicant, the local authority may decide to refuse a permit or grant a permit, subject to a number of conditions that may require immediate compliance, while others will specify certain works to be completed within a specified timeframe. However, A local authority cannot grant or refuse a waste permit until 21 days have lapsed beginning on the day of receipt by the authority of the application or further information. A local authority cannot grant a permit unless it is satisfied that the activity concerned, when carried on in accordance with conditions attached to the permit, will not cause environmental pollution, that any emissions will not result in the contravention of any relevant standard, and that BATNEEC (Best Available Technology Not Entailing Excessive Costs) will be used to prevent, eliminate or reduce an emission from the activity concerned. A waste permit may be granted for any period not exceeding 3 years. Files relating to an application for a permit are available for public inspection.

Further information is available from Ms. Katherine Walshe, Cork County Council, County Hall, Cork. Tel. 021 4285327.

Visit the Sherkin Island Marine Station website at:
http://homepage.eircom.net/~sherkinmarine

Photo: © Grace Pasley, National Botanic Gardens

West wing of Curvilinear Range, with tree-ferns and Rhododendron

Recent developments at the National Botanic Gardens, Glasnevin

By Donal Synnott

THE National Botanic Gardens was founded by the Royal Dublin Society in 1795. It was transferred to State care in 1878 and was managed until 1992 successively by the Department of Science and Art and the Department of Agriculture.

In 1992 the National Botanic Gardens was transferred to the care of the Office of Public Works (OPW). An architectural survey of the Gardens and assessment of its infrastructure needs was made. Following this a Management Plan for the Gardens was published that has been the blueprint for subsequent restoration and expansion of the facilities at the Gardens. Since 1996 the Gardens has been part of Dúchas, the Heritage Service, under the care of the Department of Arts, Heritage, Gaeltacht and The Islands.

The flagship project for the developments at the Gardens was the restoration of the historic Curvilinear Range of glasshouses. This glasshouse in wrought and cast iron was made by the Dublin ironmaster, Richard Turner, between 1843 and 1868. It was depicted on the architectural series of Irish stamps and regarded as one of Ireland's most important architectural gems. A faithful restoration of the building was undertaken under the direction of Ciaran O'Connor, OPW Senior Architect. The Great Palm House at Kew, also made by Turner, had been restored some years earlier but in replacement steel. O'Connor and his team determined that the last of Turner's major buildings to be restored would be faithful to his materials and to his spirit of innovation.

Techniques for repairing the damaged glazing bars of wrought iron had to be developed; the structural contribution of the glass itself was quantified and utilised; a mastic was developed to replace the traditional and damaging putty of the original building; structural defects in the original design were solved by utilising Turner's own solutions developed for the Kew Palm House; protective paintwork was carefully researched for colour and durability; efficient heating and other climate controls using the latest technology were installed.

The restoration has been widely acclaimed and was awarded the Europa Nostra Gold Medal in 1996 *"for the excellent and faithful restoration of one of the most important surviving 19th century glasshouses in Europe, as an incentive for the development and research of wrought and cast iron restoration techniques"*.

Further work included restoration of the 18th century Director's House and modernisation of the Curator's House. New composting and storage facilities were built to comply with the Gardens' stated intention to comply with the spirit of Agenda 21. Recycling, biological control, sustainability and economic use of resources were now firmly on the agenda.

The next major development was a new building to house the Herbarium and Library that had been contained in scattered rooms and prefabricated buildings. Both collections are important for the institutional role of the Gardens and so recognised in the Development Plan. They were important also for the teaching side, especially for the student course in Amenity Horticulture carried out by Teagasc at the Gardens. Ciaran O'Connor designed the new architecturally interesting building. Its curved outline and a number of internal features are inspired by the plant collections that surround it. New lecture rooms were also provided for the Teagasc course.

Meanwhile visitor facilities remained at a basic level. The latest developments, also designed by Ciaran O'Connor and the OPW team, include a car, coach and bike park, and a Visitor Centre with tearooms and restaurant, lecture theatre and function room and information and book sales area. This quite large building had to be fitted into a restricted space that would cause minimum disruption to the plant collections. At the same time it had to meet the need to make the Gardens more visitor friendly and provide the facilities necessary to establish Glasnevin at the heart of the botanical and horticultural life of the country. Since opening in September 2000 the Centre has proved its usefulness in promoting the aims and objectives of the Gardens and of Dúchas, the Heritage Service. It has been a useful venue for training sessions, for seminars, for displays and exhibitions and for lectures and meetings related to the work of the Gardens and its overseeing Department. The building itself has been much admired and is appreciated by the visiting public. Display elements within it include a mural by Eadain Ni Mheadagain on natural and artificial selection in the evolution of plants and introduces the concept of genetic engineering in that context.

Twelve portraits of eminent botanists and people associated with botany and horticulture were commissioned from Anna O'Leary. Paul Francis has designed a poster graphically illustrating the importance of photosynthesis for the world.

The final phase of development under the 1992 Development Plan for the Gardens will be the restoration of the 1884 Palm House. The Dublin Planning Authority has granted planning permission for the restoration of this listed building and work is expected to begin in early summer, 2001.

Photo: © Can Brogan, Dúchas - The Heritage Service

Curvilinear Range

Donal Synnott, Director, National Botanic Gardens, Glasnevin, Dublin 9, Ireland.

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National Botanic Gardens

Photographs courtesy of the Department of Arts, Heritage, Gaeltacht & the Islands

East wing of Curvilinear Range with Australian Beds

The Herbaceous Border

The Herbarium and Library

Outside landscaping at the Curvilinear Range

An aerial view of the National Botanic Gardens

The Palm House

The Rockery

The Display House

Photo: © Clive Wasson

Lorcan O Toole, Golden Eagle Reintroduction Project, holding one of the Golden Eagle chicks.

BACK FROM THE DEAD

The Re-Introduction of the Golden Eagle to Ireland

By Ella McSweeney

FOR the first time in almost 100 years, the Golden Eagle arrived back in Ireland in June 2001. Six chicks were flown over from Scotland and landed at Carrickfinn airport in Donegal. After being tagged and fitted with radio transmitters, the 8-week-old chicks will be released into Glenveagh National Park in about 6 weeks time.

The pledge made by the Irish Government to implement the 1992 Rio de Janeiro Convention on Biological Diversity included a commitment to maintain and enhance our native biodiversity. As part of these obligations, we may soon see the majestic Golden Eagle soaring over the mountains of Donegal once again.

Few other bird species are so utterly embedded in Irish culture as the Golden Eagle. Anglicised versions of Iolar - the common Irish name for eagle - form the endings of numerous placenames throughout Ireland: Drumiller, Cavan (ridge of the eagle); Slievenilra, Clare (mountain of the eagle); Coumaniller, Tipperary (hollow of the eagle). The Ordinance Survey of Ireland has frequent references to the bird: 'Eagle Mountain'; 'Eagle Rock'; 'Eagle Island'; 'Eagle Hill'; and 'Eagle's Nest'. To many people the Golden Eagle represents valour and status, virtuosity and strength; characteristics which make it a common adornment on family crests such as those of the O'Moriartys, Lallys and O'Boylans. Eagles are also inscribed on the enchanting manuscripts of the Book of Kells.

The earliest Irish fossil evidence dates back to the 13th Century, where what is thought to have been Golden Eagle remains, were found at Lough Gur. Historical maps illustrating Irish breeding records from the 18th and 19th Century indicate that Golden Eagle sites were concentrated along the north, west and southern coasts of Ireland. Towards the end of the 19th century the decline was first noticed and by 1900 the population had diminished to a few pairs nesting in the northwest. After becoming extinct in Donegal in 1910, a pair was reported breeding on the north Mayo coast in 1912 before finally disappearing from Ireland.

Ireland is the only country that has lost its Golden Eagles. What happened to this king of bird species? Extensive and excessive persecution by man, in the form of poisoning, shooting, trapping and egg collecting, led to the dwindling in numbers. This was coupled with degradation and change in the eagle's habitat due to the development of increasingly scattered and expanding human population in Ireland.

Hopes that Golden Eagles from Scotland would naturally recolonise Ireland were raised during the 1950s when a breeding pair from the Kintyre region was recorded on Fair Head, Co. Antrim. Breeding ceased in 1959 and there has been no nesting since. The likelihood of natural recolonisation seems very small. Perhaps as a consequence, in the late 1980s a reintroduction project to the Republic of Ireland was first discussed. In 1995, the project gained momentum when the Irish Raptor Study Group and the Curlew Trust joined in and undertook an extensive assessment survey of Ireland. This is necessary to fulfil criteria laid down by the World Conservation Union's Specialist Group for Reintroductions (1995) which include: the factors causing extinction should have been rectified; there should be good historical evidence of former natural occurrence; the population reintroduced should be genetically similar to the native population; and there should be enough suitable habitat for the reintroduced species.

Lorcan O'Toole of the Irish Raptor Study Group is project leader and was involved in the successful reintroduction of the Red Kite to Scotland. Fieldwork by his group indicated that the best release site for the first chicks was Glenveagh National Park, Donegal. While it is a fact that Golden Eagles rarely take lambs and those that are taken are usually already sickly, alleged predation of lambs by Sea Eagles in Scotland initially made the local Irish farming community nervous of the project. But open and frequent dialogue between the farmers and Lorcan enabled them to discuss their misgivings early on. The Irish Farmer's Union now supports the project: "We meet with Lorcan on a weekly basis and our farmers were worried about the impact during lambing season, but we are now happy with the project".

According to Lorcan, it is hoped that over 75 eaglets will be released into Ireland in the next five years and an established population will emerge: "We are confident that down the road the eagles will breed successfully."

Ella McSweeney,
ellamcsweeney@hotmail.com

Further Reading: "Ireland's Lost Birds" by Gordon D'Arcy. Published by Four Courts Press.
www.goldeneagle.ie

Factfile - Golden Eagle

Classification: *Aquila chrysaetos*

Family: Accipitridae **Order:** Accipitiformes

Related species: include the Imperial Eagle of Europe and Asia.

The Golden Eagle is included on Annex 1 of the EU Directive on the Conservation of Wild Birds (79/409/EEC).

Description: 75-88cm in length, 3-6kg in weight, with a wingspan of over 200cm. The female is slightly larger than the male. The plumage is dark brown with golden feathers on the back of the neck. The long primary feathers allow the eagle to adjust its flight movements while soaring on air currents. The bill is hooked and powerful and is used to dismember prey such as foxes, stoats and mink. The Golden Eagle is famous for its large, feathered feet which have sharp and powerful yellow talons. In the past, only kings were allowed to hunt with Golden Eagles, hence the royal association.

Habitat: Remote mountainous terrain, moorlands and forests.

Breeding: This species reaches sexual maturity at about 5 years of age. The male performs an extensive courtship display during the breeding season which lasts from March to July. After mating on the ground, the bird builds its nest ('eyrie') on a rocky ledge. The nest can be up to 3.5 metres in height and 1.5 metres in diameter. The female lays the first egg in March and lays a second egg up to a week later. Eggs are white and blotchy. Should the first chick survive, the second usually starves or is killed by its older sibling. The Golden Eagle lives for up to 20 years.

Food: The Golden Eagle preys on small mammals such as mountain hare, small foxes, stoats and mink. It will also take songbirds and gamebirds. It has keen eyesight and can kill prey in flight. It is known to swoop down on its prey at a speed of up to 150km/h. It is often thought that this bird of prey kills lambs and other livestock species. But it usually only feeds on such animals when they are sickly or already dead (carrion).

Distribution: Thinly distributed throughout parts of Europe, North America, North Africa and Asia.

Minister Acts to Clean Up our Waterways

MR. DAN WALLACE, T.D., Minister of State at the Department of the Environment and Local Government has announced the making of new Urban Waste Water Treatment Regulations which designate 30 water bodies for additional protection. This will require a higher level of treatment for waste water discharges into these waters.

The 30 water bodies have been identified as eutrophic or potentially eutrophic on the basis of comprehensive water quality assessments carried out by the EPA. Eutrophication is caused by over-abundant plant growth arising from excess nutrients (phosphorus or nitrogen) and it has been identified by the EPA in its *Millennium Report* as Ireland's most serious environmental pollution problem.

Nutrient Reduction/Tertiary Treatment

The effect of designation as a sensitive area is generally to require the provision of nutrient reduction facilities (also referred to as tertiary treatment) for discharges from large sewage treatment plants. Nutrient reduction facilities have been installed in the appropriate waste water treatment plants in the 10 sensitive areas designated in 1994 and are already in place in a number of the areas now being designated.

In announcing the Regulations the Minister said "This legislation is a major step in our sustained programme to tackle and redress eutrophication of Irish waters."

Dublin Bay

The new sensitive areas include the Liffey Estuary. It is intended that the upgrading works now in progress to provide secondary treatment at Ringsend will be extended to include nutrient (nitrogen) reduction facilities.

Consolidation

The opportunity presented by the additional designations is being taken to consolidate the relevant Regulations in the interests of regulatory reform. The new Urban Waste Water Treatment Regulations, 2001 (SI No. 254 of 2001) incorporate and update the Environmental Protection Agency Act, 1992 (Urban Waste Water Treatment) Regulations, 1994 as amended in 1999. The essential purpose is to tackle eutrophication of Irish waters by designating 30 water bodies (including river stretches, lakes and estuaries) as Treatment Directive, in addition to the 10 water bodies which were designated in 1994.

30 Water Bodies Designated as Sensitive Areas in June, 2001 within the following:

Rivers

River Blackwater (Monaghan) - from the confluence of the River Shambles to Newmills Bridge.
River Brosna - downstream of Mullingar sewage outfall [opposite intersection of regional road (R400), with N52 south of Mullingar], to Lough Ennell.
River Cavan - from the bridge at Lisdarn downstream of Cavan Town to the Annalee River confluence.
River Proules - downstream of Carrickmacross sewage outfall, to confluence with the River Glyde.
River Barrow - downstream of Portarlington sewage outfall, to Graiguenamanagh Bridge.
River Triogue - downstream of Portlaoise sewage outfall, to confluence with the River Barrow.
River Nore - downstream of Kilkenny sewage outfall, to Inistioge Bridge.
River Hind - downstream of Roscommon Town sewage outfall, to Lough Ree.
River Suir - downstream of Thurles sewage outfall, to Twoford Bridge.
River Suir - downstream of Clonmel sewage outfall, to Coolnamuck Weir.
Little Brosna River - downstream of Roscrea sewage outfall below its confluence with the Bunow River, to the bridge near Brosna House.
River Blackwater (Munster) - downstream of Mallow railway bridge, to Ballyduff Bridge.

Lakes

Lough Ennell, County Westmeath
Lough Muckno and Lough Monalty, County Monaghan.

Estuaries

Broadmeadow Estuary (Inner) - from the bridge west of Lissenhall (Broadmeadow River) to the railway viaduct.
Liffey Estuary - from Islandbridge weir to Poolbeg Lighthouse, including the River Tolka basin and South Bull Lagoon.
Slaney Estuary (Upper) - from Enniscorthy railway bridge to Macmine.
Slaney Estuary (Lower) - from Macmine to Drinagh/Big Island.
Barrow Estuary - from the weir at Bahana Wood to New Ross Bridge.
Suir Estuary (Upper) - from Coolnamuck Weir to Mount Congreve.
Bandon Estuary Upper - from Inishannon Bridge to Kinsale Western Bridge.
Bandon Estuary Lower - downstream of Kinsale Western Bridge, to Money Point.
Lee Estuary Upper (Tralee) - from Ballymullin Bridge to seaward end of Tralee Ship Canal/Annagh Island.
Feale Estuary Upper - downstream of Finuge Bridge, to Poulnahaha old Railway Bridge.
Cashen/Feale Estuary - downstream of Poulnahaha old Railway Bridge, to Moneycashen.
Killybegs Harbour - Killybegs Harbour inside Kane's Rock/Carntullagh Head.
Castletown Estuary - from the weir 130m downstream St. Johns Bridge (Castletown River) to Pile Light.
Blackwater Estuary Upper - from Bullsod Island (1km downstream Lismore Bridge) to Dromana Ferry.
Blackwater Estuary Lower - downstream of Dromana Ferry, to near East Point, Youghal Harbour.

10 Water Bodies Designated as Sensitive Areas in 1994:

Rivers

River Boyne, County Meath - 6.5km section downstream of sewage treatment works outfall at Blackcastle, Navan, County Meath.
River Camlin, County Longford - from sewage treatment works at Longford to entry into the River Shannon.
River Castlebar, County Mayo - downstream of sewage treatment works outfall at Knockthomas to entry into Lough Cullin.
River Liffey - downstream of Osbertown sewage treatment works to Leixlip reservoir, County Kildare.
River Nenagh, County Tipperary - downstream of sewage treatment works outfall in Nenagh to entry into Lough Derg.
River Tullamore, County Offaly - 0.5km section downstream of sewage treatment works outfall in Tullamore.

Lakes

Lough Derg and Lough Ree on the River Shannon.
Lough Leane, County Kerry.
Lough Oughter, County Cavan.

The Long-living Fish of Alaska and British Columbia

MANY trees and sea animals have some things in common. One of the most interesting is that they grow throughout their entire lives. Trees, growing in areas with seasons, mark their growth by causing “rings” to occur in their wood. The rings reflect the changes in growing conditions over the course of a year. Counting the rings tells one how many years have passed or how old the tree is. Some fish and shellfish mark the passage of time on their scales, bones or shells in the same way. Scientists use fish scales and a small bone in a fish’s inner ear called the otolith or “ear stone” to determine their age. Because fish move around, their “rings” are not always laid down as orderly as in a tree. Shellfish are even more confusing because they grow their shell so quickly and in strange ways. But, technology is allowing us to learn more about fish and shellfish lives as we learn more about how the rings are created.

A most interesting paper has been published in the (*Alaska Fishery Research Bulletin) No. 8 (2001)* on the maximum ages of groundfish in the waters off Alaska and British Columbia. The longevity of some of these species is remarkable. Ages are reported, in a number of fish as being over 100 years, with some areas in the region producing more than a few specimens aged to be up to 157 years old. The oldest fish recorded from Alaska and possibly for all of the North Pacific, is a rougheye rockfish captured in May 2000 in Southeastern Alaska. It was aged to be 205 years.

The author, Kristen Munk, ends her intriguing paper with a very sobering comment which should be a caution to the Irish government regarding the harvesting of our fish stocks off the west coast of Ireland. She states: “This update of maximum ages for many groundfish species in the eastern North Pacific Ocean and Bering Sea is noteworthy not just for the extension of maximum ages of fish, but also because many of the these fish were captured within the past 10 years. These increases may reflect changes in population dynamics, perhaps due to management strategies, or changes in the environment, sampling effort, or age-reading conventions. Perhaps, more likely, it reflects the cumulative effects of increased sampling and reading of age structures, as well as increases in or redistribution of harvests to deeper and previously unexploited waters. Regardless, the extreme longevity, particularly in many rockfish, and subsequent harvest of these stocks begs comparison to the mining of nonrenewable resources, which suggests that preservative measures in addition to conservative management practices be effected.” Let us remember that deep-sea fish are slow growing, often slow to reproduce and producing few offspring. The New Zealand government learned this sad fact, to their dismay, with the boom and bust of the Orange Roughy fishery in less than a decade. Wise management requires a thorough appreciation of the fish stocks in a fishery.

The maximum ages of some of the groundfishes encountered in the eastern North Pacific Ocean and the Bering Sea are as follows:

Species	*Age(years)*	*Year*	*Species*	*Age(years)*	*Year*
Sablefish	94	1989	Darkblotched rockfish	48	1977
Pacific cod	25	2000	Splitnose rockfish	86	1980
Walleye pollock	28	unknown	Widow rockfish	60	1996
Longcod	25	1995	Yellowtail rockfish	64	unknown
Atka mackerel	15	2000	Rosehthorn rockfish	87	1985
Petrale sole	35	1999	Quillback rockfish	90	1997
Flathead sole	27	1998	Black rockfish	50	1993
Pacific Halibut	55	1992	Blackgill rockfish	87	1985
Dover sole	53	1990	China rockfish	78	1992
Yellowfin sole	34	1999	Tiger rockfish	116	1992
Rock sole	26	1998	Canary rockfish	84	1980
Alaska plaice	31	1998	Northern rockfish	57	1986
English sole	22	1959	Redstripe rockfish	55	1999
Pacific ocean perch	98	1990s	Yellowmouth rockfish	99	1992
Readbanded rockfish	106	1985	Yelloweye rockfish	118	1991
Shortraker rockfish	157	2000	Harlequin rockfish	43	1980
Silvergray rockfish	81	1981	Shortspine thornyhead	89	1990s
Dusky rockfish	67	1992	Spiny dogfish	66	unknown

Recent Publications from the Environmental Protection Agency

The EPA continuesa to publish reports on their environmental research. *Sherkin Comment* highly recommends these publications. Some recent ones are:

- *Scoping Study for the EU Air Framework Directive* ISBN: 1-84095-042-0 IR£5.00
- *National Hazardous Waste Management Plan* ISBN: 1-84095-074-9 IR£10.00
- *Ecological Assessment of Irish Lakes: Final Report* ISBN: 1-84095-059-5 IR£15.00
- *Ecological Assessment of Irish Lakes: Synthesis Report* ISBN: 1-84095-060-9 IR£5.00
- *The Biological Survey of River Quality 2000* ISBN: 1-84095-051-X IR£5.00
- *Rural Environmental Indicators - A Discussion Document on Key Indicators in Ireland* ISBN: 1-84095-053-6 IR£5.00

Publications of Interest

Sea Beans & Nickar Nuts

E. Charles Nelson

BSBI Handbook 10 / 2000

BSBI Publications, c / o Summerfield Books, Main Street, Brough, Cumbria CA17 4AX, UK.

ISBN 0-901158-29-1

Price: £13.95 stg

The beachcomber will love to have this book on the bookshelf. Dr. Nelson has for 20 years been gathering information about drift-seeds found on beaches in Ireland, Britain and elsewhere. He has excellent drawings and descriptions for over 40 kinds of sea beans and nickar nuts. Various chapters included are "Drift-seeds, Buoyancy and Flotation Times", "Ocean Currents in the North Atlantic", Looking for Drift-seeds" and "Viability and Cultivation". There is a beautiful little piece about sea beans found on the shores of Inishboffin, Co. Donegal. A local silversmith made them into elegant boxes with silver attachments. The book also suggests ways of treating each bean in order to get it to germinate.

Sika Deer* **

By Rory Putman

ISBN: 090628239X / 0902754254

&

The Water Vole*

By Gordon Woodroffe

ISBN: 0 906282 44 6

Published by The Mammal Society* and The British Deer Society** / 2000

15 Cloisters Hse, 8 Battersea Park Rd, London, SW8 4BG, U.K.

Price each: £3.50 stg inc. p&p

Sika deer is essential reading for the enthusiast and expert and has been written for The Mammal Society by an acknowledged expert in the field, Professor Rory Putman. Professor Putman said "Sika deer were introduced to deer parks and private collections in Britain in 1860, they either escape or were deliberately released, forming successful wild living populations. It is likely that all the Sika deer in Ireland and most in England and Scotland are descendants of one male and three females introduced in 1860."

Author of *The Water Vole*, Gordon Woodroffe said "Predation by introduced American mink can have a devastating effect on water voles. The fact that mink are sustained by a wide variety of prey means that as one source of food is eradicated [water vole] they can easily switch to others." However the picture is not that simple, as Gordon goes on to say "The destruction of good quality habitat by riverbank management and drainage has undoubtedly contributed to the decline in numbers."

Blanket Mire Degradation - Causes, Consequences and Challenges

Edited by J.H. Tallis, R. Meade & P.D. Hulme

Published by The Macaulay Land Use Research Institute, Aberdeen, on behalf of the Mires Research Group

Available from: Dr. R. Meade, English Nature, 2nd Floor, Bullring House, Northgate, Wakefield, WF1 3BJ, UK.

ISBN: 0 7084 0597 5

The proceedings of 26 papers addresses these issues admirably. Of special importance to Irish readers is a paper on "Roundstone Bay, Connemara: the challenges for conservation" by Mary O'Connor and Micheline Sheehy Skeffington. The special conservation value of the bog complex is described, as well as the threats to its future. On reading these proceeding's papers one gets a greater understanding as to why Ireland's mire bogs must be protected at all costs.

Killarney National Park - A Place to Treasure

Edited by Bill Quirke

The Collins Press / 2001

ISBN: 1-898256-69-1

Price: IR25.00 HB

This book gives a wonderful insight into Killarney's National Park. The first chapter by Alan Craig, of Dúchas, is an introducton to Killarney National Park. He was the first biologist appointed to the park in 1971. He traces its beginnings from its existence in 1932, made possible by the generosity of Senator Arthur Vincent and his parents-in-law, Mr and Mrs William Bowers Bourn, from the USA. He brings the readers through the objectives and management of the park, the purpose of a national park and how to conserve its features. There are 13 chapters by different writers which bring you through all aspects of what the park is; they include the people, the glens, the bogland, woodland, the mountains and conservation issues. A book to be cherished and read by foreign visitors and Irish alike so that a thorough understanding of why Killarney's National Park is so much a part of Ireland's Heritage.

Wild Plants of South-western Ireland, Kerry, West Cork and Limerick

ISBN: 1-904004-01-6

&

Wild Plants of Connemara and West Mayo

ISBN: 1-904004-00-8

By Charles Nelson. Published by Strawberry Tree, 18 Woodbine Drive, Raheny, Dublin 5. 2001.

Price: IR£12.50 each

These two guide books offer a great introduction to the wild plants of two of the most diverse and interesting floristic regions in Ireland. They are full of beautiful colour photographs and have one-page descriptions for each plant.

The books have a good introduction section covering the landscape, climate and habitat types, along with guides for the beginner in plant identification and collection.

The plants are arranged simply for ease of identification and with around 100 of the more common or interesting plants, they are an excellent guide for the interested non-specialist visiting these beautiful areas of Ireland.

Lichens

by William Purvis

The Natural History Museum, London 2000

ISBN: 0-565-09153-0

Price: £9.95 stg

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Tony Rice

The Natural History Museum London 2000

ISBN: 0-565-09150-6

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by William Dubbin

The Natural History Museum London 2001

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Loch Lomondside

John Mitchell

Harper Collins Publishers 2001

ISBN: 000 2201 45 3 (hbk)

ISBN: 000 2201 46 1 (pbk)

Price: £34.99stg (hbk)
£19.99stg (pbk)

An interesting and comprehensive book describing the topography and economic development of Loch Lomondside, including forestry, agriculture, water storage and supply, but above all, it's natural history and struggle for conservation of the area's wild places. This book centres on aspects of the physical environment, the influence of man, wildlife habitats, communities and species and conservation, past, present and future. Each aspect sufficiently detailed to present a factual but concise account of Loch Lomondside dating from as early as the Ice age to present day.

Studying Temperate Marine Environments - A Handbook for Ecologists

Michael Kingsford & Christopher Battershill (Ed's)

Canterbury University Press / 1998

ISBN: 0-8493-0883-6

A comprehensive source of technical and practical information for professional biologists, conservation officers, university lecturers, and senior students studying temperate marine environments. Thoroughly authoritative and up to date, this book includes procedures for establishing a study, methods for studying reef fishes, and case studies from throughout the world's temperate seas. This book will be useful in planning and executing studies of temperate marine environments anywhere in the world.

Coral Reef Fishes - Indo-Pacific & Caribbean

Ewald Lieske & Robert Myers

Harper Collins Publishers / 2001

ISBN: 0-00-711111-8

Price: £14.99 stg

An interesting and informative reference guide that describes and illustrates coral reef fishes likely to be observed by people visiting or diving in the Indo-Pacific region. Each species is illustrated with every possible major form, as well as important identification points. The guide also covers background information on many aspects of coral reef environments, and coral reef fishes, and is therefore suitable for beginners through to more advanced levels.

Practical Statistics for Field Biology (2nd Edition)

By Jim Fowler, Lou Cohen, and Phil Jarvis

John Wiley & Sons / 2000

ISBN 0-471-98296-2

Price:£18.99 stg

An understanding of statistical principles and methods is essential for any scientist and is particularly important for those in the life sciences. This is an excellent introductory guide to practical statistics aimed at the undergraduate level. It gives comprehensive guidance to the principles and methods in a clear and interesting manner that helps to bring understanding over the different issues involved in statistical analyses. The new edition also incorporates the more advanced method of multivariate analysis and an appendix detailing the statistical computing packages available.

Oxford Ornithology Series "Harriers of the World - Their behaviour and ecology"

by Robert E Simmons

Oxford University Press / 2000

ISBN 0 19 854964 4

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The Harriers of the World provides an in-depth analysis of mating systems, population dynamics, and all other aspects of the raptors behaviour from an evolutionary perspective. The author's enthusiasm for Harriers is instantly recognised and helps convey the wealth of detailed information from recent research projects.

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"The Evolution of Avian Breeding Systems"

by J David Ligon

Oxford University Press / 1999

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Collins Field Guide "Caterpillars of Britain and Europe"

by David J Carter

HarperCollinsPublishers / 1994

ISBN 0 00 219080 X

Price: £16.99 stg

This is a clear and easy to use field guide. The caterpillars are grouped together by their food plants, which is a logical starting point when in the field. The illustrations are beautifully drawn and detailed. They show the caterpillars on their food plants, and how they look as butterflies and moths. The text is well set out and concise, making access to the information simpler. The introduction provides an interesting background, which covers the anatomy and life cycle of caterpillars, their enemies and defences, and how to find, rear, study and conserve them. One of the best caterpillar identification books available.

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Edited by Matt Murphy & Susan Murphy

Ireland's Bird Life - A World of Beauty contains photographs from the vast collection of Richard Mills, who is recognised as one of Europe's finest natural history photographers. They will show the great talent of a man who is a craftsman with his camera.

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ISBN: 1 870492 80 3 (size 8" x 12" - 160 pages)

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Agriculture and the Phosphate Regulations

By Iain Maclean

Background

The quality of inland waters in Ireland has continued to decline. Over the period 1971 to 1997, the proportion of slightly to moderately polluted rivers increased from 10% to 47% of the total length surveyed. By 1998, 19% of the lakes, representing 35% of the total area surveyed, showed a degree of eutrophication.

This decline in water quality followed Ireland's membership of the EU, which brought with it the Common Agricultural Policy (CAP). It is not entirely co-incidental that intensification in agricultural practice as a result of the CAP closely paralleled the decline in water quality.

This is not to say that agriculture alone is responsible, as the agri-food industry sector also intensified its activity in line with the primary agricultural sector.

During the same period, greater prosperity brought increased water consumption in the domestic sector, together with more use of detergents, which increased the total quantity of nutrients discharged by sewage systems.

In order to combat the decline in water quality, the Minister for Environment introduced the Local Government (Water Pollution) Act, 1977, (Water Quality Standards for Phosphorus) Regulations, 1998, more usually known as the "Phosphate Regulations". The latter is an ambitious piece of legislation that requires the restoration of most rivers and lakes to satisfactory water quality by 2007. This target will not be achieved without significant expenditure by industry and the public sector and by significant alteration in agricultural investment and practice.

Industry

All the major agri-food industry is now licensed under the IPC regime controlled by the Environmental Protection Agency (EPA). Every licensed industrial wastewater treatment plant is required to have phosphate removal. The industry has generally responded well and the level of treatment provided is continuing to improve. Work remains to be done to improve storage of sludge, particularly in the meat sector. Significant success has been achieved at at least one dairy plant where an enhanced phosphate removal system was installed and the effluent is better quality than the river.

At present rates of progress it is expected that the 2007 target will be met by industry.

Sewage

Most inland discharges of sewage receive some degree of treatment with the majority treated to secondary standards. However only a minority of plants currently have phosphate removal and it is clear that more must include phosphate removal to meet the requirements of the Phosphate Regulations. In a minority of cases, particularly in the drier, more heavily populated eastern region, conventional phosphate removal (~90% removal) may not prove adequate and that enhanced phosphate removal will be required.

Agriculture

Agriculture represents far and away the greatest challenge facing the achievement of the targeted water quality. This is because agricultural waste (mainly slurries) arising each year is very large and amounts to about 65 million tonnes. The total quantity of all waste in the country is about 80 million tonnes and thus agriculture accounts for about 80% of the total.

Agricultural wastes differ from many other wastes as they comprise less than 10% dry matter and often less. Thus 90% of the waste is water which makes it costly to transport or to treat.

Many agriculturists try to make the case that slurry is a product and not a waste. Regrettably this is not so. Speaking personally I have seen recently slurry being spread in January in proximity to a major water supply intake. I have also seen slurry being spread on top of 100cms of snow and I have seen a slurry tanker being driven along the road in winter and slurry sprayed into the adjacent field as the ground inside was too wet to travel. Unfortunately none of these activities are illegal as the slurry was not seen to be discharging directly to water, although undoubtedly the nutrients would ultimately reach natural waters as there was no plant growth. I hasten to add that the majority of farmers are not involved in this sort of activity. It is of concern to see such careless practice being continued, as it either represents inadequate management of the facilities or an unwillingness to invest in sufficient storage capacity.

The lack of storage capacity is sometimes defended by the assertion "unusually heavy rainfall rapidly fills slurry tanks". The reality is that Ireland has always experienced heavy rainfall even if individual rainfall events have tended to increase in intensity in recent years. Slightly more than half of this figure falls during the winter slurry storage period and must be allowed for in the design of slurry storage facilities. Water from clean-yards, roofs and from springs must be diverted away from slurry storage. This diversion of water is vital to allow utilisation of slurry wastes as a resource.

Agriculture in Ireland currently consists of approximately 120,000 full time farms. Of the land area that this represents, approximately 90% is grassland and 10% is tillage. The grassland can be split into grazing and silage ground and the tillage into winter crops and spring crops.

The use of slurry in the grassland areas is effectively restricted to the times prior to grazing, and after first and second crop silage. The initial pre-grazing period is normally around March, the first crop around May and the second crop silage around July. It may be possible to apply a light dressing, perhaps 10% of the total in September, but it makes no sense to apply slurry after this date, as grass growth slows dramatically in October.

Similarly the application of slurry to tillage lands should be restricted to the spring crops ie from February onwards. Application to winter crops makes little sense as the ground is bare and the slurry is extremely vulnerable to leaching either to groundwater or to surface water at this time. This can lead either to nitrate pollution of groundwater or to eutrophication in surface waters.

Research has shown that approximately 90% of phosphate loss occurs during the first flood of the winter period. Thus spreading of slurry in the autumn and early winter must be avoided.

From the above, it is clear that no slurry spreading at all should take place in the six months from September until March. This implies that every farm must have a minimum of six months slurry storage. Storage may need to be extended beyond this in some cases to allow for variability of rainfall conditions around the country and to ensure the optimum use of slurry.

The current recommendations for slurry storage are significantly less than six months and appear to be aimed at minimising the costs to agriculture rather than maximising the protection provided to the environment. The balance between cost and protection must be carefully re-evaluated to ensure that the Phosphate Regulations will be met.

The optimisation of slurry usage and environmental protection will be achieved through the use of comprehensive nutrient management planning (NMP). An NMP will identify the balance between the nutrient inputs and the crop nutrient requirements and quantify the amount of nutrient required by a farm either in the form of slurry or chemical fertiliser.

Currently NMPs are prepared under the REPs scheme that currently tends to apply only to less intensive farms. Agriculturalists view it as a farmer income support scheme. The individual farm plans are seen as commercial business plans and classified as confidential under the Data Protection Act. This is reasonable for most of the plan, as it is a business plan. However it does little to inspire confidence in the environmental protection aspects as the important nutrient usage information is not available to the environmental protection authorities. This aspect of REPs needs to be re-examined or alternative NMPs put in place.

Alternative requirements for NMPs exist under bye-laws passed by some county councils. This is a welcome development and if extended to provide a comprehensive nation wide system, would go a long way to ensuring that the requirements of the phosphate regulations are met on time.

In contrast, pig producers as part of their licence applications to the EPA must produce other NMPs. This information is in the public domain.

To conclude, in order to see the requirements of the phosphate regulations fully met by 2007, industry should continue with ongoing investment. Sanitary authorities should closely examine the provision of phosphate removal at all major inland sewage treatment plants, including the provision of enhanced phosphate removal in some cases. In the case of agriculture, regulations which ban the wintertime spreading of slurries and require 6 months storage minimum for slurries. NMPs should be made mandatory for all farms with nutrient inputs similar to those of a 50 cow dairy herd farm. Such NMPs should be produced by agricultural experts but made freely available to the environmental protection authorities and the public.

Whilst the foregoing is not a comprehensive solution to all the requirements of the phosphate regulations, it addresses the major issues.

Iain Maclean, Director, EPA (Environment Protection Agency), Johnstown Castle, WEXFORD.

Travelling in Harmony

By John Akeroyd

NEVER before have so many people taken holidays. Tourism has evolved into a massive global industry that employs millions and generates considerable amounts of money. Holidays bring pleasure to almost all of us, young and old, and allow us to seek relaxation and mental stimulation in other countries. Sadly, however, tourism is too often a burden on the environment: crowds of people and vehicles, extensive and intrusive infrastructure of roads and hotels, increased fuel consumption, sewage and exhaust pollution, and over-use of often scarce water supplies. Above all, tourism alters, damages and degrades natural and semi-natural habitats, especially of coasts and wetlands, and disrupts wholesale the culture and traditions of local people.

That is not to say that we can, or should, curtail travel and tourism. Hard-working people need and deserve leisure, and travel does broaden the mind – as well as providing a chance to see and appreciate other cultures. Cork and Dublin would not be the vibrant cities they are today but for travel and the importing of new ideas. Yet, conservationists need to speak up for 'moderation in all things', and the need to protect fragile habitats and people. Without being patronising or over-protective, and avoiding the temptation to wish to see others live in picturesque squalor, above all we must buffer human communities that live in harmony with nature. Modern life has many temptations, not least the urge to worship money, material goods and 'style'.

My late friend and mentor, Oleg Polunin, once quite rightly dissuaded me from writing an article on Mt Athos, the Holy Mountain of northern Greece. This 1000-year old monastic republic is peopled entirely by holy men who live and pray amid some of the most unspoilt green forest and mountainside of southern Europe. The Athos peninsula, jutting into the Aegean Sea, is a priceless treasure for all of us, one that would crumble rapidly before an onslaught of tourists. More Greeks now visit (men only, for women are banned!), but access by foreigners is restricted. But even here, old structures are crumbling. Venerable monasteries survive but, for example, roads and vehicles are replacing ancient stone trackways I walked with fellow English and Greek botanists, and a mule, 25 years ago.

One compromise solution is green tourism or ecotourism. This needn't be a trek through a steaming Andean jungle, a lorry ride across the Sahara or even a serious session at a field study centre. Several companies offer small-scale holidays based in village houses or sensitively planned villas. Others provide group holidays for painting, regional cookery, bird watching or looking at churches or wildflowers. The emphasis is on escaping the beach or ski resort and living alongside local communities and the natural world for a week or fortnight. Many young people especially have already adopted a more *ad hoc* approach to this style of holiday by backpacking through rural or remoter areas and integrating into local life. Massed back-packers may, however, be as much of a problem as any other sort of tourist. It is all a matter of scale, and sympathy for the environment and people with whom we stay.

For nearly 20 years I have escorted numerous wildflower and general interest tours in southern and central Europe, as well as in Britain and Ireland. Apart from the members of my own groups, I am constantly delighted by the many other tourists whom I meet on my travels who are interested, if only casually, in natural history. So many of them want to learn more and to try and protect the wonderful animals and plants that they see in habitats richer and less spoilt than we have at home. " What is that yellow flower along all the roadsides ... on the wall of the Turkish baths ... around the villas ... all along the beach?"; "Are those vultures?"; "What are they growing in the fields?" It is such a pleasure to help, knowing that a germ of interest may be sown even in the casual observer.

Eastern Europe is a region where ecotourism may prove particularly valuable in maintaining traditional country life, while offering villagers an improved income. Much has been written about pollution and environmental damage, but huge stretches of countryside from Balkans to Baltic are as pristine as anywhere in the world. Otters, beavers and fire-bellied toads swim in the streams, and orchids and hayrattle colour the hay-meadows. A few weeks ago I sat in a meadow in Transylvania, a landscape of rolling hills and red-tiled villages in central Romania. A man from the BBC was recording my comments on the the fantastic richness of the grasslands. As I enthused about the most extensive and flower-rich lowland meadows in Europe, a corncrake began to rasp nearby, followed by the liquid "wet-my-lips" of a quail. Overhead a buzzard circled and mewed, and we had earlier seen a Red-backed Shrike on a wire. The adjacent village, with a magnificent medieval church, an 18th century street and simple but comfortable farmhouse accommodation, ought to have a great future as a centre for ecotourism. And it is possible that the needs of the tourist may be a factor in saving these precious and unique meadows for posterity.

Photos: © Jane Smart, Plantlife

Wildflower meadows always thrill green tourists: the author in western Turkey.

Botanist and conservationist Dr John Akeroyd has escorted wildflower tours since 1983.

Photos: © John Akeroyd

The best flowers often grow around historical monuments: old Genoese bridge on Corsica, a rich site for wildflowers and singing nightingales.

Providing local jobs: village boatmen in Poland ferrying tourists by traditional punt.

Aliens in Antarctica

By Tony Fogg

OF things, from oil spills to housing estates, that can disrupt a natural community of organisms, invasion by an alien species is not the least damaging and is certainly one of the most insidious. Arriving by chance or conveyed by human activity, the probability is that a plant or animal is unable to establish itself in a strange habitat and disappears unregarded. But some may find conditions favourable, with no serious trouble from competitors, parasites or predators, and flourish to the determent of the natives. The grey squirrel and Dutch elm disease are aliens that have badly afflicted the British flora and fauna.

"One might think that invading species are not likely to cross the thousands of miles of tempestuous seas and ice that surround Antarctica and that any organism which did arrive would find an extremely hostile environment."

One might think that invading species are not likely to cross the thousands of miles of tempestuous seas and ice that surround Antarctica and that any organism which did arrive would find an extremely hostile environment. Nevertheless, aliens have established themselves and if this unique area of our planet is to be preserved, in anything like pristine condition, steps have to be taken to control them.

The peri-Antarctic islands are more accessible than the continent and do not have such extreme climates. They were the first parts of the Antarctic to be visited and the early explorers, with a view to future visits, left rabbits, pigs, sheep, cattle, or fowls on them in the hope that they would multiply and provide food. The explorer Captain James Cook himself was a great offender, as we could now describe him, in this way. A British naval vessel, sent to the desolate Kerguelen Islands to observe the transit of Venus in 1874 deliberately left domestic rabbits, which throve on the Kerguelen "cabbage", a remarkable plant good for curing scurvy, virtually eliminating it and leading to much erosion of the terrain, except on small outlying islands. The Kerguelen rabbit is now distinct from its ancestral type, although it has not reverted to the original wild phenotype. Brown and brook trout have been successfully introduced into Kerguelen's originally fishless freshwaters but seem to have had no serious ecological effects. Rabbits released on to Macquaries Island multiplied as on Kerguelen but here largely at the expense of *Pleurophyllum hookeri*, a member of the daisy family, causing extensive erosion of the herbfield. This plant is now recovering following deployment of the myxoma virus to reduce the rabbit population. This, however, involved introducing another alien, the European rabbit flea, as vector. Cats, presumably brought to Macquarie by sealers as pets, admittedly do something to keep the rabbits down, but are a great threat to small ground-dwelling or burrowing birds and have been responsible for the extinction of two native species. Hunting has killed hundreds but made little difference to the cat population. Kerguelen and Macquarie are both sub-Antarctic islands, north of the Convergency, the line that marks the limit of the icy Antarctic seawater. Only Heard and Macdonald Islands among the sub-Antarctic groups remain free of alien mammals.

The island of South Georgia, being south of the Convergence, has a much more frigid climate. Nevertheless, from 1778 it has been visited by numerous sealers and whalers and has acquired, thanks to them, a wide variety of aliens. It now has 25 alien flowering plant species as against 17 native ones. Brown rats, introduced accidentally from the early 1880s onwards, are the worst menace to the native flora and fauna. They have a severe impact on the endemic South Georgia pipit and pintail and burrowing petrel species, preying on both the birds themselves and their eggs. When these are not available the rats have no difficulty in surviving; tussock grass not only provides for their runs and nests but the succulent leaf bases are a staple food. Exterminating the rats will be a formidable task. Another alien is the reindeer, brought by whalers in 1911 and again in 1926 to provide a source of food. These have flourished but by grazing and trampling

Photos: © Tony Fogg

Tourists landing from the cruise ship *Kapitan Khlebnikov* at Cape Hallett, Ross Sea, February 1998.

Two native plants Macquarie Island, *Pleurophyllum hookeri* (sage-green leaves) and the Macquarie Island "cabbage", *Stilbocarpa polaris*, used as an anti-scorbutic by sailors (bright green leaves). Both are favourite foods of the alien rabbits.

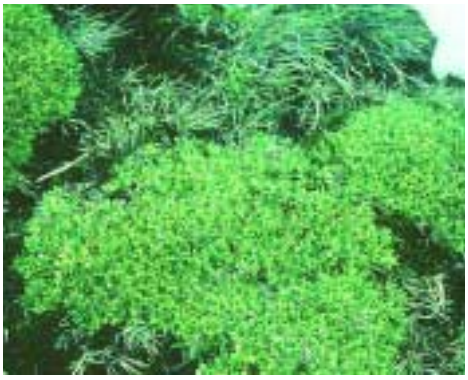
have devastated the natural vegetation. Fortunately the two herds, totalling about 2000 individuals, are confined by glaciers but retreat of these would liberate them to do damage over much of the island. In its Environmental Management Plan for South Georgia the Falkland Islands Government proposes to remove the reindeer, relocating some in the Falkland Islands so that their unique genetic value will be preserved.

Signy Island, one of the South Orkneys, once a whaling station and then a British Antarctic Survey base, is further south and has no obvious aliens. However, two inconspicuous visitors which successfully established themselves were a midge and a worm, accidentally introduced in plant material. They both seem to have been genetically pre-adapted to harsh conditions and survived for 17 years.

The continent itself has no alien flowering plants nor, except for human beings, mammals. There are just two native flowering plants - a grass, *Deschampsia antarctica*, and a pink, *Colobanthus quitensis* - both of which are spreading south, perhaps because of global warming. Attempts have been made to grow other plants on the Antarctic mainland. Some make a feeble attempt and the common grass *Poa pratensis* can germinate and grow under adverse conditions at 72°S but has not established itself permanently. Sledge dogs are well adapted to severe Antarctic conditions and have been bred on the continent continuously from 1945 to 1995. They have never been a threat to Antarctic ecosystems but under the Antarctic Treaty rules they are alien and have had to leave, mostly dying on return to civilisation because they have lost their immunity to the usual canine diseases. This is a deplorable example of bureaucratic correctness since a dog sledge is still the safest mode of transport in the Antarctic and dogs do much for moral on lonely bases during the winter. Turning the microscopic organisms one finds no lack of aliens. Freeze dried bacteria, fungi, algae and protozoa may survive for long times - viable bacteria, for example, have been recovered from ice laid down ten-thousand years ago. So it is not surprising that around buildings of Antarctic expeditions one can find many of the common microbes of civilisation. Alien organisms, however, do not need human assistance to reach Antarctica, many are carried there in air currents. An example is provided by the presence of the moss *Campylopus pyriformis* on fumarolic ground at 2733m on the volcano Mount Melbourne in the frigid Antarctic. This moss has a wide distribution in hot spring areas in south temperate regions but seems to occur only in this particular place in the Antarctic. Its propagules must have travelled a long way to get there. A habitat particularly sensitive to invasion by microbial aliens, whether brought by human agency or air currents, is that of the dry valleys. These are ice-free areas, occurring in several places around the periphery of the continent, characterised by extreme desiccation. The occasional seal or penguin which wanders in to them dies a miserable death but becomes preserved as a mummy for perhaps centuries. There are, however, niches in which microbial life can be active. This is of great interest from many points of view, one being that they give an indication of the kind of life that might be expected on Mars. Invasion by alien microbes might be particularly destructive of these unique communities. The Antarctic Treaty Parties have set aside one dry valley as a Specially Protected Area with elaborate precautions against human contamination with micro-organisms.

People, at present predominantly scientists and supporting staff together with tourists, are undoubtedly the alien species, which most threatens Antarctic ecosystems. Their impacts, on the whole, is being strictly controlled by the Antarctic Treaty protocols for the scientists and general agreement of the tour companies on a code of conduct.

Prof. Tony Fogg, Bodolben, Allt Cichle, Llandegfan, Menai Bridge, Gwynedd LL59 5TA, Wales, U.K.



The two flowering plants native to the Antarctic continent. The cushion plant is *Colabanthus quitensis*, a pink, and the grass is *Deschampsia antarctica*.

Mummified seal in Taylor Valley, Victoria Land. Desiccation kills higher forms of life entering dry valleys like this but micro-organisms grow in porous rock.

The dog line, Stonington Island, 1974.

Junior Pages

Captain Cockle and the Loch Ness Monster

Abridged in four parts - *Episode Three - The Trap!*

Sketch: © John Joyce

By John Joyce

The story so far – Captain Cockle, retired submarine captain and inventor of the *Cormorant* – an amazing submarine that can not only fly, but also shrink to the size of a sausage at the touch of a button, had flown to Scotland with his wife Dr Catherine Cockle, and their grandchildren Jenny and William to sort out a row between fish farmer Alistair McTavish and film-maker Professor Potts. In the course of their research they have stumbled on a hidden underwater cavern containing the key to an age-old mystery – the Loch Ness Monster!

There was a bone-shaking "Thud!" as the head of the largest monster collided with the *Cormorant*. Everyone could hear equipment crashing about in the diving chamber. The lights dimmed and came on again as the main batteries were jarred loose.

For a moment there was silence. Then they all heard a faint clicking outside in the water - "ticka, ticka, ticka, ticka, tick, tick, tick," followed by the "CRASH" of the monsters on the hull outside.

"They must be finding their way in the dark by sending out those clicking noises and figuring out where objects are from the time it takes for the sound to bounce back," said Jenny. "Just like bats do."

"Ticka, ticka, ticka, ticka, tick, tick, tick!" – CRASH!

So Captain Cockle let the *Cormorant* sink silently to the bottom of the loch, where he and his crew held their breaths and waited for the monsters to go away.

"We can't tell anyone the monsters are here," said Jenny. "If we do that, then people like Professor Potts will hunt down that family of monsters and put them in a zoo or something."

"And if we leave them in the loch they'll all starve to death!" said MacTavish. "It'll take weeks to put treatment works on all the pollution sources around the loch and in the meantime, with no fish in the deep water to feed on, the monsters will die of starvation or break up my fish farm and put me out of business!"

"Well, I don't know what you expect me to do," said Captain Cockle. "I can hardly scoop up a whole family of prehistoric monsters in a net and smuggle them out of here in my pocket. Now can I?"

"Why not?" said Dr Cockle quietly. "Don't forget that this submarine can shrink to the size of a sausage. And if it can do that, then surely you could shrink those monsters as well.."

Back at the fish farm there was a large crowd of newspaper reporters and TV camera crews waiting for them.

"Any sign of the monster? Any video footage? Any proof?"

But Captain Cockle and his crew pushed past them and went straight to the farm workshop where they started working on their plan to save the monsters.

"Pack of loonies!" snorted MacTavish. "Now, Cockle, you see that big circular fish cage drawn up on the beach there. Do you think that will be strong enough for what you have in mind?"

Later that evening, as the sun was finally setting over the loch, a strange-looking fleet set out from Alistair MacTavish's fish farm. In the lead was the submarine *Cormorant*, with Captain Cockle, Dr Cockle, Jenny and William aboard. Behind the *Cormorant* was the big fish farm workboat with its hydraulic crane and MacTavish's two strong sons aboard. Finally, in tow behind the workboat was the big circular fish cage with Alistair MacTavish himself standing tall on the outer collar, a stout rope gripped in his powerful hands.

The little convoy made its way southward across the loch until it was just above the secret cavern where the monsters lived.

"Is everyone clear on what they have to do?" said Captain Cockle over the radio. "William, you get on the controls of ROVER. Guide it into the cavern and draw the monsters out. Make sure they chase it into the fish cage, through the special gate that MacTavish has built into the side of it. MacTavish, you close the gate and stand clear. Then, once the monsters are safe inside the cage, I'll use the *Cormorant's* special shrinking machine to shrink them down to the size of newts before they can break out. Is that OK?"

The tiny robot submarine dropped into the water, whirred into the monster's cavern and woke them up with its powerful lights. Then it sped down and out of the cavern into the loch, bringing the monsters with it. Captain Cockle could see all four of them on his sonar screen – the single small blip of ROVER, racing out of the cavern, with the four larger blips of the monsters in hot pursuit.

Then, over to the right of the screen, in shallower water, was another blip, moving far more slowly.

"Another monster?" asked Dr Cockle.

"Another submarine, most likely," said Captain Cockle. "And there's only one other submarine in the loch that I know of."

"Professor Potts," gasped Jenny. "He probably saw us leaving and followed us, hoping to film the monsters and get his name in all the papers!"

"He'll do that all right!" snorted MacTavish. "I can see the headlines now; 'Potts Pounded to a Pulp!"

"He's right between the monsters and the fish cage," said Captain Cockle. "ROVER will lead the monsters right to him."

"The poor man will be killed!" cried Dr Cockle.

Will Potts be pounded to a pulp? Will the monsters be saved?

Find out in the next episode – The Rescue - only in Sherkin Comment.

Abridged by the author from "Captain Cockle and the Loch Ness Monster " - published in Ireland by Poolbeg Press and available in all good book shops, price Ir£2.99

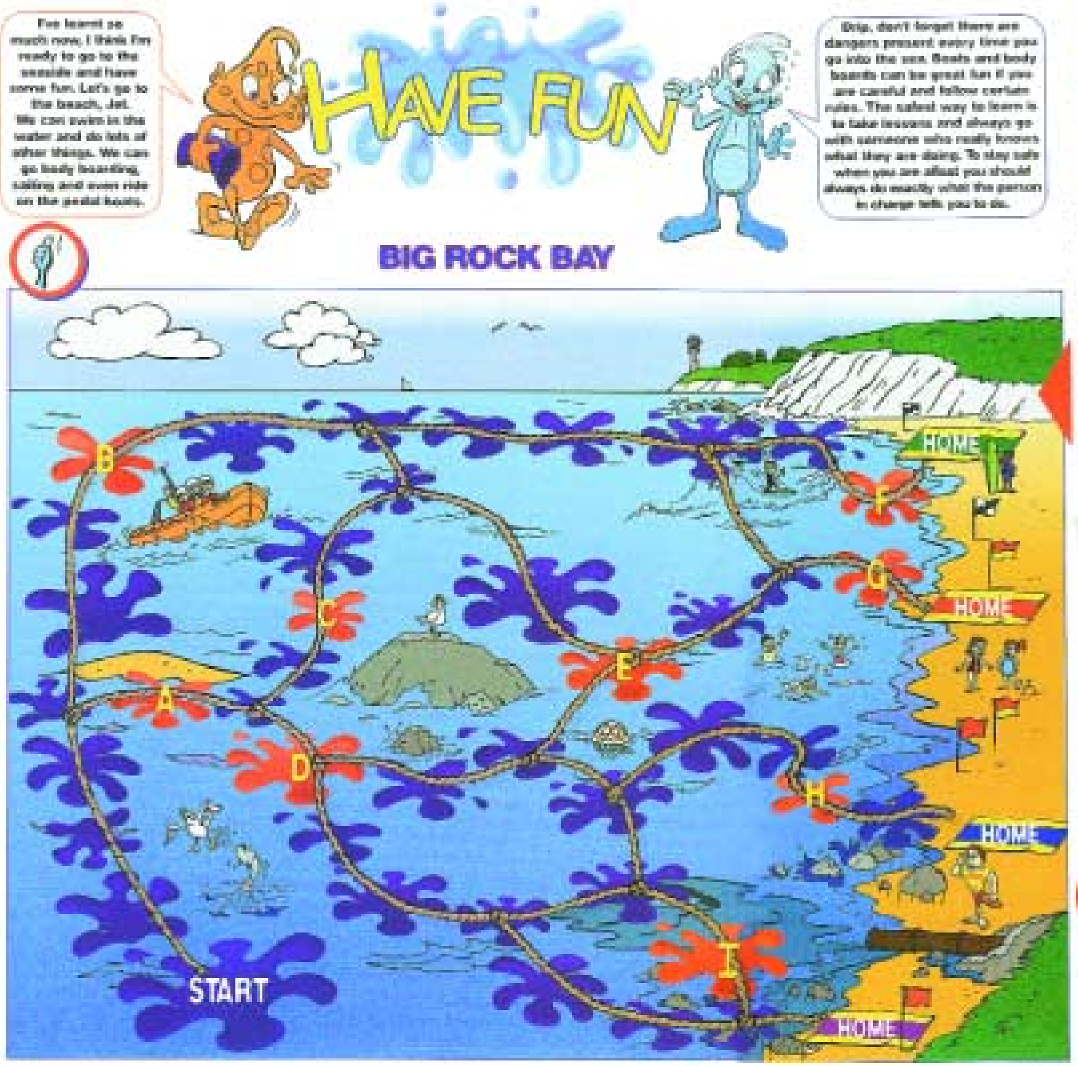
Visit Captain Cockle and friends online at www.cockle.com

RNLI Lifeboats Ireland

Get Splashed!

This game has been reproduced from "Get Splashed", an activity booked based on water safety, which has been produced by RNLI Lifeboats Ireland. To become a member with the RNLI's Storm Force, see details on the right. To join the Water Safety Ireland club Tel. (01) 496 34222

Join "Storm Force", the RNLI's club for young people, and you will be sent an exciting members' pack filled with lots of goodies. Four times a year you will receive the action packed *Storm Force News* magazine full of exciting stories, paintings, ideas or jokes to Storm Force headquarters.
To join just send your name and address, with a cheque/P.O. for £5.00 to Storm Force HQ, RNLI, 15 Windsor Terrace, Dun Laoghaire, Co. Dublin. *Tel: (01) 2845050 Fax: (01) 2845052 Email: info@rnli.org.uk Internet: www.rnli.org.uk*



You should:
1. Always wear a lifejacket.
2. Never go on a boat on your own.
3. Tell people on land where you are going and when you will be back.
4. Always watch out for hazards in the water.

To help you understand a little more, here is a fun game to play. Imagine you are right in the middle of Big Rock Bay! How about a race to the beach? You have to get back safely and also learn more about water safety on the way.

Instructions

Trace the spinner and stick it on to a piece of card. Cut it out and colour it in. Then stick a cocktail stick or a matchstick through the centre. When it is your turn to play, spin the spinner. When the spinner stops, the number on the side touching the table or floor is the number of splashes you can move.

Spinner

Characters

Swimmers Body boarders Pedal boat Dinghy

Choose your character

Spin the spinner. Whoever spins the highest number chooses their character first, second highest chooses second and so on. Trace your character and cut it out. Colour it in. These will be your counters.

Starting the game

The person who picked their character first spins first. The players then take turns to move in the order the characters were chosen. Spin a three to start. You must follow the rope at all times, but you can change direction at each knot.

There are some special splashes

IF YOU LAND ON OR CROSS A LETTER SPLASH. Each letter of the alphabet stands for a different hazard. Your character must follow the "what to do" instruction listed on the right.

The finish

The winner is the first player who gets to the shore safely. The game ends when the final player arrives on the shore.

Have fun!

Have Fun - Letter Splashes

Which hazard have you landed on or crossed?

Character	What to do
A. The sandbank	
Swimmer or Body boarders	[illegible]
Pedal boat or Dinghy	[illegible]
B. [illegible]	
Swimmers or Body boarders	[illegible]
Pedal boat or Dinghy	[illegible]
C. [illegible] Rocks	
Swimmers, Body boarders, Pedal boat or Dinghy	[illegible]
E. Jelly fish	
Swimmers or Body boarders	[illegible]
Pedal boat or Dinghy	[illegible]
F. The "surfers only" flags	
Body boarders	[illegible]
Swimmers, Pedal boat or Dinghy	[illegible]
G. Swimmers only	
Swimmer	[illegible]
Body boarders, Pedal boat or Dinghy	[illegible]
H. No swimming	
Swimmers or Body boarders	[illegible]
Pedal boat or Dinghy	[illegible]
I. Sewage outlet	
Swimmers or Body boarders	[illegible]
Pedal boat or Dinghy	[illegible]

Irish Bats

BATS make up almost a quarter of all land mammals in Ireland. Yet, few people have ever seen a live bat or know anything about how they live. In Ireland, as throughout the rest of the world, these small, furry, intelligent animals are surrounded by myth and superstition which often leads to their persecution. What is the real truth? What bats occur in Ireland? How do they live? Do we need bats? Can we help them to survive?

Dispelling the Myths

Let's put to rest some of the popular myths about bats.

Bats and Human Hair

Probably the most common myth about bats is that they become entangled in women's hair. An Irish twist to this is that if the bat escapes carrying a strand of the woman's hair, she is destined for eternal damnation! While no one really knows how this myth originated, it could have arisen from bats swooping low over the heads of people in pursuit of the swarms of insects that follow people at dusk. The recorded instances of bats getting into human hair are so rare that it is hard to understand the broad acceptance of this myth.

As Blind as a Bat

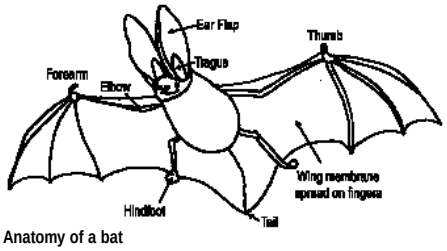
Another myth is that bats are blind, giving rise to the above saying. Even though the eyes of most species are small and not highly developed, all bats have eyes and use their eyesight to recognise landmarks in their surroundings and to distinguish changes in light intensity, particularly at sunset and sunrise. In common with many other nocturnal animals, bats do not possess colour vision.

Bats are Mice with Wings

Bats are often compared with mice, and a superficial examination will show that some bat species have a body size, fur colour or ear shape very similar to those of mice. However, bats are not flying mice but a distinct order of mammals known by the scientific name of Chiroptera (meaning hand-wing). Bats are unique among all the mammal groups by being the only mammals with the ability to fly. Another major difference between bats and mice is in the number of young produced in a year. Bats give birth to just one offspring, following a long pregnancy. Similar sized mice give birth to large litters of young, following a relatively short pregnancy.

Bats have Radar

This is a commonly held belief which is only approximately true. Bats use sonar rather than radar. Sonar is an echolocation system based on sound. Radar is based on electromagnetic energy. Bats echolocate by producing a series of ultra-sonic sounds (inaudible to humans) which strike against a solid object, bounce off the object and return to the bat as a series of echoes. These echoes contain information on the size, shape, speed and direction of the object. By listening to these echoes, bats can accurately detect insect prey between 2-20mm in size, and manoeuvre to avoid obstacles. Bats, and other animals such as whales and dolphins, create a sonic image of their environment.



Anatomy of a bat

Are Bats Harmful

Bats are not a health hazard, unlike rodents. Bats will not damage houses as they are not capable of doing any structural damage to timber or electrical cables, do not bring nesting material into buildings, and their droppings (composed of undigested insect parts) dry to a harmless, fine powder. Unless handled roughly, bats will not bite, indeed, bats are extremely beneficial because they consume large numbers of insects, including some pest species.

Irish Bats

Seven species of bat occur in Ireland, belonging to two families, Rhinolophidae (horse-shoe bats) and Vespertilionidae (evening bats). Some species are easily recognised but others require a detailed knowledge of such features as the tragus (an extra ear lobe) and the calcar (a cartilaginous spur along the tail membrane), to enable identification.

All seven species are small, the smallest measures between 35-45mm from head to tail and weighs less than 8 gms, while the largest measures 54-64mm and weighs less than 20 gms. We call a group of bats a colony, and a site used by bats a roost. All Irish bats eat insects that can range in size from almost microscopic to quite large moths and beetles.

The Seasonal Cycle of Bats

Although it is possible to see bats at any time of the year, the activity of Irish bats falls into a seasonal cycle. In early spring, pregnant female bats search for safe dry places, usually buildings, in which to give birth. A collection of females and their young is called a nursery or maternity colony. Males, who play no part in rearing the young, live away from the nursery colonies.

The baby bats are born in June/July, depending on the temperature (cold springs delay birth) and the availability of insects for the females. The young bat is totally dependent on the mother for about six to eight weeks during which time she suckles it, usually leaving it alone only at night when she goes hunting.

By mid August, most nursery colonies disperse as the young learn to fly. Mating takes place in the autumn, but the females delay pregnancy until the following spring. As insect abundance drops in late autumn, bats choose cool safe places in which to hibernate for the winter. During hibernation bats drop their body temperature to that of the surroundings, maintain a weak heart beat and a low rate of metabolism. In this way, they survive on the fat reserves they accumulated by voracious feeding in autumn.

Common Roosting Sites of Bats

Threats Facing Bats

Every year bats are excluded from or killed in buildings, accidentally (during repair work) and deliberately (through fear and ignorance). Original roosting sites, such as old trees, are cut down. Cracks in stone bridges are sealed, often entombing the bats. Underground sites are vandalised or over-visited. Chemicals used during timber treatment can kill bats, both during application or months later. Changes to our landscape, such as removing hedgerows, draining wetlands, clearing scrub land, and changes in agricultural practices all affect the abundance and diversity of insects available to bats.


Common roosting sites of bats

How can we conserve bats?

Bats are protected under the 1976 Wildlife Act. In June 1993 Ireland signed the European Bats Agreement which aims to promote greater protection for bats by protecting key sites and habitats.

Ultimately, bat protection is in the hands of those people who have bats visiting their homes during the year. The best way to protect bats is to leave them alone.

Local authorities can help by leaving some cracks for bats under repaired bridges

Community, youth and school groups can help by erecting timber bat boxes to replace lost tree roosts.

You can help by joining or forming a bat group and so educate the people where you live about bats.

The National Parks and Wildlife Service of the Office of Public Works should be notified about any work (e.g., roof repairs or timber treatment) at a building used by bats.

Bats are an essential part of our natural heritage, we must conserve them.

Text prepared by Dr. Kate McAney, Bat Conservation Officer, VWT/OPW Bat Project, the Office of Public Works. Artwork reproduced by kind permission of the Vincent Wildlife Trust and Professor J.S. Fairley.
Further information on "Irish Bats" is on the fact sheet which, along with other fact sheets, is available from ENFO - The Environmental Information Service, 17 St. Andrew Street, Dublin 2. Tel 1890200191 (price of local call) Fax 01-8882946
Email: info@enfo.ie
Fact sheets are also available at their Website: www.enfo.ie

Land Mammals in Ireland

1. badger
2. bat
3. fallow deer
4. field mouse
5. fox
6. hedgehog
7. otter
8. pygmy shrew
9. rabbit
10. red squirrel
11. wild goat

The pictures of the animals on the left are nameless. Can you select a name from the list on the right? Each has a description along side to help you. *Answers on page 30.*

Information from "Land Mammals in Ireland", which was published by the National Parks & Wildlife Section, Dúchas - the Heritage Service, 7 Ely Place, Dublin 2.

a

A large animal. Antlers are found on the male.

_ _ _ _ _ _ _ _ _ _ _ _

b

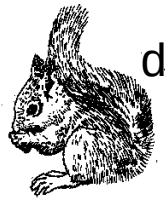
An animal with a coat of protective spines, short stumpy body and very short legs.

_ _ _ _ _ _ _ _ _

c

A dog-like animal, with a red coat and bushy tail.

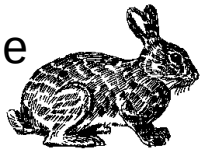
_ _ _



d

A small animal, reddish in colour, with a bushy tail, which lives in trees.

_ _ _ _ _ _ _ _ _ _ _ _



e

This animal has long ears and powerful back legs, which it uses for hopping.

_ _ _ _ _ _

f

A heavy thick-set animal, with strong limbs. It has a distinctive white head with a black stripe running over each eye.

_ _ _ _ _ _

g

An animal which is closely related to the sheep. The males have long curving horns.

_ _ _ _ _ _ _ _ _ _

h

The smallest of Ireland's land mammals, it has velvet-like fur and a distinctive long, pink snout with stiff whiskers.

_ _ _ _ _ _ _ _ _ _

i

A very small animal with a long tail and legs, large ears and eyes and a bright golden brown coat.

_ _ _ _ _ _ _ _ _ _

j

A flying land mammal, which comes out at night and uses echo-location to navigate.

_ _ _

k

An animal with a long, slender body, flat head, tapering tail and webbed feet.

_ _ _ _ _

Odd One Out!

Can you pick the odd mammal out? Three of them live on land and one of them lives in the sea? Why not colour the circle of those that live on land green and the one that lives in the sea blue? *Answer on page 30.*

Bat

Seal

Rat

Wild Goat

Animal Connections

Below are the names of eight Irish land mammals. Using their names we have made eight other words out of them. With the help of the clues, can you figure out the words? *Answers on page 30.*

1. **V O _ _ _ L E _ _**
(Unable to speak)

2. **R _ _ A T _ _**
(Boat races)

3. **_ O T T E R _**
(Ware made from clay)

4. **S T O _ _ A T _ _**
(It measures times)

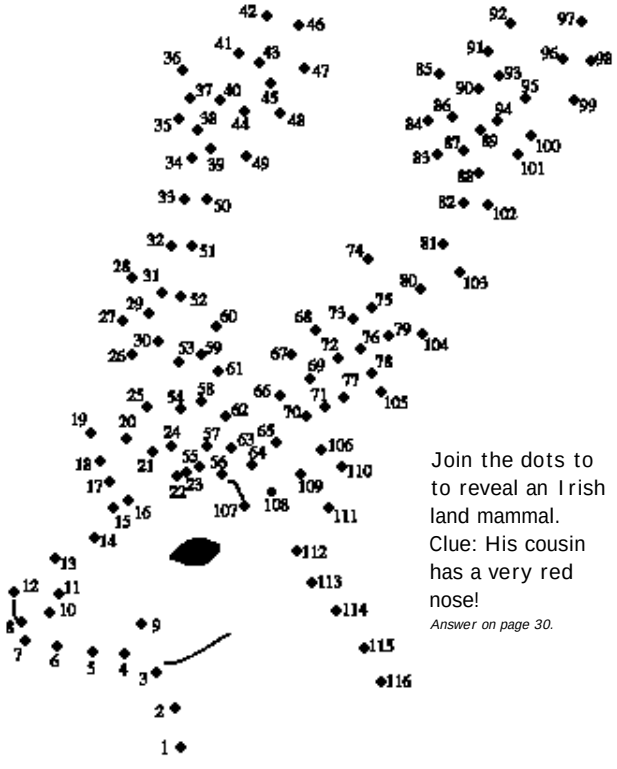
5. **_ D _ E _ _ _ _ E R**
(A person who places an ad)

6. **_ H _ A R E _**
(One who clips wool from sheep)

7. **G _ O A T**
(To rejoice unpleasantly)

8. **B _ A _ T _**
(Loveliness)

Dot-to-Dot



Join the dots to to reveal an Irish land mammal. Clue: His cousin has a very red nose!

Answer on page 30.

Barbecued Seafood with Chargrilled Vegetables

Photo: © BIM

To Prepare: Choose meaty fish like salmon, mackerel, herring, tuna, swordfish or whole Dublin Bay prawns. Deepwater fishing is now also giving us a whole new range of exciting fish like blue ling, siki, Greenland Halibut, redfish, mora and many more. Be adventurous and ask your fish retailer for them!

You need:

4 portions of fish of your choice
Olive oil
Crushed thyme leaves & garlic
1 red onion - quartered
1 aubergine - sliced
2 courgettes - cut lengthwise
8 large potatoes - part baked/microwaved
Salt & pepper

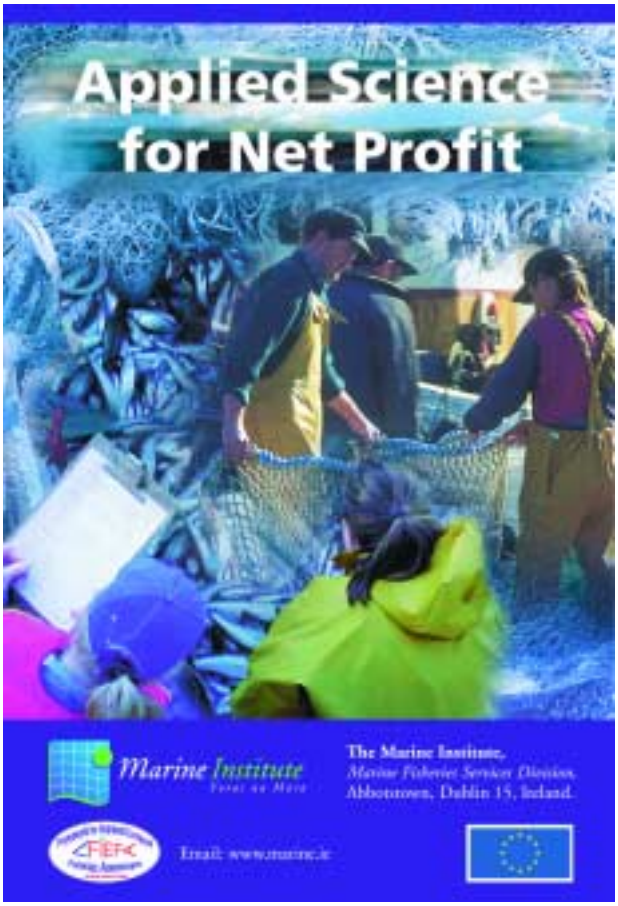
Method:

Add crushed thyme leaves, garlic, salt and pepper to the olive oil.
Marinate fish in seasoned oil for 10 minutes.
Brush potatoes and vegetables with seasoned oil and cook on heated barbecue.
Cook tuna and swordfish until seared on the outside and slightly rare in the centre.
Place other fish on foil before cooking.

Serve with yoghurt & herb sauce. Have with chilled apple juice.

Answers to Puzzles on page 29

Land Mammals in Ireland: a. fallow deer; b. hedgehog; c. fox; d. red squirrel; e. rabbit; f. badger; g. wild goat; h. pygmy shrew; i. field mouse; j. bat. k. otter.
Odd One Out: The Seal is not a land mammal. It lives in the sea.
Animal Connections: 1. voiceless; 2. regatta; 3. pottery; 4. stopwatch; 5. advertiser; 6. shearer; 7. gloat; 8. beauty.
Dot-to-Dot: A Deer



Climbing for Gold

Anne Marie and her friends taking a well-earned rest before continuing their climb.

Anne Marie O'Connor's Gold President's Award

ANNE MARIE O'Connor earned a Gold President's Award from President Mary McAleese on the 14th of February 2001. She is a 25-year-old student nurse from Wilton in Cork City. To earn a Gold Award she had to agree a challenge in four different activities with her President's Award Leader Maria Kidney of Cobh.

The four activities are:

- Community Service
- A Personal Skill
- A Sporting Activity
- A Venture Activity

For her Venture Activity, Anne Marie, accompanied by some friends, decided to climb the highest peak in each of the four provinces in four consecutive days.

The four peaks were:

Mweelrea in Mayo, Carrantuohill in Kerry, Lugnaquilla in Wicklow and Slieve Donard in Down.

This was a pretty daunting task and Anne Marie soon learned that it is so easy to underestimate the amount of time it takes to get from A to B in the mountains, especially when there are bog holes to be negotiated and when the mist decides to come down on you.

All of this and more happened on the way to climbing Mweelrea. Within half an hour of the summit – feeling exhausted in the mist, they suddenly met two equally exhausted climbers returning from the summit. "There is nothing up there except to turn around and come back" was the unhelpful contribution of one of the climbers. Ann Marie persevered and a half and hour later she and her friends found the small pile of stones that marked the highest point in Connaught, 814m above sea level.

Photos: © Anne Marie O'Connor

A spectacular bird's-eye view from Carrantuohill, Co. Kerry.

Unfortunately on day two her best-laid plans for climbing Carrantuohill came unstuck. The river - which was easily negotiable when Anne Marie checked on it a month previously before heading up her chosen route - was now in full flood. Eventually after exhausting all possibilities Anne Marie decided it was too dangerous and instead planned an alternative hike.

Lugnaquilla was conquered in day three amidst hail, rain and gales.

Day four climbing Slieve Donard would surely be better Anne Marie thought. You follow the river path and then the wall to the top. It's as simple as that, however, Mother Nature decided to intervene again in Slieve Donard and a storm kicked up in the middle of the night prior to the climb, reducing her campsite to a pile of nylon. Luckily the car was nearby where they managed to "nod off" a little before successfully climbing Slieve Donard.

Such are the experiences of earning a President's Award and that was just one of Anne Marie's four activities. If you want to read Anne Marie's diary of the adventure go to www.p-award.net and click into Participants Profiles.

Anne Marie (on the left) with her boyfriend; Dr. Martin McAleese and President McAleese; Anne Marie's mother, Mrs. O'Connor; and Maria Kidney, Anne Marie's Award Leader.

For further information please contact: The President's Award – Gaisce, The State Apartments, Dublin Castle, Dublin 2.
E-mail: mail@p-award.net

Sherkin Island Marine Station Environmental Award 2000

Photos: © Robbie Murphy

Mr. Matt Murphy, Sherkin Island Marine Station, presenting the award to Mr. Tom MacSweeney, Marine Correspondent, RTE.

By Matt Murphy

I WAS delighted to present the Sherkin Island Marine Station Environmental Award for 2000 to a person whose name and voice is recognised by everyone involved with the sea around our coast. I have known him for most of the 25 years of our marine station's existence. I have always admired his honesty and sincerity - in dealing with him everything is always straightforward. No hidden agenda. What you see you get. He has always displayed a wonderful love for the environment.

Whilst Southern Correspondent for RTE over 15 years he highlighted many environmental issues which were essential for the well being of our country. He has a wonderful nose for a story and above all is able to get to the kernel of it in a few seconds. He puts interviewees at ease and is able to extract what he wants from them in a painless way. He'd have made a wonderful dentist.

In 1989 he started the Seascapes Maritime Radio programme as a weekly 15-minute slot on Radio Eireann. It is now a half hour one full of news coverage of the marine sphere. Concern for the marine environment has always been foremost in this programme. What many may not know is that he is also a major contributor with his column to the UK fishing weekly "Fishing News", and the Irish fishing monthly "Marine Times". In both of these he highlights his concerns for fishing conservation.

I have no doubt in my mind that but for him many problematic issues in the environment - terrestrial and marine would not have been highlighted over the past 20 years.

I was delighted that Tom MacSweeney accepted the Sherkin Island Marine Station Environmental Award for 2000.