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Franciscan Abbey, Sherkin Island, Co. Cork. Photograph by Robbie Murphy

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Editorial

Ireland's Hidden Jewel

By Matt Murphy

THE present severe downturn in our country's economy means we must rethink and refocus our strategy on employment and wealth creation. Since the heady days of the Celtic Tiger we have totally forgotten and ignored the true value of many of our natural resources, in particular our seas. The EU and successive Irish governments have never had any sustainability policy in this regard, having allowed our marine resource to be plundered for its fish for over 30 years with no regard to the long-term consequences. If managed properly our seas could offer a valuable and sustainable means of employment in the deprived areas along our coasts, to the benefit of the National economy.

It is a pointless exercise to rake up the past and to continue to question why we gave away our right to control most of the seas around our coast. We must now look to the future and consider three main issues over which we still retain some control. The first is our inshore waters within a 6 mile zone of our coasts over which we have full jurisdiction. Yet we have no policy, or plan on how this zone can be developed and managed in a sustainable manner. There are over 2,500 small Irish boats fishing these waters for many fish species, as well as shellfish such as crabs, lobsters, crawfish and scallops. At first sale value, they contribute €40 million annually to the Irish economy. Some inshore fish and shellfish stocks are being overexploited and proper regulation, based on scientific research, must be implemented to ensure the responsible management and sustainability of these valuable stocks.

A proper management plan could help to conserve and stabilise inshore fish stocks within five years. This stability would mean that added value processing could take place locally creating much needed employment and secondly, increasing value-added activity within the local community. Our inshore small fishing boats are the mainstay of many small coastal communities and are a critical component in keeping families living in the local area. In their absence many will emigrate from areas and there will be nothing but part-time occupied holiday homes.

The second major issue that confronts us is aquaculture. Its development is static – in fact the overall tonnage of salmon produced in Ireland has significantly declined – and we have failed to introduce new species to a commercial stage. There has been no initiative for development taken since the recommendations of the Cawley Report in 2006. The Report stressed that aquaculture is the way forward to the creation of employment in coastal areas. Now with major government cutbacks, will we see any change? I fear not.

I fear that the demise of the Celtic Tiger may unfortunately ring the death knell to many, if not all, of the recommendations of the Cawley Report. It would be most unfortunate if this were to happen and go unchallenged. It is imperative that a robust

and adequately resourced aquaculture development strategy be implemented as a matter of urgency and priority.

It is most disappointing to learn that Udaras na Gaeltachta has decided to discontinue the activities of Taighde Mara Teo, its subsidiary company for technical and research support to the aquaculture sector. The reason it given for this decision does not stand up nor make sense. It says the Martin Ryan Institute of NUI, Galway and the Marine Institute have the necessary expertise and experience to fill the void, which of course they have not. This announcement by Udaras na Gaeltachta is so sad as Udaras is the only hope for communities along the west coast, where fishing was once the backbone of the local economy. Udaras prides itself on its community development initiatives and, as most of its areas of responsibility are coastal, it is in its interest to see development in these areas. It must continue to be at the forefront of aquaculture development along the west coast, as it has in the past and it should have a significant marine development section, with a team of experienced specialists in commercial fishing and aquaculture. Udaras created industrial jobs during the Celtic Tiger, few with a fishing base, but what now? The important thing to remember is that, whilst BIM have the major responsibility for development of fishing nationally, Udaras is an essential part in that development. One must ask how often BIM and Udaras have met to discuss the implications and recommendations of the Cawley report since it was published in 2006?

The third and final issue to be considered is by far the most difficult. The EU controls our waters outside the 6-mile limit so nationally we have little or no say in who gets what fish stocks and in what amount. The solution presented to resolve overfishing seems to be decommissioning. This may be fine for an individual vessel owner. It enables him to exit the declining fishing industry to clear his debts and perhaps profit to some degree. But has anyone worked out the social cost and economic cost to a fishing village or town in monetary terms. It is estimated that annually each decommissioned vessel is worth €500,000 to €750,000 to the wider community annually.

It must be recognised that there is a serious problem with overfishing and deliberate overfishing should be stopped. This means that fishermen must be pursued and made amenable to the law where there is criminal behaviour. The issue of overfishing is a far more complex problem than catching more fish than legally allowed and the simplistic approach, applied by regulators, does not adequately consider the fishermen's viewpoint. Regulations do not properly take into account the by-catch that inevitably comes aboard in the haul, especially discards. It is ridiculous that thousands of tonnes of good fish are dumped overboard and will not survive. Irish fishermen are expected to comply with the regulations and thousands of tonnes of good fish are dumped

overboard annually. However it is suspected that foreign vessels, fishing in Irish waters, take everything caught back to their home port.

What is unreal is that it costs over €10 million to police Irish vessels landing fish. There are 75 inspectors for approximately 250 vessels (those over 15 metres), that is one inspector per 3.3 vessels. This type of policing does not happen in France, Spain or the Netherlands. There should be a level playing field for all vessels fishing in Irish waters with regulations equally and fairly applied to all, regardless of country of origin. Maybe some of these inspectors should be deployed to foreign ports to check vessels landed fish which were caught in Irish waters?

Proper conservation is necessary but will not be achieved by crucifying Irish fishermen and accepting lax policing in other countries. If regulations are properly enforced for all, then some progress can be achieved. In parallel to this we must develop far more added value by having our fish landings in Ireland. This will increase employment and the value of our exports.

We have been informed that former Irish vessels are now fishing under the French flag in Irish waters and with the benefit of a very large French fishing quota. It is reasonable to assume that there must be some major differences in how the French authorities implement and administer its fishing regulations compared to Ireland.

What is now urgently needed is an in-depth discussion and agreement between Government, fishermen, BIM, Udaras and financial institutions as to how we can optimise the value of our fish stocks to the economy – inshore and offshore. It is essential in this task that fishermen have a united front and come together under one representative umbrella. For example, the IFA have been most successful in representing all interests in agriculture, serving large and small farmers. If nothing is done Irish fishermen will be a rarity in Irish waters in 10 years time – just like the com-crake is a rarity in the Irish countryside. Meanwhile, others will continue to fish our waters, reaping huge financial rewards and breaking every rule in the book with no benefit to our coastal communities.

BIM has an annual budget of €28 million to develop and market the whole fishing industry. As already mentioned, the SEPA (Sea Fisheries Protection Authority) has over €10 million for policing the fishermen and what they catch. This is an insane policy, which seems totally out of proportion. It puts the cart before the horse.

Our seas are a special jewel in our natural resources. Their richness has been neglected, abused and unprotected. We should be creating many more jobs from that richness and stop looking on it as the black sheep of the family – someone not to be mentioned or recognised.

We must act now.

Matt Murphy, Director, Sherkin Island Marine Station, Sherkin Island, Co. Cork.

By Oscar Merne

IN my last article, in Sherkin Comment No. 45, I briefly described the coastal birds which my wife and I found in November 2007 on the Bijol Islands in The Gambia, and on Les Isles de la Madeleine off Dakar in Senegal. In this article we move northwards from Dakar to the delta of the Senegal River, which forms the border between the West African states of Senegal and Mauritania. To get there from Dakar we took a sept-place taxi from Dakar to the UNESCO World Heritage city of St. Louis, the first French colonial city established in West Africa, on an island near the mouth of the Senegal River. The taxi was the usual 30+ years old Peugeot estate, shared with five other passengers, and the journey of c.230 km through mainly flat Acacia savannah took us three hours, on a surprisingly good highway, for the princely sum of €7. We made our base in an excellent small hotel (the Auberge La Louisiane) on the waterfront at the north side of St. Louis, from where we were easily able to walk around the old city, and watch waterbirds from the verandah.

We spent five days in northern Senegal, on three of which we visited two major wildlife sites – two days at the UNESCO World Heritage Parc National des Oiseaux de Djoudj, a couple of hours' drive up the Senegal River Delta, and one day at the Reserve Special de Faune de Guembeul, 12 km south of St. Louis, near the mouth of the Senegal River.



At the edge of the Sahara, Parc National des Oiseaux de Djoudj provides a welcome relief to migrating waterbirds.

Waterbirds migrating from Europe and the Arctic to wintering grounds in sub-Saharan Africa have a difficult journey south from Morocco because of the lack of freshwater wetland areas in the Western Sahara Desert. This was brought home to us as we viewed the desert from our high-flying jet on our way south from Brussels to The Gambia: absolutely nothing but sand, rock and gravel for over 2,000 km. Right at the southern edge of the Sahara the Senegal River and its delta provide welcome relief for the migrating waterbirds, and it is estimated that 3,000,000 make landfall (waterfall?!) in Djoudj before dispersing to wetlands further south.

Somewhat to my surprise, our visit to Djoudj in the third week of November was a bit too early for the tens of thousands of northern ducks (mainly Garganey and Pintail) which occur there in winter. However, there were large numbers of resident Afrotropical waterbird species, and also migrant waders, gulls and terns. The accessible parts of the national park which we visited is a mosaic of ponds, lagoon, channels, of varying trophic status and depth – some of open shallow water,

others with rich growth of reeds or water lilies. Each kind of water body attracted its own particular suite of waterbirds, adapted to exploiting the abundant food resources.

The first shallow, muddy lagoon we came to had a flock of European Spoonbills (some with colour leg rings from The Netherlands), Avocets, Black-winged Stilts, Temminck's Stints, and several common species of European waders, gulls and terns. The water lily ponds had Little Grebes, African Jacanas (lily-trotters), Moorhens, Purple Swampheens, Black Crakes and Malachite Kingfishers, while the reedbeds had Greater Swamp Warblers, Reed Warblers and cisticolas. The main channel, with abundant fish, supported thousands of Great White Pelicans and African Great and Long-tailed Cormorants.

Other common waterbird species seen in Djoudj included African Darters, Western Reef Herons, Grey Herons, Black-headed Herons, Black-crowned Night Herons, Purple Herons, Little Egrets, Cattle Egrets, Great White Egrets, Glossy Ibises, Egyptian Geese, Northern Shovelers, Black Crowned Cranes, Black Storks, Senegal

Waterbirds of the Senegal River Delta



African Great White Pelicans and African White-fronted Cormorants

Thick-knees, Spur-winged Plovers, Kentish Plovers, Marsh Sandpipers, Slender-billed Gulls, Grey-headed Gulls, White-winged Black Terns, Gull-billed Terns, Caspian Terns, Pied Kingfishers, and others which are common and familiar in Europe.

In addition to these waterbirds many landbirds were also seen, in the open dried-out areas of the marshes and in the tamarisk bushes and a few patches of mixed woodland.

The most numerous birds-of-prey at Djoudj were Ospreys, Marsh Harriers, Black Kites and African Fish Eagles.

The Reserve Special de Faune de Guembeul, while located in the delta of the Senegal river, is mainly dry Acacia scrub, typical of the Sahel zone. Its main purpose is the captive breeding (for release into the wild) of endan-



A rich growth of water lilies in one of the ponds at Parc National des Oiseaux de Djoudj.

gated Sahelian antelopes (e.g. Arabian Oryx, Addax, Dama Gazelles), and tortoises, but included in the reserve is a large shallow lagoon. Here we found a flock of c.190 Greater Flamingos, c.210 European Spoonbills, 400+ Avocets, 200+ European Coots, some Great White Pelicans, European Shovelers, Black-winged Stilts, Ruffs, Greenshanks, Ringed Plovers and Stints. In conclusion, those interested in coastal and wetland

species of birds will be able to see a great variety, and impressive numbers of Afrotropical and Eurasian species on a visit to the coasts and estuaries of The Gambia and Senegal, particularly to the sites mentioned in these two articles.

Oscar Merne retired from Ireland's National Parks & Wildlife Service in January 2004.

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Endangered Sahelian antelopes, including the Addax (above), are bred in the Reserve Special de Faune de Guembeul, for release into the wild.

Biodiversity offsets – the way forward?

By
William Milliken

THE offset concept is an attractive one to the justified sinner. No more worries about swelling carbon footprints as one jets away to the Caribbean to burn off the winter blues. A quick web transaction and the damage is undone: trees planted, wind farm erected, problem sorted. Or so the carbon offset propaganda would have you believe. There's nothing very new about this idea: penitents have been assuaging guilt with donations and sacrifices since the invention of conscience. Treachery, greed, infidelity – there's nothing you can't offset if you know the right broker, so why not biodiversity?

Why not indeed? Wildlife has an unfortunate habit of getting in the way of development, and although statutory compensation and avoidance measures are now widespread and sophisticated, at the end of the day it usually ends up on the losing side. For more 'enlightened' organisations

rising to self-imposed challenges of 'net positive impact on' or 'no net loss of' biodiversity, this represents a significant hurdle.

The concept itself is simple. First, calculate residual impact after working through the 'mitigation hierarchy'. In other words, once you've decided what you can leave alone, how you can modify your operation to minimise the damage on what you can't (or won't) leave alone, and how much you'll be able to restore once you've finished, it should be possible to estimate how much biodiversity loss you'll be responsible for. Then all you have to do is design a conservation or restoration project whose benefits are as great as – or greater than – your impact.

This, of course, is where things become difficult. Firstly, biodiversity is so complex and frequently so poorly understood that it's very hard to make a meaningful estimate of loss. To measure and monitor all its components would be unrealistic and some sort of proxy measure is needed. Simplest, and most commonly

used, is the 'habitat hectare' – destroy a hectare of oak woodland and you more-or-less know what's going. But it's rarely as simple as that, as one is usually dealing with a complex mixture of habitats and species, some of which may be impacted more than others.

Secondly, there's a strong element of prediction involved. One can never know how successful a restoration scheme is likely to be, and, without detailed understanding of 'background rates' of biodiversity loss or gain, rarely predict with accuracy what the situation would have been like if the development had not gone ahead. Disturb that oak forest instead of felling it and the biodiversity loss will obviously be smaller, but how to predict what it will be? And how to know whether the rare or important species that it may have harboured will still be there?

Estimating biodiversity loss also depends on one's perspective. From the conservationist's point of view the loss of a small mussel bed may be no terrible tragedy in the wider scheme of species



Constructing the new Rochedo hydroelectric dam in Mato Grosso State in the Brazilian Amazon. Can the biodiversity impacts of such projects really be offset?

extinction, but if it's been providing you with food for generations you'd be justified in regarding it as significant. So estimates not only need to take into account a range of perspectives, from local to national to international, but also the wider 'ecosystem services that biodiversity provides: food and medicine for local people, watershed protection etc.

On the other side of the coin, estimating the benefits and suitability of whatever conservation measures may be proposed as offsets is even more complex. Firstly there are technical difficulties of demonstrating 'additionality', i.e. showing that the outcome is additional to what would have happened in the absence of any specific conservation measures. Secondly, that the threats avoided aren't just shifted elsewhere (e.g. logging companies moving out of the conservation area and setting up shop down the road. Thirdly, ensuring that the ben-

efits are felt by all the relevant stakeholders: if in compensation for the lost mussel bed another threatened one is conserved 100 miles away that is not much good to the local people who subsisted off it.

In many cases it may prove impossible to come up with a local, appropriate solution that exactly balances the impact. So is it acceptable to develop an 'out-of-kind' offset as opposed to an in-kind one, conserving something else entirely? Perhaps, if the impacted habitats or species are not particularly threatened or significant in the local context, but with this approach somebody has to make difficult value judgements. Who's to judge, and how to work out whether, in biodiversity value, a hectare of threatened marshland is worth one, two or three hectares of upland heath?

Technical challenges aside, there are philosophical or perhaps moral questions over such a process. Critics argue that offsets run the risk of pro-

viding developers with a 'licence to trash', in much the same way that carbon offsets may be thought as a licence to avoid the underlying problem of excess emissions. Proponents argue that development is inevitable and that it is more responsible to help establish mechanisms for minimising impact than to pretend the situation can be otherwise. The reality must lie somewhere in between. Development is indeed often inevitable, and with it irreparable damage and loss. Offsets do have a role to play in certain circumstances, but only once the value of what's at risk has been given due consideration, and options for avoidance and mitigation properly considered.

William Milliken is Head of the Tropical America Regional Team at the Royal Botanic Garden, Kew, London, UK, and formerly a volunteer at Sherkin Island Marine Station.

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Edinburgh, Scotland. The city got the name "Auld Reekie" (Scots for Old Smokey) because of the columns of smoke that spewed into the air when buildings were once heated by coal and wood fires.

Auld Reekie and the Lady Isabella

By Daphne Pochin Mould

MEN (and women) today may be shedding crocodile tears over the mess they seem to have made of the planet, but

greed and grab is part of human nature. The world's goodies are there for the taking, so why not take them; timber or coal, oil and nuclear power. The old hunter-gatherers were not too destructive of the places they lived, though far better than we in making a

life of what they could catch or pick. But learning to farm meant clearing land, felling trees – possibly leading to erosion; farm animals ate up the grass, being in more confined areas than wild ones do.

It was discovered that the seeds of certain plants could



The Lady Isabella, Isle of Man: a huge water wheel, once used to remove water from a mine.

be ground between stones, mixed with water and heated to make bread. But a hand mill (quern) is hard work and slow, so men looked for an easy way out, more especially as corn crops were getting bigger. They turned to the two great natural sources of power, to which we now must return, wind and water. The water mill, with its paddle-shod wheel, turned by a driving stream of water, turned the millstones, and in the heel of the hunt, produced thousands of tons of flour at each harvest. The wind mill used the wind to do the same job.

Sometime, somehow, people found that wood burned

with restricted air, would char and that this charcoal would give a very intense heat. And that certain rocks heated up produced metals – copper, tin, iron. The Bronze Age copper miners of Ireland worked small mines – Ross Island at Killarney has a very early one, Mount Gabriel's sides are dotted with little workings. But copper is too soft to make hard tools, you must add tin to make bronze and you have a bronze weapon. Tin was found in Cornwall (and continued to be mined there 'til the mid 20th century). Ireland then was heavily forested, with plenty of good timber for ship building. So the Irish would set off by sea to trade with the Cornish, bartering what they had – hides, woven stuffs, maybe shaggy Irish hunting dogs.

And so it went on, using up mineral resources, beginning to work coal, and cutting down the forest. In England charcoal burners coppiced, letting the trees regrow to provide fresh raw material, but in Ireland and Scotland they clear felled, leaving the mountains bare, while the woods smelted imported iron ore.

And there was need for vast amounts of timber for houses and for ships. By Nelson's time, good oak for the naval ships was becoming scarce, like oil today. One Admiral was urging everyone to plant acorns. You needed many mature oak trees to build one man o'war. "Heart of oak are our ships; jolly tars are our men". And the world's sea were full of ships, of all sorts and sizes, all built of timber for the most part, and, going about their business with, at most, a compass and a sextant, and a knowledge of the sea.

Mining meant going deep and dealing with both flooding and ventilation. The first steam engines appeared in the 18th century – massive beam engines, whose houses you can still see at old mine sites like Allihies. They could pump water out of deep mines and drive ventilating fans. On the Isle of Man a huge water wheel, named for a local lady, The Lady Isabella, pumped the mine below dry, thus using water power to remove water. She is still a showpiece of the island. But steam engines soon became mobile. Railways arrived and you are into the Industrial Revolution of smoking factories and heavily polluted rivers, badly paid, over worked men and women and children in the new factories, some still powered by water, some by steam engines. A black cloud hung over England's industrial districts, and was still there into the 20th century. London had its "pea soup" fogs. People on the other side of the Firth of Forth looked across at Edinburgh and saw the smoke rise as folk stoked up their fires in the evening. Auld Reekie (Old Smokey) they called Scotland's capital city. It was the age of coal and my grandmother told me that as a child she worried about how we would keep warm when the coal gave out. Just as we now worry over oil.

By and large, it's all a history of grab, using up resources without a thought for the future. That's human nature, to take and not give back. Can we reverse it now? It seems so much against our own nature to start doing something for the good of the planet and even for our own greedy selves.

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Moreton Bay Marine Park



Moreton Island east coast from Cape Moreton – Mount Tempest on right skyline.

By Anthony Toole

ABOUT an hour's drive either side of Brisbane are two of the most popular beach resorts in Australia. To the south lie the brash excesses of the Gold Coast, while to the north is the more restrained sandy strip of the Sunshine Coast. Bounded by the two, and reaching from the city's eastern seaboard to a line

some three miles beyond the islands of Bribie, Moreton and North and South Stradbroke, is the Moreton Bay Marine Park. Encompassing several hundred reefs, rocks and islets, the area is listed as a wetland of international importance under the Ramsar Convention.

Around 3500 wading birds of 16 species are resident in Moreton Bay. A further 34 species, comprising 60000 individuals, pass through on

their annual migrations from as far north as Arctic Siberia. The bay and its islands are important feeding and resting points along the East Asian – Australasian Flyway, one of eight major migration routes in the world.

The seas around Moreton Bay also witness the migration of some 7000 humpback whales from the Antarctic to the Great Barrier Reef in June, and their return southwards between August and October. Dolphins and turtles regularly swim here, while dugong graze the sea grasses in the shallower waters.

With its proximity to Australia's third largest sea port, and a local population of two million, the potential pressures on this valuable ecosystem are enormous. The task of balancing the requirements of the wildlife with those of recreation for the city dwellers falls to the Queensland Parks and Wildlife Service (QPWS). As Moreton Bay District Manager, Miles Yeates told me, "We have a unique fauna so close to a major city, which is managed through a Marine Park zoning plan that allows sustainable development and protects wildlife."

Moreton Bay Marine Park is divided into a patchwork of conservation, habitat and protection zones and is surrounded by several island National Parks, guarded by legally enforced restrictions, set within an area for general recreational use. The largest

of the National Parks occupies 98% of Moreton Island, one of the biggest sand islands in the world. Less well known than Fraser Island, about 150 kilometres to the north and less visited than its southerly neighbour, North Stradbroke, Moreton Island is largely a wilderness. It has no surfaced roads and movement around the island is on foot or by 4WD vehicle, either along the beaches or via very rough, sandy tracks through dense forest and scrub. Only at Cape Moreton, on the northern tip, is there any rock, made up of a basalt bed overlaid by sandstone, on which stands Queensland's oldest lighthouse, built in 1857. The view to the south from here takes in the 40-kilometre curve of the island's east coast and the inland forests, dominated by Moreton's highest hill, Mount Tempest, at 285 metres, claimed to be the highest sand hill in the world.

In 2002, lightning set fire to the northern end of Moreton Island, destroying 12000 hectares of vegetation as well as the viewing platform at the summit of Mt Tempest and most of the wooden steps leading to it. Working closely with the traditional owners, the Quandamooka People, the QPWS managed the reconstruction. The new track and platform were opened in September 2005.

"Fire management is carried out by means of controlled burns at a variety of intervals," says Miles Yeates.



Flowers (*Platysace ericoides*) growing in the sand of The Desert, Moreton Island.

"This helps in the preservation of the different habitats and protects the townships and resort adjacent to the park from wildfire."

Though there are no longer any Aboriginal communities on the island, the evidence of historical occupation needs to be preserved, and an indigenous ranger oversees the shell middens and other occupation sites to ensure that they remain undisturbed. Sites of more recent historical interest, such as WWII defensive gun emplacements are also preserved.

Feral pigs are pests that can devastate large areas of vegetation, so these are gradually being removed using the services of a trained poisoner. "A wheat-and-molasses bait is buried under the sand, so that only the pigs can find it. The poison remains active for only five days, so we are confident that other animals are unaffected. Two years ago, we had 400 pigs. This number has now been halved, and we can anticipate their complete elimination if good results continue. Goats, which also used to roam the island in large numbers, are now few

and far between, with only a few known on the island, mainly in the south.

"So far, there is no population of cane toads, though occasional individuals have been found, probably arriving from the mainland in timber piles. One was recently discovered in the mouth of a dead snake."

Controls are also needed on the many visitors to Moreton Island. Numbers have increased by 15% each year over the past five years. Most guided tours stress the importance of the ecology. Independent travellers require a permit if bringing a vehicle or if they intend to camp. Certain beach areas, notably that around the township of Cowan Cowan, are closed to vehicles, in consideration for the local children. Restrictions in other areas are being considered.

While activities such as sailing, fishing and diving can be carried out in most areas of Moreton Bay, there are conservation zones, notably to the south of Moreton and Stradbroke islands and to the west of Bribie Island, where restrictions apply. Several regions of the shallow sea



Mangroves growing along the margin of Moreton Bay.



Oystercatchers on the shore – Moreton Island.



North Point – Moreton Island.

between Moreton and Stradbroke have been declared “go slow” areas, in order to protect the turtles and dugong that feed here. In a small number of protection zones, boating and diving are allowed, but nothing else. The removal of anything from these zones is strictly prohibited. Maintenance of water quality in the bay is also important.

Grey nurse sharks are among Australia’s most endangered species, their numbers being severely affected by diving and fishing. It has been estimated that, without conservation measures, they could become extinct in forty years. Three special areas to the east of Moreton Island, each with a radius of 1.2 kilometres, have been declared special protection zones for these sharks.

Flinders Reef, which can be seen to the north of Cape Moreton, contains nearly 120 coral species within an area of 10 hectares. This is one-third of the total number found on the entire Great Barrier Reef. This tiny reef has a buffer zone, which extends 150 metres from its protection

zone. Special boat moorings have been set up here to prevent damage to the reef caused by anchors. The number and size of boats that can be moored here are set within strict limits.

The waters of Moreton Bay are continually patrolled by the QPWS to ensure that the regulations are adhered to.

On Moreton Island, with some 300 000 visitors each year, some restrictions in numbers may be required in coming years. Campgrounds are being created which allow

zero discharge of effluent. Toilets are sealed, electricity is generated by solar panels and water is removed by evaporation. Brisbane is at present growing faster than any other major city on the continent. Without continued careful management, the pressures on the unique collection of wildlife in Moreton Bay can only increase.

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



Banksia flower.



The Desert – Moreton Island.

Photos: © M.A. Toole



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SMOOTH-HOUNDS

(Triakidae: *Mustelus*)

in Irish and Northern European Waters



Photo courtesy of Edward Farrell, Dept. of Zoology, UCD

Starry Smooth-hound *Mustelus asterias*.

By Declan T. Quigley

SMOOTH-HOUNDS are small to medium sized sharks (usually <2m T.L.) which belong to one of the largest families of sharks (Houndsharks: Triakidae) comprising 9 genera and at least 42 known species. Some species are very difficult to identify and many species remain to be described. Smooth-hounds are found world-wide in warm and temperate coastal waters (mainly), while a few species are found at depths of >2000m. Many species are endemic with very restricted distributions while some species are locally abundant and others extremely rare.

Although at least 24 species of the genus *Mustelus* have been described, only 2 species have been recorded from Northern European and Irish waters to date: Starry Smooth-hound (*M. asterias*) and Smooth-hound (*M. mustelus*). A third species, the Black-spot Smooth-hound (*M. punctulatus*), is found in the Mediterranean (but not the

Black Sea), southwards from southern Portugal to South Africa. The two Northern European species have long been confused with one another, aided and abetted by various conflicting identification keys. While the morphological differences between them are relatively small, the species also differ in terms of their embryonic development and were recently shown to be genetically distinct using both DNA and protein electrophoresis tests. Table 1. summarises the main morphological, meristic and embryological differences between *M. asterias* and *M. mustelus*.

Smooth-hound (*M. mustelus*)

Although there are many anecdotal references dating from 1774 and throughout the 1800s to the occurrence of "Smooth-hound" (under various synonyms: e.g. *Squalus galus*, *S. mustelus*, *M. vulgaris* & *M. laevis*) from various locations around the Irish coast, none of these can be attributed with certainty to

M. mustelus. Indeed, the few references that provide descriptive details clearly relate to *M. asterias*. Despite the fact that *M. asterias* (as *M. stellatus* & *S. himulus*) was definitively identified from Irish waters by William Thompson in 1838, many authors subsequently (up until the late 1950s) continued (probably erroneously) to regard *M. mustelus* (or *M. vulgaris*) as the dominant species. Indeed, it was only acknowledged in 1969 that the status of *M. mustelus* required investigation and that *M. asterias* was (probably) the commoner species in Irish waters. Perhaps all of the specimens registered as *M. mustelus* (or *M. vulgaris*) currently housed in the Natural History Museum in Dublin and dating from the late 1800s should be re-examined.

Although *M. mustelus* has been recorded from UK waters, albeit with much less frequency than *M. asterias*, there are still few, if any, definitive records from Irish waters. Indeed, in general, *M. mustelus* appears to be rather

uncommon throughout Northern European waters, an area that may represent the northern-most limit of its natural range (UK to Mediterranean, Morocco, Canaries, possibly Azores, Madeira, Angola to South Africa including the Indian Ocean coast).

The current UK rod & line-caught (boat) record for *M. mustelus*, weighing 12.7kg, was captured during 1969 off Heacham, Norfolk. However, a pregnant female, weighing 23.5kg (1.65m T.L.), was captured by a commercial fishing vessel in the Adriatic Sea during March 2000 and an even longer specimen, measured 1.73m T.L. was reported from South Africa during 1997.

Starry Smooth-hound (*M. asterias*)

The natural range of the Starry Smooth-hound extends from the North Sea southwards to the Mediterranean and off NW Africa (Canaries and Mauritania). The species is generally found in relatively shallow inshore waters, from the intertidal down to depths of >100m.

with the stipulation that the body must be supplied to the ISFC for identification purposes. Following a significant increase in the number of specimens submitted during 1985, the minimum specimen weight was increased to 3.175kg (Figure 1). Since then, the annual number of specimens recorded has decreased dramatically. Although it has been suggested that this decrease may be due to over-exploitation, there is no evidence that the species is (or has been) specifically targeted by commercial fishermen. It is possible that the number of exceptionally large specimens (> 3.175kg) in Irish waters may be relatively low (>90% of the specimens weighed < 4.5kg) and/or there may be an increasing reluctance on the part of anglers to sacrifice specimens on conservation grounds. All of the specimen "Smooth-hound" submitted to date have been identified as *M. asterias*, including the current Irish Record, weighing 7.521kg, captured off Carne, Co Wexford in September 2000. The current UK Rod &

coast [e.g. Cahore (40.4%) & Tinnabeara (22.1%)].

M. asterias is considered to be a specialist feeder on crustaceans, including hermit crabs (*Anomura*) occupying empty whelk shells (*Buccinum undatum*). It is interesting to note that almost 80% of the specimens recorded by the ISFC were captured on "crab" baits. Indeed, >97% of its diet on the UK side of the Irish Sea was found to consist of crustaceans and particularly (>52%) Swimming Crabs (*Liocarcinus* spp). Although at least 14 species of *Liocarcinus* have been recorded from Irish waters, it may be significant that the east coast of Ireland accounts for a significant percentage (20%) of national commercial landings of Velvet Swimming Crab (*L. puber*). Indeed, the same region also accounts for 75% of commercial whelk landings. Perhaps the distribution of *Mustelus* spp. in Irish waters may be related to the distribution of potentially important prey species such as *L. puber* and *B. undatum*.

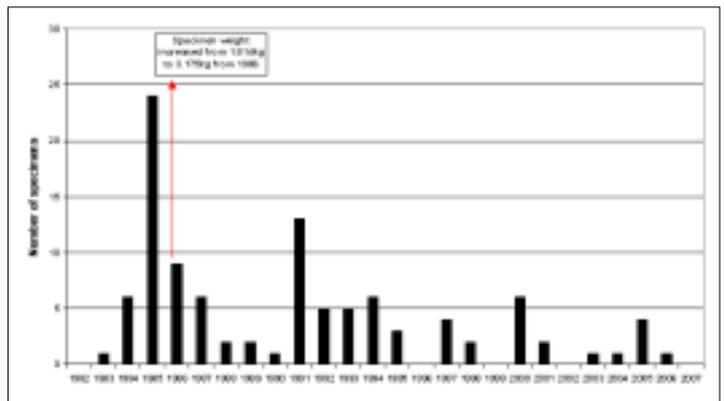


Figure 1. Annual numbers of specimen (>3.175kg) Smooth Hound (*Mustelus asterias*) N=104.

In 1982, "Smooth-hounds" (including *M. mustelus* & *M. asterias*) were included for the first time by the Irish Specimen Fish Committee (ISFC) in its list of eligible rod & line caught species (at a minimum qualifying weight of 1.814kg)

Line (Boat) Record, weighing 12.757kg, was captured during 1998 off Minehead, Somerset (Bristol Channel).

All of the specimen *M. asterias* recorded by the ISFC were recorded between April and October inclusively. However, almost 90% were recorded between May and August including >50% during June, which may indicate a summertime inshore breeding migration.

Based on anecdotal references, *M. asterias* appears to occur on several parts of the Irish coast. However, >99% of specimens recorded by the ISFC to date have been captured off the east coast (Irish Sea), especially from Co's Wexford (80.8%), Wicklow (12.5%) and Dublin (5.8%). The species appears to be particularly common off certain parts of the north Co Wexford

Conclusions

Although the biology of *M. mustelus* and *M. asterias* has been extensively studied in the Mediterranean and off NW Africa, until recently very little was known about the species' biology in Northern European waters. A joint research project, led by scientists from the Central Fisheries Board (Willie Roche) and the Department of Zoology, University College Dublin (Edward Farrell), is currently investigating the biology of both species in Irish and adjoining UK waters (www.cfb.ie).

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Table 1. Identification characters of Smooth-hound species in Irish and Northern European waters (*Mustelus mustelus* & *M. asterias*)

Identification Character	Smooth-hound (<i>M. mustelus</i>)	Starry Smooth-hound (<i>M. asterias</i>)
Colouration (Spots)	no white spots (occasionally dark spots)	white spots usually present on dorsal surface and along lateral line, but may be faint or absent
Intermarginal Width (IMW) as % of T.L.	2.4-3.0%	2.0-2.6%
Ratio of IMW:Total Nostril Width - NOW (Intermarginal ratio)	broad Intermarginal (IMW > 1.5 - 1.7)	narrow Intermarginal (IMW 1.2 - 1.3)
Labial Furrows	upper jaw labial furrows (U.L.A. - 1.4-2.1% of T.L.) slightly longer than lower jaw labial furrows (L.L.A.)	upper jaw labial furrows (U.L.A. - 1.8-2.5% of T.L.) considerably longer than lower jaw labial furrows (L.L.A.)
Dermal denticle shape & length of ridges	large, oval or weakly hexaplate, ridges extending their entire length	denticles broadly lanceolate, ridges extending at least half their length
Dorsal fins	unringed	unringed
Origin of 1 st dorsal fin in relation to pectoral fins	origin of 1 st dorsal fin above and behind the rear margin of the pectoral fins	origin of 1 st dorsal fin above and in front of the rear margin of the pectoral fins
Embryonic development	ultraplacental - pseudo-placental (embryo nourished through yolk-sac placenta)	acoultriplacental - aplacental (embryo nourished by a distinct yolk sac without a maternal connection)

Hidden benefits of aquaculture in the US

By Mike Ludwig

WE have come to rely on aquaculture to provide a growing share of our seafood because the oceans can no longer sustain the hunting and gathering fishing practices. Farming the oceans is needed to obtain the food that the growing population seeks. Today, most of the salmon, shrimp (prawns) and shellfish we eat are farm reared. But, aquaculture has been reported to destabilize the environment and degrade or diminish natural resources. While there are sites and situations where this has occurred in the past, the move is toward it being environmentally compatible or even beneficial to its sur-

roundings. But, before looking at aquaculture impacts, it is important to consider how farming evolves, keeping in mind that aquaculture is farming in an aquatic setting.

Farming starts when someone identifies potential crops from wild species growing around them. Oysters are a good example. Our forefathers were able to gather oysters and use them as a food source with little effort. (Oysters can't scuttle or hop away and they don't bite.) Snap them off their perch and toss them into the fire and a meal is ready. The next step was to bring the crop closer to the users by putting them in more accessible sites. These efforts probably included successes and failures which allowed the farmers to dis-

cover what oysters need for habitat. As oysters were used, the farmer would collect more to maintain the crop size. In the US, transplanting oysters grew to involve shipping them all along the Gulf and eastern seaboard. In Europe, it means bringing in oysters and placing them in local waters to acquire the desired taste. When successful spawning occurred at a new site, the farmer had control of his crop from eggs to consumer. (This chain of crop development is often used to describe most of the species now farmed.)

In the wild, aquatic resources utilize the available habitats (niches). The oyster bed is a diverse ecological community. Oysters tend to grow better on oyster shells

so once an oyster bed starts it frequently grows on top of itself. However, as oyster harvesting progressed, attempts were made to exclude all but the oysters and harvest a large crop. In attempting to limit all but oysters on a bed farmers often lost sight of the ecological value of the natural oyster bed. Fortunately, the ecological composition of the oyster reef continued. Beginning in the 1960s, that ecological value began to be recognized and used. Mitigating habitat destruction by creating or enhancing oyster beds became a management tool. Initially, the intent was to maintain oyster production but the use of the mitigation area by other aquatic species quickly caught resource managers' attention and the program was expanded to include providing benefits to other shellfish (northern quahogs and blue mussels, juvenile lobsters and other crustaceans, benthic and pelagic finfish as well as waterfowl).

The most productive habitats are ones with lots of different elements. In most shallow water areas, natural habitats are wave washed flats with little rising above the seafloor. Next time you are at the beach at low tide look for any objects that rise above the bottom. Notice that they have more things growing on them than their surroundings and productivity is increased. (Think of coral reefs and the almost barren seafloor around them.) Shellfish beds and aquaculture equipment provide habitat diversity. Their presence attracts native resources and enhances ecological functions and values. Oysters have spaces between themselves, shell surfaces to attach to and currents sweeping the area. Small organisms hide among the shells, plants and animals attach to them, larger animals search the reef for food. The reef is a community.

The enhanced productivity created by a concentration of



Opening or "shucking" oysters.

shellfish extends from above the bed to below the seafloor. Predators roam the bed for food. Hard clams (the clam usually eaten raw when small) and soft shell clams avoid predators by moving into the sediments below the oysters. Algae, worms and other scavengers use the waste materials from the community while other species range around the crop and cages feeding on those organisms. Some farmers take advantage of the herbivores, using them in their cages to eat the algae and maintain water circulation. This multi-use of the bed creates vertical layers of potential crops. Fishermen catch the finfish and crustaceans. Shellfish harvesters can remove the oysters and dredge for the clams.

Finfish aquaculture can have the same effect on an area. Net pens full of fish create a habitat in the water column. The cages slow water movement, provide places where organisms can hide in the netting. Floating structures are not very common in nature, but they quickly become habitats. Finfish need to be fed but not all the food gets eaten by the crop which increase the availability of food for the neighbours. Yes, sloppy farmers and farms in areas where currents don't disperse excess food create problems. But, these are signs of bad management not evidence that aquaculture is bad. Farmers now use television cameras to monitoring feeding and stop dispensing it when the fish stop feeding

And, we have seen juvenile Atlantic butterfish move into a summer flounder net pen farm to eat the dispensed fish food. They grew so large they couldn't get out of the net. The farmer wound up with two harvestable crops!

To eliminate the use of sites with undesirable environmental impacts, resource managers such as the State of Maine have developed farm site identification and monitoring programs. These programs help farmers select sites with high probability of environmental compatibility. Monitoring limits the likelihood of mistakes and degraded water quality. The Maine program has been in place for over a decade and has been a help to salmon farmers. Similarly, the National Marine Fisheries Service developed an aquaculture development guide. It was designed to allay fears about aquaculture and help farmers explore potential sites.

Isn't it curious that some people say the best oysters are farm reared but the best fish are wild caught? The need to protect aquaculture sites from polluted waters and farmers teaching their fish to eat soybeans rather than other fish, indicates that farmers are proving their worth. One might want to consider that knowing where dinner was swimming last night and what it was eating throughout its life is a good thing.

Mike Ludwig, Ocean & Coastal Consultants, Trumbull, CT USA.

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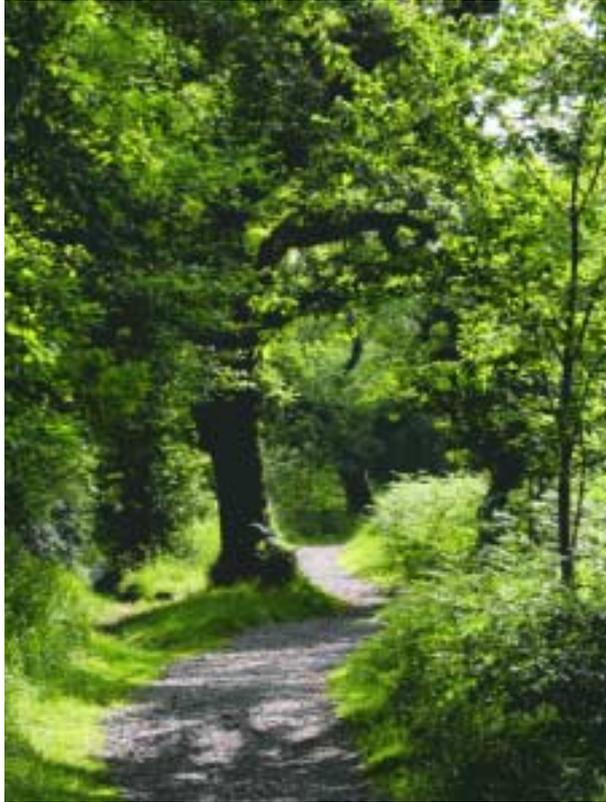


Photo: © Robbie Murphy

TO maintain the environmental quality of our towns and countryside we need to plant more trees to replace those lost through old age, urban development and changes in agricultural practices. The following suggestions show how trees can be properly planted and maintained in order to grow into healthy specimens.

Suitable sites for tree planting include open spaces in housing areas, land around car parks, churches, schools, supermarkets, factories, town dumps and eyesores, and along streets and roads.

What to Plant

Once a site has been selected for tree planting, the most suitable species for planting on it must be chosen. The choice of species should be based upon the following considerations:

The suitability of different species for the physical conditions of the site – soil type, drainage, exposure, etc.

The suitability of different species for the use and size of the site – there must be enough space for trees to develop without pruning. Some trees may not be suitable for certain situations – trees with large leaves may make roads and pavements slippery.

The suitability of different species in the landscape

Knowledge of those trees that grow well in the area, on similar sites, is a useful guide to what to plant. This ensures that new trees blend with the landscape and have a better chance of surviving with minimal maintenance.

In a rural setting ornamental garden trees and shrubs should be avoided as they look incongruous.

Sizes of trees usually available are:

- forestry transplants – 0.5m in height;
- whips – single stem to 1m in height;

Both these sizes are suitable for rural areas.

Nursery stock to 2.5m in height, is recommended for general amenity planting and obtained as standards (with clear stems) or 'feathered' (branches to ground level).

Where vandalism may be a problem, the larger size of trees known as 'heavy standard' nursery stock should be planted, with the added protection of a tree guard and a stake extending into the crown of the tree, to which the leading shoot is tied.

When to Plant

Planting is carried out when the trees are dormant,

from November to March, but not when the soil is frozen or waterlogged. Evergreens are best planted in September or from late April to early May. Container-grown trees can be planted throughout the year, but they should be kept well watered after planting.

How to Plant

The following directions cover the planting of nursery standards:

Keep the roots of bare-rooted trees moist, while awaiting planting, in a polythene sack or loosely dug to a trench with the roots covered by earth.

Prepare the tree pit before trees are delivered to the site. It should allow good clearance for the roots and should be at least 600mm (2ft) wider and 150mm (6in) deeper than the root system. The bottom of the pit should be forked over to break up the subsoil.

Drive tree stakes slightly off-centre into

the bottom of the pit. Stakes should be about 2400mm (8ft) long and should be treated with a wood preservative other than creosote to not less than 150mm (6in) above soil level.

Remove any containers from the roots. Cut back broken roots to sound growth. Place the tree on the side of the stake away from the prevailing wind. Plant the tree at its original soil depth as shown by the discolouration at the base of the trunk. Backfill with good quality topsoil or a mixture of 7 parts topsoil, 3 parts peat, 2 parts sand and 200g (7oz) fertiliser (in the ratio of 10N:10P:10K). Fine soil should be placed around the roots and the tree gently shaken to fill any air pockets. Soil should be firmed layer by layer taking care not to damage the roots.

Secure the tree to the stake with a tree-tie just below the lowest branch and also just above ground level. If proprietary tree-ties are not available, ties can be made by inserting stout galvanised wire through a length of rubber hosing, twisting it around the tree and nailing it to the stake.

Water the tree after planting, using at least 22 litres (5 gallons) of water per tree. Mulch the area around the tree after watering, with a 100mm (4in) depth of farmyard manure, garden compost or leaf mould.

If using a tree guard, wrap it around the tree and secure it to a stake, making sure it does not chafe the lower branches. A gap should be left between the base of the guard and the ground so that rubbish and weeds can be cleaned out.

Maintenance

It is important to consider the level of maintenance that is available before a tree planting scheme is devised. There is little point in embarking on an ambitious planting programme if there are no maintenance skills available to see the scheme through to fruition. A

maintenance programme should be followed for at least the first two growing seasons after planting and it can be based on the following checklist.

Tree stakes and ties should be checked regularly. Loose stakes should be firmed and broken ties replaced as soon as possible, otherwise chafing of the bark and looseness at the roots will cause permanent damage to the tree.

Weeds and rubbish around the base of the trees should be cleared regularly.

A fertiliser should be forked in around the trees in their second season of growth or if their growth appears to be checked during the first season after planting. Proprietary tree and shrub fertilisers can be used or any of the general agricultural fertilisers without high nitrogen content.

Watering should be carried out regularly during

the first two growing seasons. There is often a dry period from late May to June and many newly planted trees die at this time through inadequate watering. During dry weather the soil around young trees should be soaked thoroughly at least every week with about 22 litres of water per tree, with the soil lightly pricked over to reduce subsequent evaporation, or else mulched with peat, bark chippings or manure.

Broken branches should be cut back to a strong shoot or to the main trunk and the wound should be painted with a sealing compound, such as Arbrex.

Any dead or vandalised trees should be replaced at the end of the growing season. Vandalism is discouraged if the planting has the appearance of being well-maintained and if damaged trees are always replaced.

Further Information

The Tree Council of Ireland, Royal Hospital, Kilmainham, Dublin 8
Tel: (01) 679 0699
Fax: (01) 679 9457

Crann, Aughavas, via Cavan, Co. Leitrim.
Tel 078-36020.

An Taisce, Tailors Hall, Back Lane, Dublin 8.
Tel:(01) 454 1786 Fax: (01) 453 3255

Teagasc, Johnstown Castle, Co. Wexford.
Tel:(053) 42622

From the ENFO leaflet "Tree Planting". ENFO – The Environmental Information Service, 17 St Andrew Street, Dublin 2, Ireland. Tel: (01) 8883911 (01) 8883933 Fax: (01) 8883946 e-mail: info@enfo.ie web site: http://www.enfo.ie

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It's easy to make a difference

New roles for a historic garden

The development of the National Botanic Gardens



Ireland's only tropical rainforest has been created in the newly-restored Great Palm House at the National Botanic Gardens.

By Peter Wyse Jackson

If you were to ask most people in Ireland "What is a botanic garden?" you would get a huge variety of answers. These would range from "A beautiful garden where the plants are labelled" to "the place people go to take their wedding photos". Perhaps only a few would be able to give you the answer that approaches the officially recognised international definition that they are "institutions holding documented collections of living plants for the purposes of scientific research, conservation, display and education".

We are very fortunate in Ireland to have not only one of the oldest botanic gardens in the world but also one that is amongst the most beautiful. However, as botanic gardens go, it is now also one of the most up-to-date and go-ahead, carving out a modern role for its work in Ireland and internationally. Behind the scenes at the National Botanic Gardens in Glasnevin, just a few kilometres north of Dublin city centre, an urgent programme of research is underway studying the biology and conservation of many plant species.

The transformation and restoration of the National Botanic Gardens at Glasnevin has been a major project for the Office of Public Works over the last two decades. The developments at Glasnevin not only include such high-profile projects as the restoration of the historically important Curvilinear Glasshouse range and the Great Palm House built in the 1800s which had become seriously dilapidated over the years. Other recent work has included the construction of a fine new Visitor and Education Centre and a new building to house the National Herbarium, the Gardens' library and art collection and a small laboratory. While the work of restoring the infrastructure of the Gardens is not yet complete (several other important Victorian glasshouses remain to be conserved), exciting new work in the Gardens has moved forward in recent years preparing the institution for the challenge of the 21st century.

In 1995 the National Botanic Gardens took over the management of the Kilmacurragh Arboretum in Kilbride, Co. Wicklow. This important garden was laid out and planted by the Acton family in the 1800, and includes many plants provided by the National Botanic Gardens. It is being restored and developed as the Garden's satellite south of Dublin and increasingly welcomes thousands of new visitors each year.

New recent initiatives at Glasnevin include a



Displays of spring flowers and bulbs by the new Education and Visitor Centre at the National Botanic Gardens is a popular visitor attraction.



Kilmacurragh Arboretum in Co. Wicklow, now being restored and managed by the National Botanic Gardens, includes a remarkable collection of Rhododendron species and rare conifers.

new area opened to the public for the first time in 2008, to demonstrate and display fruit and vegetable gardening, managed according to organic principles. New educational projects include a particular focus on sustainability – recycling, environmentally-friendly gardening, composting, reducing waste and energy consumption and biodiversity conservation.

A major new native plant conservation area is being planned including a range of rare or endangered Irish plant species – due for inauguration in 2010. In Ireland we have almost 1,000 native plants, many of which are rare and endangered. Plant conservation is a key role for the Gardens today, ensuring that no native plant becomes extinct in the future in Ireland. Of course research into the biology of plants is essential if we wish to understand how to manage and conserve them for the future. For that reason, the National Botanic Gardens has recently created a DNA molecular laboratory where we can study the genetics, populations

and variation patterns of Irish plants, particularly those that are endangered. In that way we can ensure that we conserve the diversity of such species, not just miscellaneous individuals.

In the last twenty to thirty years there has been a renaissance in botanic gardens worldwide, largely as a result of the developing concern for biodiversity loss and the need for many more institutions to become active in plant resources conservation. Today we know of over 2,500 institutions defined as botanic gardens, in 153 countries. More than half of these botanic gardens have been created over the last fifty years. Worldwide botanic gardens receive more than 250 million visitors. At Glasnevin more than half a million people visit each year and the numbers continue to rise. Between them the botanic gardens of the world grow over 100,000 plant species (probably about one quarter of the plants of the world are included in their collections) – what Noah did for animals, botanic gardens are now doing for plants.



New Zealand tree ferns and south-east Asian tender Rhododendrons in the magnificent Curvilinear Glasshouse range, designed by Richard Turner and built from 1843 to 1869.

The National Botanic Gardens at Glasnevin are extremely well placed to contribute effectively to life in Ireland, as well as to be an internationally recognised leader amongst botanic gardens. The collections of the Gardens are of considerable international importance and include over 17,000 species and varieties in cultivation. International plant conservation has also become a major focus of the Gardens' work and the collections currently include over 400 rare or endangered species from around the world. New collaboration with botanical institutions in other countries has also been developed in such countries as Belize, Brazil, Chile, China, Jordan, Malawi and Russia. Part of our work has been to help to develop and strengthen botanic gardens in those countries.

The 21st century will be an exciting and important time for the National Botanic Gardens and indeed for all botanic gardens worldwide when they will face increasingly challenging tasks. We now recognise that there is a desperately urgent extinction crisis facing the world's biodiversity. Over the coming century it is estimated that up to two-thirds of the world's plants will become threatened in the wild and the situation can be even worse if the expected impacts of climate change cause the loss of many wild plant habitats. In Ireland research has shown that over 170 native plant species could become extinct as a result of climate change, making a critical situation for many habitats even worse.

Botanic gardens are responding well in most countries to the biodiversity crisis with the development of new plant conservation initiatives as well as embracing the need to raise public concern for plants and the environment. For all of us working at the National Botanic Gardens, it is very rewarding to be part of an institution that is increasingly recognized in Ireland and internationally for its importance and for its essential roles in the modern world.

Dr Peter Wyse Jackson, Director, National Botanic Gardens, Glasnevin, Dublin 9, Ireland. www.botanicgardens.ie

Why worry about nuclear power?

By Alex Kirby

THE future is nuclear-powered, and we'd better get used to it. Right? Not according to the thinking of most environmentalists these thirty years or more. But something odd is starting to happen. The occasional lone voice is beginning to argue that nuclear energy is an essential part of the mix, at least in the short and medium term.

There's the respected climatologist who told me that since nuclear power stations exist, it's worth using them till they reach the end of their working lives to give us the breathing space to get from where we are, producing most of our energy unsustainably, to producing it in a way we can continue indefinitely.

There's the British environmental biologist Sir Frederick Holliday, who wrote (Nuclear Europe Worldscan, 5-6, 1999):

"The world has still to consider the detailed consequences of two scenarios: firstly, that global warming, whatever its cause, will proceed to an extent that will significantly raise sea levels and alter weather patterns; secondly, that fossil fuel burning and nuclear power generation will, for different reasons, be phased out by

the middle of the next century . . . My belief is that all the people of the world need abundant energy at reasonable costs. My science tells me that without nuclear power the long-term future of global ecosystems is at risk".

Calls like Sir Fred's are not likely to be popular in Ireland, which bears the brunt of emissions from Sellafield (formerly Windscale, and known before that as Calder Hall: the name changes were intended to help us to forget the disastrous fire there in 1957, one of the world's worst nuclear accidents, and the plant's subsequent chequered history). Calls for nuclear power to be given a new lease of life won't go down well in many parts of Britain itself. It is a science still regarded by many of us as a form of sorcery.

But we live in a hard world — more to the point, in a warming world, if the climate scientists have got things even half right. If we want rising living standards here and in the developing world, and if at the same time we want to minimise greenhouse gas reductions, we don't have many choices.

The environmentalists point to renewable energy as the way forward. They're right. Islands in the gale-swept north-west corner of Europe, with long coastlines pummelled by the

Gulf Stream, should be able to cover much of their needs from wind and wave energy. And as the technology improves, not even the succession of downpours marching in from the Atlantic will be able to stop solar power from fuelling the economy. It's already possible to construct buildings with cladding that is not just decorative but which generates electricity as well. It's possible to design clothing that will produce enough power to run the wearer's computer and mobile 'phone. Solar panels available today respond not just to sunlight, but to any light. They'll even generate a trickle of electricity under a bright moon.

So there's huge promise from renewable energy sources, and from "the fifth fuel" — energy efficiency. But it is going to take some time to get there. We need something else to bridge the gap. And nuclear power can do that.

But throughout its career, nuclear power has laboured under a devastating handicap. When the Queen opened the United Kingdom's first reactor at Calder Hall in 1956, she said it was there to produce electricity. But electricity was a by-product: the reactor was built to produce weapons-grade material for Britain's nuclear bombs. And civil nuclear power is irrevocably and understandably linked, in the minds of most of us, with military power — not just linked to it, but spawned by it. Fear of the civil uses of nuclear energy may perhaps be irrational. But fear of its military uses — even with the Cold War apparently left behind — is the only possible rational response.

So, just as we learnt to be deeply sceptical about promises that nuclear power would provide "electricity too cheap to meter", we've remained deeply sceptical about assurances that reprocessing at Sellafield's Thorp and MOX plants will be good for UK p.l.c., and in all our best interests.

And there lies the rub. Reprocessing gives

the world even more plutonium, a highly dangerous element for which it can find no use now — except for weapons. A nuclear scientist told me a few years ago: "Reprocessing makes no sense at all — unless you want to make bombs".

Professor James Lovelock, the inventor of the Gaia Hypothesis, wrote: "Compared with the imaginary dangers of nuclear power, the threat from the intensifying greenhouse effect seems all too real. I wholly support the Green wish to see all energy eventually come from renewable sources but I do not think that we have the time to wait until this happens. Nuclear is the only practical energy source that we could apply in time to offset the threat from accumulating greenhouse gases. Greens could look on the use of nuclear power as a temporary bandage to be used until the harm from carbon burning has been remedied."

Later in the same article (London Daily Telegraph, 15 August 2001), Professor Lovelock wrote:

"Nuclear electricity is now a well-tryed and soundly engineered practice that is both safe and economic; given the will it could be applied quickly. It is risky if improperly used but, even taking the Chernobyl disaster into account, it is, according to a recent Swiss study, by far the safest of the power industries . . . There seems no sensible reason why nuclear waste should not be disposed of in the deep subducting regions of the ocean where tectonic forces draw all deposits down into the magma."

As rallying cries go, it may lack a certain elemental power. But it is at least a new way of thinking about the energy conundrum. And if it doesn't get us flocking to the barricades, maybe that's no bad thing. Try it yourself: "Reprocessing no! Nuclear energy yes!" It might even lower the temperature a bit.

Alex Kirby is a freelance journalist in the UK.



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The Skeams

JOHN AKEROYD looks at two rarely visited islands in Roaringwater Bay

IN the last *Sherkin Comment* I described the Calfs, three of the remoter islands of Roaringwater Bay. Deserted from the first half of the 20th century, they remain a grazing resource for local farmers and refuge for plants and animals that are rare and threatened on the mainland. Two other deserted islands, West Skeam and East Skeam, are closer to the mainland and larger islands but every bit as remote and rarely visited by outsiders. The Skeams lie west of Cunnamore, from where the ferry connects with the eastern tip of Heir. Low-lying, they are easily seen from the north side of Heir.



Sharp-leaved Fluellen (*Kicksia elatine*) – a rare wayside plant found on West Skeam.

While most of the islands of the Roaringwater Bay are formed of purplish mudstones and yellowish sandstones from the Devonian era, the Skeams consist of greyish Carboniferous slates, laid down slightly later in Earth's history, when most of the limestone that underlies Ireland was forming. The four small Carthys to the west of the Skeams, uninhabited and now without even grazing animals, are made up of the same

rock formation. These slate and mudstone rocks erode easily and at the western end of East Skeam the sea has carved them into a natural arch. At the western end of West Skeam is a shingle strand, and both islands have a sandy strand at their western end, the site of former settlements. Both are divided by a low central valley, with ridges of slightly harder rocks on each side. The soils are fertile enough for cultivation, formerly extensive, and much of the vegetation remains lush. West Skeam is treeless but East Skeam has shelter-belts of pine and Sitka spruce. A low-growing, shrubby apple tree grows by a sea inlet on the north coast of East Skeam, appropriately named Cuaisín na n-úill or Little Cove of the Apple Tree, perhaps a relic of a long-ago lunch break from hay-making or harvest.

The islands were inhabited for centuries, the ruined church on West Skeam dating from at least the 10th century. It is said to have replaced an earlier building erected by St Ceim, brother of St Ciarán,

from Cape Clear, who brought Christianity to Ireland even before the ministry of St Patrick. The Skeams perhaps take their name from this holy man (Inis Ceim), and archaeological evidence shows the burial ground being used from the 5th century. As on the Calfs, small farming communities survived on the islands within living memory – the last families leaving East Skeam only in 1958. The population of the islands (never more than about 40 from the late 19th century) fell by half after World War I. East Skeam, like East Calf, was for many years the property of the Townsends of nearby Whitehall, who had a summer cottage there to replace one they had built on East Calf but sold to the O'Regan family in 1876.

A memoir by Joseph O'Regan, published in 1994, talks of a hard, isolated life on a small farm on West Skeam growing potatoes, roots and cereals, and some flax. The pig yielded protein, a cow or two gave milk and butter. Chickens provided an income



Bird's-foot (*Ornithopus perpusilus*)

from eggs (the children were given one on St Patrick's day and at Easter). Lobsters too were a source of money, and O'Regan noted how shellfish and carrageen seaweed helped keep starvation at bay even during the Famine years of the 1840s. A threshing machine arrived only in 1939 but the family left in 1943. Today West Skeam has a holiday cottage, otherwise the islands provide pasture for cattle from the mainland.

The flora of the islands shares much of the richness of Roaringwater Bay. Patches of coastal heath are bright with heather and gorse in late summer and also shelter rarer plants such as the clover-like Bird's-foot (*Ornithopus perpusilus*). Some rare wayside and cornfield weeds survive, notably Sharp-leaved Fluellen (*Kicksia elatine*) and (*Torilis arvensis*) on West Skeam. And two old medicinal plants persist among the deserted houses by the strand at the eastern end of East Skeam: Wormwood (*Artemisia vulgaris*) and Pellitory-of-the-Wall (*Parietaria officinalis*), which grows in crevices among the ruins. Pellitory, growing here at one of

its few sites in Roaringwater Bay, was long a remedy for coughs and chest and throat infections, probably all too prevalent in those damp cottages. Nearby on the strand, where cattle are landed, the related Annual Stinging Nettle (*Urtica urens*), rather rare in this part of West Cork, thrives in the nitrogen-enriched sandy soil (as it does at Barley Cove on the mainland). Thus the Skeams are an integral part of the varied jigsaw of wild plants and habitats that make this corner of Ireland so special.

Dr John Akeroyd, a visitor to Roaringwater Bay since 1986, edited The Wild Plants of Sherkin, Cape Clear and adjacent islands of West Cork (1996) and is author of A Beginner's Guide to Ireland's Wild Flowers (2008). For further information on the Skeams, Calfs and Heir islands, he recommends Heir Island. Its history and people, by Eugene Daly (Heron Press, 2004).

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Photo: © Michael Guiry

Prof. Michael Guiry, Director, Martin Ryan Institute

By Michael Guiry

HOW one becomes anything is largely by a series of flukes. I ended up at University College Cork mainly as it is close to Youghal, but partly because my mother ordered me to go: "You're not hanging around the house here!" she demanded. I would have preferred much to be a parent-parasitic gentleman of leisure.

1966 was a watershed for UCC. Suddenly, demand for science places doubled overnight and many students whose families had no experience of universities entered the university. And this lack of experience showed itself in huge failure rates in First Science that year, including my good self. In fact, I have not forgiven UCC zoologists for putting a dissection of the garden snail on the practical examination that year. They should have known that I had mitched off to the cinema on the particular afternoon that horrible animal was being demonstrated. Bluffing does not work when you don't even know how to cut open a snail!

I suppose that this is why I was driven towards botany rather than zoology, but once I

got past my second first year, I started to enjoy biology, particularly the natural history part of it (now renamed "biodiversity"). A summer bursary from the Department of Fisheries on foot of a spectacular lack of judgment on the part of Dr Alex Gibson and David Griffiths got me started on seaweeds.

It was yet another lucky accident that Bantry Bay was such a seaweed-rich place and I had so little money from the bursary that I had nothing else to do except to work out what the dratted seaweeds were from Newton's Handbook of the British Seaweeds (1931) and Harvey's *Phycologia Britannica* (1846–51). The wonderful illustrations in both books helped enormously, despite their venerable ages.

I quickly learned the art of making herbarium specimens and the good old postal service delivered my specimens all over the world to experts such as George Russell and Elsie ("Bunny") Burrows of the University of Liverpool, and Peter Dixon of the University of California. Peter did me a great favour in sending some of my specimens to Linda Irvine of the British Museum (Natural History) in London, and she and I corre-

spond to this day. I still remember the thrill of those brown, windowed "OHMS" envelopes arriving with new knowledge and identifications. Dazzled by the interest of these world-class experts, I redoubled my efforts and eventually compiled quite a respectable list of species from Bantry, later published in my first paper in *Irish Fisheries Investigations*. Looking back, I would not have accepted that paper had I been the editor.

Returning to Cork in 1968 I came to know John (Seán) Cullinane, a lecturer in the Botany Department at UCC, who was then working closely with Máirín De Valéra at UCG on the marine algae of Cork Harbour, but who was much better known as a iconic Irish dancer, judge and teacher. John immediately took me under his wing, as he had done with many students now scattered around the world, and took some of my specimens to Galway to be verified by Professor De Valéra.

In 1970, I started work on the Waterford coast and with the help of Máire Mulcahy, a zoologist from UCC – by then forgiven for the snail – got me a job with Waterford County Council surveying Dungarvan

Bay. This was due to the extraordinary foresight of Jim Shine, a far-seeing engineer with the County Council.

John Cullinane and Gary Prendeville, another eminent UCC botanist who had just returned from Perdue University in the States, encouraged me to write up a Master's thesis on the seaweeds of Bantry Bay and the west Waterford coast, which was awarded in 1972.

By another fluke, John Cullinane was visiting Linda Irvine at the Natural History Museum in London, and going up to the Cryptogamic Section in that dreadful little lift near the Museum's main door – still there – she suggested that I might come to London to do a PhD with her husband David, then a lecturer at the Polytechnic of North London. Much to my astonishment, since neither husband or wife had ever even met me, David was able to raise a stipend from the Department of Biology & Geology, and together with my new wife, Wendy (from Cobh) whom I had met at a zoology practical at UCC over the dissection of yet another mollusc, the squid, we set off for London in September 1972.

The 1970s was not a good time to be in London. IRA bombs were going off regularly on the "mainland" and the miners' and other strikes plagued the economy. I well remember Oxford Street at Christmas 1973 grimly lit by candles. However, I continued happily getting to know the seaweeds even more intimately and travelling all over

England and Wales in a dreadful little rear-engined car called a Hillman Imp, which has been in a crash, although I did not know it then, and which chewed up its water pump regularly for some reason. The resources of the British Museum (Natural History) were all mine and the Polytechnic was a safe and kindly home. I must say that all the time Wendy and I were in England, nobody ever said a cross word to us despite the bombings. Silly Irish jokes, yes, but no nastiness was every apparent.

grow them in seawater enriched by tertiary treated sewage. Not very successfully, I might add, as I had little or no experience.

In 1979, I was appointed a Junior Lecturer in Botany at University College, Galway by Dr Colm Ó hEochá, originally from An Rinn near Youghal and yet another circle was closed. I have remained at NUIG ever since, still privately gobsmacked that so little planning and design and so much serendipity can result in so much. I have never forgotten the kindnesses of those



From left: Michael Guiry in his student days, with Michael Barry and Kieran McCarthy.

Getting a PhD from the University of London (the Polytechnic was an internal College of UL for postgraduates) allowed me to move to a post-doctoral position Portsmouth Polytechnic in 1976, where I was fortunate to work at the Hayling Island Marine Laboratory, since shut down, with a great group of botanists and zoologists. About this time I became interested in applied aspects of seaweeds and started to

who have helped me on the way, only some of whom are highlighted here.

Somebody once said to me that I am so lucky that I should buy a Lotto ticket every single day, advice I foolishly ignore.

*Prof. Michael Guiry,
Director, Martin Ryan
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Irish and British Gobies

By Paul Kay

THE small gobies which inhabit the shallower waters around the coasts of Ireland and Britain are both equally known and ignored. Some are easy, under certain circumstances, to identify whilst others have been considered notoriously difficult. The traditional scientific methods of capturing specimens and evaluating the dead and often less than perfect creatures has often proved difficult, and has led to a degree of mystique which is associated with accurate identification.

One goby – the leopard-spotted goby – has eluded capture by traditional methods so effectively that it was originally considered to be a new species when finally observed by scuba divers who could see it first hand. In fact this goby is widespread, often abundant in its crevice-laden habitat and was already well known from the Mediterranean!

The two-spotted goby is another easily identifiable species. Its small size, shoaling habit and overall shape make it easy to identify underwater – there is nothing much similar.



Leopard-spotted Goby: Until scuba divers 'discovered' this goby it was thought extremely rare – it actually lives in rocky areas, in crevices and is very difficult to catch!

Other gobies are readily identified with a little knowledge or some observational skills. Both transparent and crystal gobies are difficult to see but once seen are differ-

entiable by characteristics such as jaw length and overall shape – there are almost certainly under-recorded though as there are many old records of these two species.

However the relatively recent introduction of high quality digital cameras which are usable underwater and yield high resolution files has increased our abilities to not only photograph gobies with a high certainty of success, but also to differentiate them and their habitats more readily.

As an example of the usability of digital imagery increasing our knowledge of gobies there is the example of Jeffrey's goby. The goby is superficially similar to others in the 'sand goby complex' – which covers a variety of gobies living on softer sediments. It is most similar to the painted goby but the second ray of the first dorsal fin is elongated in Jeffrey's goby – and this has been a key identification feature in undamaged specimens. Unfortunately fin damage or positioning may mean that this ray is broken or cannot be seen. Both may have an ice-blue first dorsal fin but careful scrutiny of underwater photographs of live fishes shows substantial differences in the way that this fin is coloured and patterned and also, more subtle differences in body shape, posture and stance.

Rock and black gobies are also easily confused. Again close-up images of these reveal that the black goby has dark pigmented sensory papillae on its face and head (the only other goby to show these is the leopard-spotted) and so even if their dorsal fins are flat the two can be differentiated by photography. There are other differences but this can be readily seen from digital images.

Other sediment dwelling gobies are still hard to identify but a clear underwater image can at least narrow down the possibilities – especially if allied to habitat data

such as depth, sediment type, salinity, etc. – and it may be possible to identify some of these fish (the common and sand gobies) with a high degree of certainty.

The diminutive goby is rarely recorded. It is as its name suggests, small. But what it lacks in stature is made up for in colour and once spotted a photograph will accurately confirm this fishes' identity.

There are of course other gobies such as the giant, the red-mouthed and Couches' which are known from only very localised and specific areas – digital underwater photography may well eventually increase the knowledge of their distribution too.

As more scuba divers take up underwater photography and start taking images of the creatures which they see underwater, our knowledge of what lives around our coasts may increase. To do so requires that the understanding of what is being photographed is effectively disseminated and is accessible. The internet is an ideal tool to do this with (although as yet not really an effective 'field technique'!) and I am setting up a fish identification/information section of my own (commercial) website. Initially this will be under the auspices of "Welsh Marine Fishes" but it is hoped that this will be of use to those interested in fish around both Britain and Ireland (fish after all know no political nor national boundaries) and will be extended if at all possible. It will also finally be utilised by the Marine Conservation Society on their website too.

Paul Kay, www.marinewildlife.co.uk – stock marine life photo sales
www.underseacameras.com – Seacam underwater equipment sales
www.paulkayphotography.co.uk – professional photography



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Jefferies Goby: Considered an 'offshore' species in many books, a substantial population of Jeffrey's Gobies have been recently been found living at the inland end of Loch Fyne in Scotland where conditions clearly suit them.



Painted Goby: Male Painted Gobies have a blue and black striped first dorsal fin making them readily identifiable – their face is also characteristically blunt and rounded.



Diminutive Goby: Aptly named, the very small Diminutive Goby is rarely observed or recorded and few details of its natural history are properly known. It may well be quite widespread.



Two-spotted Goby: Easily identified underwater, this goby occurs in small shoals amongst weed and kelp.



Rock Goby: Although the Rock Goby is easily confused with the Black Goby, a look at its head will reveal scales whereas the Black Goby's head is bare.



Black Goby: These gobies are rarely black but often do have a black mark on the front of both first and second dorsal fins.



Sandy Goby: There are several sediment dwelling gobies which are often described as the Sand Goby 'complex' – differentiating them is far from easy.

Irish & British Gobies

Photography by Paul Kay



Crystal Goby: Crystal and Transparent gobies are mid water dwellers and because they are rarely still for long are difficult to differentiate without capturing or photographing them (which is also difficult).



Fries Goby: Soft seabeds with burrows in them are where Fries' Gobies live. When alarmed they dart away into the burrows in which they will share space with scamp.

True Love?



Right now we can't get enough of the environment. Business, media, consumers – we're all infatuated. But, wonders Rich Cookson, can it last?

FlyBe leads the way on the environment,' the airline crowed in June. 'We've taken steps in all areas of our business to be as ecologically responsible as possible, from assembling one of the youngest and most environmentally sensitive fleets in the world, to introducing an eco-labelling scheme.'

A surprising declaration from a short-haul airline. Such companies have long been targeted by green campaigners, who point out that air travel is the fastest-growing source of greenhouse gas emissions. Director of Friends of the Earth Tony Juniper summed up his reaction to environmentally sensitive airlines in three blunt words: 'It's an oxymoron'.

But whatever you think of FlyBe's sincerity, its announcement is a powerful sign of the times. Barely a day now passes without another big com-

pany unveiling a set of new environmental initiatives. Ecofriendly products are flying off the shelves. Green issues are receiving massive media attention, pop stars are playing awareness-raising gigs and the public has never been so passionate about saving the planet. In short, Britain seems to have fallen in love with the environment.

With scientists and campaigners issuing ever more worrying predictions and stressing the need for urgent action, the message at last seems to be getting through.

Or is it? How real are these announcements from businesses? True commitment or opportunistic marketing? Can the media have its feeding frenzy without getting sick of all things green? And as for our own commitment, will our love for the environment last, or will it turn out to be a quickie?

There's good reason to ask. The last time we witnessed such an upsurge of enthusiasm for the environment was in the late 1980s. Then, the country was gripped by paranoia about acid rain and the ozone layer. Whales needed saving and bombs needed banning. But rather suddenly, the interest evaporated. Mortgage rates soared and the nation found it had plenty of other things to worry about. It was the end of the affair. So could the same happen this time round?

FlyBe's Chief Commercial Officer

Mike Rutter insists that his company is serious about its commitment to the environment. 'This is absolutely not a flash in the pan,' he says. 'We have put £2 billion of investment where our mouth is. It will always be part of our agenda because it makes good business sense.'

He is not alone in trumpeting long-term eco-credentials. Marks & Spencer has launched its ambitious £200 million Plan A programme. Tesco has promised to label every one of its 70,000 products with details of their carbon footprints. HSBC has pledged \$100 million to four climate change charities. And if you think the latest ad campaign from Ariel, which explains how much energy can be saved if we turn our washing machines down to 30°C, is just cashing in on the zeitgeist, talk to Win Sakkidan. The External Relations Manager for Procter and Gamble, which owns Ariel, says that his company is totally sincere about its commitment. 'Concern for the environment is embedded in our business. It's here to stay,' he says.

A shaky relationship

So UK Plc does at least seem pretty serious about the environment. But a recent YouGov poll of business leaders suggests otherwise. It found that climate change is bottom of the priority list for Britain's largest companies, and their major shareholders aren't much more exercised by the issue either. More than half of the companies surveyed said that brand awareness, marketing strategies and corporate social responsibility were more pressing issues. Just 14 per cent had a strategy for tackling climate change. A separate report, published on the same day, found that many fund managers see industry's efforts to demonstrate environmental credentials as a cynical attempt to get 'the green fraternity off their backs'.

Even some of the most high-profile green brands are not immune to a touch of eco-exaggeration: a TV advertising campaign for the Toyota Prius has just been banned by the Advertising Standards Authority because claims about the environmental benefits of the car were misleading.

All of which leaves consumers like me pretty confused. In fact I can't help feeling deeply sceptical about most companies' commitment to the environment. The imperative to maximise profits will always override any voluntary action they have pledged to take on the environment. As relationships go, I think it looks decidedly shaky. So does the media's commitment to the environment fair any better?

Greenpeace UK Director John Sauven is certainly impressed with the sheer volume of coverage. 'It's astronomical,' he says. 'Hardly a day goes by when it's not front page news.'

Across TV, radio and print, there are literally hundreds of environmental stories every day. In the last couple of months, the Daily Telegraph has launched its 'Earth Channel' – a website dedicated to environmental news and features. The BBC's schedules are brimming with green stuff, including the current season of programmes on saving the planet. And AOL's homepage is rarely without an eco-feature.

But the increase in coverage has been nowhere more dramatic than on SkyNews. In November, the channel ran a whole week of reports focused on green issues, fronted by its newly-appointed Environment Correspondent, Robert Nisbet. Sky News' Executive Editor Chris Birkett says that the environment is one of the key stories of our generation and that regular coverage is 'absolutely' here to stay, alongside more traditional beats such as crime, health and education. 'The number of stories will probably increase,' he says. 'There's so much to cover: climate change, energy, the effect of a rising population on the environment, food supplies, and so on.'

Tony Juniper welcomes the increase in coverage, but says that the media needs to put more effort into investigating the truth behind business claims. A lot of corporate greenwash is getting through without being challenged, he argues. 'That may be correct,' concedes Birkett. 'We've always done stories about carbon offsetting and waste disposal in broad terms rather than ripping into one company specifically – but there's certainly scope to do that.'

Juniper adds: 'Discussions of big policy changes are also not getting enough airtime. In fact, pretty much every policy change, such as congestion charging and taxes on aviation fuel, seems to be presented as highly controversial.'

Actions speak louder than words

So while the quality of coverage could improve, the media does seem pretty committed to covering the environment for the foreseeable future. This relationship looks set to last. But what about the public's giddy passion for the planet?

Despite the acres of media coverage and general agreement that it's good to be green, surprisingly few people are actually doing anything about it. A recent poll carried out for the Environment Agency revealed

that only two in five people in Britain are actually doing something to tackle climate change – and of them, more than half said that recycling was their main contribution. That leaves 59 per cent of people who are doing nothing. 'There's a huge mismatch between the number of people who say they have done something for the environment and those who actually have,' says Sauven.

And this, campaigners say, goes to the very heart of the issue. Action on climate change and other environmental problems is still a matter of goodwill and personal choice. There will always be limits to what any of us is prepared to do – including those of us who count ourselves as committed greenies. I spend much of my working life thinking and writing about global warming and the scale of the changes we are going to have to make to protect ourselves against its effects. So I conscientiously recycle, compost, shop at local farmers' markets, and try to save water and energy. But I still drive a car and haven't yet got round to lagging my loft. Despite what we all know about the environment, we are only prepared to go so far to protect it.

And while individual action is important, it's simply not enough. 'We can't leave this to the good nature of individuals, shareholders and executives,' says Juniper. 'Looking to the private sector alone is a false hope, and consumer demand alone is not going to be enough. We need an 80 per cent reduction in carbon dioxide by the middle of the century, and that's simply not going to happen without new laws.'

Sauven agrees: 'It could have a huge impact if everyone used low-energy lightbulbs. But persuading everyone to do that will take years. As we go into a low-carbon economy, some choices will be removed. This is not new territory: the option to buy leaded petrol or smoke in public places is no longer available.'

So where does that leave me? Should I wait for Government to make loft-lagging compulsory and driving my car uncomfortably expensive? Of course not. We all need to challenge ourselves to do more. But while insulating my loft is pretty straightforward, I do need the Government's help to quit the car habit. A better bus service would be a good start.

There is a clear need for far-reaching changes in the way we live. The reaction of businesses, the media and we as individuals will be the acid test of our love for the environment. If we are serious, we should expect some arguments, some pain, some tough times. But whatever happens, once this honeymoon is over, the love had better last.

Richard Cookson is a freelance journalist who writes for the Independent and works for Channel 4's Dispatches.

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A Moral Dilemma

Food Versus Biofuel

By Alex Kirby

IF ALL you want to do is to find a cleaner alternative to petrol and diesel, biofuels look likely to be the answer (let alone the 50% population increase expected by mid-century) can feed ourselves properly, then beware of biofuels, at least for the time being.

Most biofuel – anything made from plants, animals and their by-products – is ethanol or diesel. Suitable crops include cereals, soybean, rape seed, sugar cane and oil palms. The best-performing biofuels, like Brazil's ethanol, made from sugar cane, can deliver 10 times more energy than is needed to produce them, and release only a quarter of the greenhouse gas emissions of their fossil fuel equivalents. Others are nowhere near as effective.

There are definite pluses. Biofuels do reduce greenhouse gas emissions, or they should. Although they release carbon dioxide, the most abundant greenhouse gas from human activities, when they are burnt, they have already absorbed the same amount of gas while they were growing. So they should be carbon-neutral, unlike fossil fuels. They are homegrown, and so reduce dependence on imported oil. And

growing them can regenerate poor rural communities. Demand is huge: the European Union's ambitious target for 2010 is for biofuel to supply 5.75% of transport needs, and 10% by 2020. George Bush says that by 2025 it should replace 75% of US oil imports.

But the downside is worrying. Farming and processing the crops needs energy, for fertilisers, farm machinery and processing, which reduces their advantage over oil. Land clearance to make room to grow the crops can also worsen climate change: there are economic incentives to plough peatlands and fell forests, which releases huge amounts of greenhouse gases. More farmland will be needed, a threat to wilderness areas. Even meeting Europe's 5.75% target, one study says, would take a quarter of the EU's arable land.

The greatest worry is about competition between food and fuel. Drought, rising oil prices, and growing consumer demand for more meat and dairy products in rapidly-developing countries are already pushing food prices beyond the reach of millions. In less than a year the price of wheat has risen 130%, soya by 87% and rice by 74%. Overall global food prices have risen by 83% since 2005.

There have been widespread protests, some involving loss of life. In Ethiopia 75,000 children are suf-

fering from acute malnutrition and illness, 4.6 million people need emergency food aid – and the global food crisis and increased fuel prices have forced a sharp rise in the price of imported food.

Jeffrey McNeely is chief scientist of IUCN, the International Union for the Conservation of Nature. In September 2006 he wrote: "The grain required to fill the petrol tank of a Range Rover with ethanol is sufficient to feed one person per year. Assuming the petrol tank is refilled every two weeks, the amount of grain required would feed a hungry African village for a year."

In 2007 the US burned about a quarter of its national maize supply as fuel – from a total harvest of 414 million tons of grain, it used 81m tons for producing ethanol and exported 106m tons, making it the world's leading grain exporter. At least 8m hectares (20m acres) of maize, wheat, soya and other crops which once provided animal feed and food have already been taken out of production in the US, a threat to exports. Lester Brown, director of the Earth Policy Institute in Washington DC, said on 4 April that land converted to biofuel production in the US in the last two years would have fed nearly 250m people with average grain needs. The same week the World Bank predicted rice price rises of 55% in 2008.



The greatest worry is about competition between food and fuel.

The International Food Policy Research Institute believes the average global grain price has risen by 30% because of demand for biofuels. On current biofuel investment plans, it predicts that the international price of maize and oilseeds will increase by 26% and 18% respectively by 2020. But if the expansion of biofuels doubles, it suggests a price increase of 72% for corn and 44% for oilseeds. With high prices, poor people will probably spend less on food, worsening poor diets and micronutrient malnutrition. IFPRI estimates that calorie consumption will decrease across whole regions, most notably in Sub-Saharan Africa, where food availability could fall by more than eight per cent by 2020.

Not long ago hunger appeared to be in retreat. In 2004 researchers at the University of Minnesota said they expected the number of hungry and malnourished people in the world to fall from over 800m to 625m by 2025. In early 2007 they updated this to include the biofuel effect. Now they expect the number of hungry people to rise to 1.2bn by 2025.

But biofuels are profitable. The British development charity Action-Aid says biofuel subsidies to US and EU farmers are worth US\$16–18bn a year, four times as much as all agricultural aid to the developing world. It says 260m people are at risk of hunger. The subsidies have been condemned by the director general of the FAO, who said they were depriving people of food.

But if biofuels did not devour food crops, there would be a case for them, and that is the glimmer of hope their proponents can offer. Many of the fuels available today are a very wasteful way of producing energy, because they use only part of the plant, usually seeds or grains like wheat, which yields starch that is fermented into bioethanol, or sunflower seeds, which are pressed to yield vegetable oil for biodiesel. There are hopes that so-called second-generation biofuels could be much more efficient. They process the inedible parts of the plants and so do not divert food away from the animal or human food chain, but scientists say it will be five to ten years before they become commercially viable. Even then, some of these cellulose-rich materials are normally used for ani-



mal feed or for enriching soil fertility, so a trade-off may still be inevitable. And land, water and money will be needed to produce them, meaning they may still compete with food crops, if indirectly.

One British company, Vireol, says it is already producing an entirely benign biofuel. Its source is European feed wheat, which Vireol says is "currently used to feed animals due to its modest protein content, its unsuitability for human consumption and its relatively low price. Bioethanol produced from European feed wheat in the quantities needed to meet current EU targets will have a negligible effect on future prices of wheat. In addition, the by-product of the ethanol production process retains the protein content which is the basis for the animal feed value of the original wheat so that it is still available for the animal feed market."

More positively, the next generation of biofuels may serve several purposes. One is jatropha, a bush found across the tropics. Jatropha oil seed cake, left after extracting the oil, is rich in plant nutrients, and may have potential as an organic fertiliser and pesticide. The seed cake might also be an energy source, for example as a feedstock in village biogas plants. Further ahead, there are plans for producing fuel from algae, or by using genetically-modified bacteria to convert carbon dioxide. For the moment, though, many biofuels continue to take food directly from the mouths of the starving. One UN official has called the use of agriculturally productive soil for energy crops "a crime against humanity".

Alex Kirby is a former BBC environment correspondent.



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Photos © National Library of Ireland

National Library of Ireland Architectural Features: Monkeys. 2–3 Kildare Street, designed by Benjamin Woodward and Thomas Deane and carved by James and John O'Shea.

By Elizabeth M. Kirwan

THE National Library of Ireland was established in 1877 by the Dublin Science and Art Museum Act. Its collections came from the Library of the Royal Dublin Society, which dated from 1731, when the Dublin Society for Improving Husbandry, Manufactures and other Useful Arts and Sciences, later the Royal Dublin Society (RDS), was founded. The RDS was then located in Leinster House, Kildare Street, in central Dublin, where the National Library was located until it opened on its own site next door on 30 August 1890. Ireland's National Library was part of the complex around the RDS known as the Science and Art Institutions, including the Metropolitan School of Art, the National Gallery, and the National Museum with its Natural History Museum and Botanic Gardens. Responsibility for the administration of the National Library of Ireland (NLI) was transferred from the Department of Science and Art in London to the Department of Education in Dublin in 1924. In 2005, the National Cultural Institutions Act (1997), established the NLI as a corporate entity, managed by a Board appointed by the Minister for Arts, Sport and Tourism.

Buildings

The Main Library building was designed by the Cork-born architect Thomas Newenham Deane and his son Thomas Manly Deane. Granite and marble from Co. Wicklow and sandstone from Co. Donegal were used in its construction while the ornate carved wooden fire-surrounds originated in Siena, Italy. The floor mosaic in the Main entrance hall includes such naturalistic iconography as owls on an ivy branch, bowls of fruit and of flowering bulbs, as well as Greek sphinx and serpents guarding a flame in a chained urn.

The NLI has expanded since 1890. The oldest building, 2–3 Kildare Street, was the former Kildare Street Club, founded in 1782. It was revamped to house the Department of Manuscripts and the Heraldic Museum, which opened in 1991. The building was redesigned in 1860 by Benjamin Woodward and Thomas Deane. Its external window sculptures of monkeys playing billiards, a serenading shrew, a hound chasing a rabbit, polar bears confronting a harpooning sailor, a snake and a frog, lizards, mice, a hen, a dolphin, a phoenix, and a dragon, were carved by the Cork brothers James and John O'Shea. Similar sculptures of monkeys by

the O'Sheas for the Oxford Museum were removed during the debate on evolutionary biology that followed the publication of Charles Darwin's *Origin of the Species* (1859).

The award-winning National Photographic Archive building, designed by O'Donnell & Toomey, opened in 1998. It houses the NLI's photographic collections and exhibition space and is located in Dublin's Temple Bar cultural quarter.

In 2005, a new wing opened off the Main Library including an exhibitions space, a lecture theatre, the Prints and Drawings Collections, the Ephemera Collection, and the Ordnance Survey of Ireland Map Conservation Project. This wing opened originally in 1827 as the RDS Drawing School, later the National College of Art and Design until 1998.

Collections

The NLI's statutory mission is 'To collect, preserve, promote and make accessible the documentary and intellectual record of the life of Ireland and to contribute to the provision of access to the larger universe of recorded knowledge'. The Library's collecting interests therefore extend to recorded Irish experiences beyond the boundaries of the State. The Library acquires material through purchase, donation and legal deposit.

The NLI houses the world's largest collection of Irish documentary material, with more than five million books, serials, newspapers, manuscripts, photographs, official publications, manuscript and early printed plus Ordnance Survey maps, prints, drawings, political memorabilia, literary correspondence, heraldic and genealogical materials, music collections, and items of ephemera.

In 1877, 70,000 volumes of the RDS Library with particular emphasis on science, technology and natural history were transferred to the NLI. This includes many rare illustrated books such as Henry van Rheede /Draakestein's 1678 study of the bio-diversity of grasses in Malabar (India), and includes the manuscript surveys, reports and maps of the Irish Bogs Commissioners (1809–14). As well as 30,000 items from the RDS School of Landscape And Ornament Drawing, and the Thorpe Collection of 300 pamphlets relating to Irish politics (1695–1758), the Joly Gift was also transferred from the RDS Library. It consists of 25,000 printed volumes and pamphlets including many seventeenth century Irish first editions, 700 volumes of sheet music, 70,000 topographic prints, and a significant mixed media collection of French Napoleonic works.

Ireland's National Library

In 1943, the Archives of the Office of Arms, dating from 1552, and its Heraldic functions, were transferred to the NLI. They now operate under the Chief Herald of Ireland as The Genealogical Office, a function unique among National Libraries. This archive was compiled by various heraldic Officers of Arms and the heraldic and genealogical manuscripts dating from the 16th century are of key importance. The archive also includes coins and insignia, costumes, porcelain, and flags.

The Library's Department of Manuscripts was formally established in 1943. It houses over one million items and holds significant collections of papers relating to Irish landed estates, women's history, political and military history, cultural movements, Irish literature, theatre, music, and Gaelic manuscripts (see also the website of the Irish Script on Screen project, www.isos.dcu.ie). There are also 100,000 early printed, manuscript and Ordnance Survey maps.

The Library's photographic collection of 630,000 images is in a variety of formats. The images document early photography in Ireland, the work of the Congested Districts

Board (1890s), the landed gentry, the 1916 Rising, the War of Independence and the Civil War, Irish aerial photography 1954–7, and twentieth century Irish photojournalism and sport.

The Ephemera Collection consists of 100,000 printed items, including historical proclamations and posters, flyers, handbills, theatre programmes, broadside ballads, memorial cards, calendars, postcards, cigarette cards, invitations and restaurant menus.

There are 100,000 Prints & Drawings, covering topography and antiquities, portraiture, caricature and satire, military, naval and political events, costume and dress, architectural drawings, theatre, and collected work of twentieth century Irish artists.

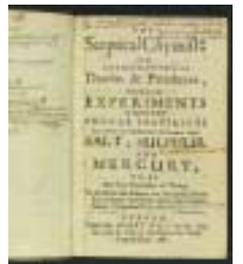
The Library first secured legal deposit privileges for publications in the Irish State in 1927, enabling it to build its collection of modern Irish books, newspapers and serials. In 2007, legal deposit privileges were extended to electronic publications. The Library collects a representative selection of scientific titles published by Irish-based international publishing houses with headquarters out-

side Ireland. Copies of all Northern Ireland publications are purchased.

Contact

The NLI's greatest collection strengths are now in the areas of Irish studies, Irish history, Irish language, Irish imprints, and Irish literature in English particularly the works of James Joyce and William Butler Yeats, the subjects of two recent major NLI exhibitions. To visit the Yeats and other exhibitions online and for further information on the NLI and its services, please visit the Library website, www.nli.ie.

Elizabeth M. Kirwan, Assistant Keeper I, Outreach and Preservation, The National Library of Ireland, Kildare Street, Dublin 2.



Robert Boyle, *The Sceptical Chymist*. London 1680. Robert Boyle (1627–91) who formulated Boyle's Law was born in Lismore. He is regarded as the founder of modern chemistry.



Elinor Wiltshire Photo collection, Patrick Kavanagh in a Monaghan potato field. 1963. The poet Patrick Kavanagh was born in Co. Monaghan and worked as farmer, cobbler and poet before moving to Dublin. Elinor Wiltshire worked from the Green Studios, Dublin.



Unpublished Illustration by Rosalind Praeger for "The Adventures of the Three Bold Babes". Rosalind's brother, the botanist Robert Lloyd Praeger was NLI Librarian from 1893–1923.

Green House Programme

By Niamh Leahy

AN Taisce, in partnership with the EPA, officially launched the Green Home programme in May 2008. At the launch Mr. John Gormley, T.D., Minister for the Environment, Heritage and Local Government, awarded the participating communities with the Green Home flag, in acknowledgement of their efforts to improve environmental actions within the home.

The aim of the Green Home programme is to raise environmental awareness and support positive and sustainable environmental actions amongst householders and community groups. Through participation in this programme communities are being strengthened as they work together to protect their environment.

The programme focuses on waste reduction, energy efficiency in the home, water conservation and the promotion of sustainable travel. Householders receive information and advice through the programme to help them make

informed decisions and take various actions that will help the environment, while also reducing costs in the home.

The Green Home programme, which builds on the very successful Green Schools programme, has been run on a pilot basis since November 2006. To date, almost 2,500 families in seventeen different communities throughout Ireland have been given the opportunity to participate.

Continuous monitoring of the programme through the use of surveys has shown a positive shift in environmental behaviour amongst participating householders.

The programme aims to support and direct householders in bringing down their waste and fuel bills by putting certain actions into place. These actions will also assist householders to reduce the amount of CO₂ emissions they are sending into the atmosphere. Every time we send too much waste to landfill, leave lights on unnecessarily or use too much water we are contributing to the ever-increasing CO₂ levels.



At the launch of the Green Home Programme.

Participants were surveyed in 2006, at the beginning of the programme, and again in 2008. The purpose of the survey was to analyse any change in their environmental behaviour and attitudes on completion of the programme. Some results from the surveys, which show an overall improvement, are:

Energy use:

– Only 10% of respondents in 2006 stated that they “always” turn off electrical equipment fully without leaving them on standby. In 2008, this had increased to 59%.
The number of respondents to ‘always’ use energy-saving bulbs jumped from 37% in 2006 to 55% in 2008.

Waste reduction:

– The number of participants who ‘always’ deal with biodegradable waste by composting or running a wormery, has risen from 30% in 2006 to 35% in 2008.
In 2008, 7% more respondents were recycling paper, plastic, and cardboard than in 2006.

Water conservation:

– In 2006, 78% of respondents stated that they ‘always’ fix leaking taps quickly. Having completed the Green Home programme,

88% of respondents stated that they “always” take this action.

Sustainable transport

– In 2006, 29% of respondents stated that they ‘always’ buy cars that are more fuel efficient. This rose to 47% in 2008.

According to the 2008 survey, 59% of respondents felt that participating in the Green Home programme raised their awareness on environmental topics either “quite a lot” or “greatly”.

The next phase of the Green Home Programme involves working with 40 new school areas. Challenges will be set for participating householders over a two-year period, with 10 community areas being targeted.

The GreenHome programme is strongly linked to the local Green School through curricular work and also as a venue for GreenHome evening meetings.

For further information or to join the Green Home programme visit www.greenhome.ie or contact the Green Home Team on teach-green2@antaisce.org or by calling 01 4002205.

Niamh Leahy, EPA Media Relations Officer, EPA Headquarters, PO Box 3000, Johnstown Castle Estate, Co Wexford, Ireland. www.epa.ie



Reduce the weight of your refuse bin by composting your kitchen waste.



Composting is recycling too!

Green Home Area	Host School for Meetings
Old Leighlin, Co. Carlow	Scoil Molaise
Bennekerry, Co. Carlow	Bennekerry N.S.
Slieverue, Co. Kilkenny	Slieverue N.S.
Lisdowney, Co. Kilkenny	Scoil Bhride N.S.
Drogheda, Co. Louth	Scoil Aonghusa
Dromiskin, Co. Louth	St. Peter's N.S.
Durrow, Co. Laois	Our Lady's Meadow N.S.
Abbeyleix, Co. Laois	Scoil Mhuire N.S.
Tallanstown, Co. Louth	Tallanstown N.S.
Stabannon, Co. Louth	Stabannon N.S.
Skerries, Co. Dublin	Holm Patrick N.S.
Palmerstown, Dublin 20	St. Brigid's N.S. Turret Rd.
Clonburris, Dublin 22	Our Lady Queen of the Apostles
Oranmore, Co. Galway	Maree N.S.
Claregalway, Co. Galway	Bawnmore N.S.
Renmore, Galway City	Gaelscoil Dara
Circular Rd. Galway City	St. James' N.S., Bushy Park

Seventeen Green Home Communities around the country.

By Peg Herring

NO matter how high you climb up the mountains or how far north you travel into the Arctic, no matter how remote you find yourself, you will find some of the world's most toxic chemicals in concentrations that threaten fish and humans.

"Places that are far removed from human activity, places high in altitude or high in latitude, were once thought to be pristine," said Carl Schreck. "They are not; nothing is pristine anymore. Pollution doesn't go away, because there is no 'away'."

Schreck, a professor in OSU's Department of Fisheries and Wildlife, is part of a collaboration of university and government scientists who have recently completed a six-year study of airborne contamination in national parks from California to Alaska. The National Park Service first became interested in the issue of airborne transport of contaminants when they found compounds such as DDT and PCBs in arctic parks, far from any agricultural or industrial source. The Western Airborne Contaminant Assessment Program (WACAP) was commissioned to learn more about the pollutants found in these remote areas, where they came from, and how they impact the plants there.

Far from the usual crowds of national park visitors, the researchers trekked to isolated wilderness lakes in the high Sierra, Rocky, and Cascade mountains, and deep into Alaska's backcountry. There, they measured toxic metals and other contaminants in snow, soil, air, water, fish, and vegetation in places once thought to be among the most pristine areas in the world.

Some of these contaminants have a very long commute, crossing the Pacific Ocean on atmospheric currents from as far away as Asia and eastern Europe. These air masses can carry coal smoke (a major source of mercury) and polychlorinated biphenyls (PCBs) emitted from industrial sites in Russia, China, and elsewhere. Some concentrate in cold environments, where they settle on soil, vegetation, and water. Mercury, PCBs, and pesticide compounds can be rained down into arctic lakes, bound onto falling snowflakes, or absorbed from the air by vegetation.

Staci Simonich is an expert in tracking airborne pollutants in global air currents. A professor in OSU's Department of Environmental and Molecular Toxicology, she leads the project's assessment of per-



New study reveals contamination in the world's most remote places

sistent organic pollutants. "These compounds can travel very long distances in the atmosphere," Simonich explained. When air masses hit the mountains of western North America, some of the pollutants they carry begin to fall out. As contaminants are deposited, they warm, volatilize, and rise farther up the mountainside before they settle, volatilize, and rise again. In this way, persistent organic pollutants hopscotch their way into the highest elevations and latitudes.

It takes more than hopscotch to get a team of scientists and all their research gear into these remote areas. They carried the bare essentials: 2,000 pounds of scientific equipment, inflatable boats, hand pumps, dry ice, shelter, and food for eight people for three or four days. Where pack animals were allowed, they used horses to help carry the load. In remote arctic lakes, they relied on floatplanes to reach their sampling sites.

"A floatplane would drop us off with all our equipment a hundred miles from the nearest village," said Adam Schwindt, one of the OSU researchers with the WACAP team who worked in the arctic parks. "We just hoped that the weather would hold for three or four days so the plane could come back to get us when we were done."

"Bears were a big concern," said Schreck, who leads the USGS Cooperative Fish and Wildlife Research Unit in Oregon and led WACAP's fish physiology investigations. "Almost everywhere we sampled, there were bears. And there we were, dissecting fish, covered in fish blood, in a camp filled with fish samples."

And there was the fatigue factor. The researchers had to



In winter, the researchers collected snow samples throughout the depth of the snowpack and packed the samples out on skis and sleds.

carry everything in, sometimes on their backs, set up camp at 10,000-foot elevations, then work very precisely for 16-hour days. They devised hand-powered portable gadgets to accomplish tasks usually reserved for bigger, heavier, more sophisticated instrumentation. They rigged a hand-cranked centrifuge resembling an old washing machine and packed in hundreds of pounds of dry ice to freeze their samples for later analysis.

Using an inflatable raft, a winch, and some aircraft cable, the researchers probed layers of lake sediments. The layers could be read like a history book written through more than 130 years. There were layers of fly ash from early coal-fired plants, cleaner sediments that marked the passage of the Clean Air Act, and recent increases in contaminants that likely marked the Asian industrial boom. Pesticides, both those in current use and those long-banned, showed up in the high lakes of Rocky Mountain, Glacier, and Sequoia national parks.

Many of the contaminants end up in fatty tissues of fish and can accumulate as contaminated fish are eaten by other fish in turn. Such bioaccumulation has caused some fish to exceed the safety threshold for food, a concern for people who live off those



The world's pollution migrates around the globe, hitchhiking on global air masses into the highest altitudes and polar latitudes.



Battling mosquitoes and wary of bears, the WACAP researchers developed portable lab equipment, such as this hand-powered centrifuge, that could be carried to remote locations and operated without auxiliary power.

fish in arctic communities, Schreck explained.

The researchers observed endocrine disruptions that feminized male fish, a trait sometimes found in fish in sewage treatment plants. "We have seen physiological and pathological changes in fish in these lakes and an accumulation of toxic chemicals in the environment that could only have come by air," said Michael Kent, director of the centre for salmon disease research at OSU and head of the WACAP fish pathology investigation.

Airborne contaminants are absorbed by some kinds of vegetation, and the researchers found contaminants accumulated in lichen and in the needles of trees.

When the needles dropped they carried an application of chemicals to the ground with them. In this way, and in many other ways, toxic metals and organic compounds persist long after being released into the atmosphere.

In the winter, the researchers carried their gear on skis and sleds to sample the snowpack. They tunneled down as much as 15 feet into the snow to measure its temperature, density, and other characteristics. They packed samples of snow into dozens of containers the size of basketballs and hauled them back to camp on sleds and in backpacks. Then they shipped the frozen samples to Simonich's lab at OSU, where her team tested for the presence of 89

different organic compounds and 49 toxic metals.

"We had to keep the snow frozen until we were ready for the analysis, because snow chemistry can change as it melts," Simonich explained. Some of the targeted compounds can turn to gas and escape as the snow melts, so it took Simonich's team about six days to melt and filter each snow sample and test it for hazardous compounds.

It took them even longer to develop the laboratory procedures they would use to test the samples, tests that they would be the first to develop and use. "The students in my lab were working 24/7, each specialising in one type of test," she said. "The results were phenomenal: two PhD's and two master's degrees based on new procedures developed during this project."

The strength of the study comes in part from the collaboration among agencies and across disciplines, according to Dixon Landers, the project's scientific director and a senior research scientist at U.S. Environmental Protection Agency.

"We had no idea what suite of contaminants we would find or where we'd find them," Landers said. "We were investigating the presence of more than 100 compounds across a very large area, essentially from the Arctic to Mexico." Some sources of pollution were nearby and obvious: smelters, industrial agriculture, population centres. Others were much more distant. Still others were the result of chemicals long banned but still making their presence known. For example, DDT is so persistent, soils are still exhaling it from applications made 40 years ago.

Jennifer Ramsay, a student researcher with the WACAP team, recalled a moment working at a site above the Arctic Circle. "A herd of caribou came up and just stared at us; they probably had never seen a human before," she said. "It's hard to imagine that you can be so far away from the industrial world and still measure its impact."

Peg Herring is Editor of "Oregon Agricultural Progress", which is published by the Oregon Agricultural Experiment Station, Corvallis, OR, USA. This article is reprinted with permission. Website: <http://oregonprogress.oregonstate.edu>.

Photo: Tom Weeks, Oregon State University

Photo: Dave King, Oregon State University

Photo: US National Park Service

Sampling fish for the Water Framework Directive

By Ciaran Byrne

Central and Regional Fisheries Boards

The Central Fisheries Board (CFB) and the Regional Fisheries Boards (RFBs) are working jointly to monitor fish communities in rivers, lakes and estuaries around Ireland as part of their remit for the Water Framework Directive (WFD).

The responsibility for monitoring fish for the Water Framework Directive has been assigned to the Central and Regional Fisheries Boards. Stock assessment surveys are being carried out at specified locations in a 3 year rolling cycle. 73 lakes, 179 sites in rivers and 54 estuaries are being surveyed for fish. The surveys are being conducted using a suite of European standard methods; electric fishing

is the main survey method used in rivers and various netting techniques are being used in lakes and estuaries. Survey work is being conducted between June and November, which is the optimum time for sampling fish in Ireland. All fish species are being targeted during the surveys. This research will provide new information on the status of fish species present at these sites as well as on their abundance,

growth patterns, and population demographics.

A team of scientists has been recruited to the Central Fisheries Board to carry out the fish monitoring surveys in 2008 and 2009. The sampling programme planned for 2008 was extensive and involved surveying 31 lakes, 120 river sites and 43 estuaries. Monitoring on lakes and estuaries is on schedule in 2008, however the river surveys have been

delayed due to the unseasonal flooding. To date 60 river sites, 23 lakes and 7 estuaries have been surveyed and approximately 20,000 fish were recorded during the surveys. All fish have been identified, counted and a representative sample was measured, weighed and had scales removed for aging purposes. Some fish have been retained for further analysis in the CFB laboratory. Preliminary reports are available to read on the WFD fish website (www.wfd-fish.ie). A more detailed report will be available in 2009.

As well as providing a better knowledge of Ireland's fish, this research will be relevant to all those with an interest in freshwater and coastal fisheries. The information from this work will be used (with other data) to evaluate the effectiveness or otherwise of the programme of measures in the River Basin Management Plans.

In 2007, the Central and Regional Fisheries Boards, together with fishery owners and angling clubs, successfully surveyed 15 lakes around Ireland. Preliminary results from this work are available on the WFD fish website (www.wfdfish.ie), and a comprehensive report is due for release following the analysis of samples from this survey. In addition, transitional waters in the Barrow, Nore and Suir estuaries and in Waterford Harbour were also surveyed with the assistance of the Southern Regional Fisheries Board.

The Water Framework Directive

In December 2000, the European Union introduced the Water Framework Directive (WFD) – as part of a new standard approach for all countries to manage their water resources and to protect aquatic ecosystems. The fundamental objectives of the WFD, which was transposed into Irish Law in December 2003, are to protect and maintain the status of waters that are already of good or high quality, to prevent any further deterioration and to restore all waters that are impaired so that they achieve at least good status by 2015. Many pollution reduction measures, already in place as part of existing directives and national legislation will be evaluated, modified, and coordinated under the WFD to achieve these objectives. The

WFD is being administered and managed at local level by River Basin Districts (RBDs). In accordance with national legislation (S.I. 722 / 2003), the Environmental Protection Agency published, in 2006, a programme of monitoring to be carried out in Ireland in order to meet the legislative requirements of the WFD.

Why monitor?

The WFD calls for the protection and restoration of clean water across Europe. A key step in this process is for EU Member States to assess the health of their surface waters through national monitoring programmes. Monitoring is the main tool used to classify the status (high, good, moderate, poor and bad) of each water body (section of a river or other surface water). Once each country has determined the current status of their water bodies, monitoring then helps to track the effectiveness of measures needed to clean up water bodies and achieve good status.

Previous monitoring

Water quality in Ireland has been assessed for many years by the Environmental Protection Agency (EPA) principally on the basis of water chemistry and aquatic creatures such as insects, snails and shrimps. In the year 2000, the OECD criticised Ireland for placing too much emphasis on water quality and not enough on ecosystem quality. The WFD now requires that, in addition to the normal monitoring carried out by the EPA, other aquatic communities such as plants and fish populations must also be evaluated periodically in certain situations. WFD will also monitor human impacts on hydromorphology (i.e. the physical shape of river systems). These data collectively will be used to assess ecosystem quality.

Anyone who would like further information about the WFD and fish monitoring can contact:

*Central Fisheries Board,
Swords Business Campus,
Swords, Co. Dublin. Phone:
01-8842600. Email:
info@cfb.ie Web Address:
www.wfdfish.ie www.cfb.ie*

Ciaran Byrne is Chief Executive of the Central Fisheries Board.

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POST

Understanding Sustainable Development

By John Blewitt

Earthscan

www.earthscan.co.uk

ISBN: 978-1-84407-454-9

Price: £18.99stg/2008

Examining a range of terms and theories from globalisation to humanism, the author methodically discusses the sustainability of global development; its basis, progression and future. Blewitt's writing encompasses a clever balance of unique insight and an evaluation of many ideas and opinions, with "Thinking questions" to take away from each chapter. This text is ideal for any student or interested party that is struggling to come to grips with the growing fount of perspectives and buzzwords surrounding this field. The final words from the author highlight the importance of communication, leadership and individual commitment for the future of our sustainable development.

The Climate Diet How you can cut carbon, cut costs and save the planet

By Jonathan Harrington

Earthscan

www.earthscan.co.uk

ISBN: 978-1-84407-533-1

Price: £9.99stg/2008

Presented in a format to parody the numerous diet books that call out to us from bookshop windows every January after our Christmas overindulgence, this title tackles the infamous climate change issue and the steps each of us can take to help cut carbon and save money at the same time. This book is an essential handbook for anyone with an environmental conscience that has been agitated by the media but left wanting of facts. The author uses simple tables of statistics to emphasise energy and emission saving points, and summarises handy tips for use at home at every chapter's conclusion.

Real-Time Coastal Observing Systems for Marine Ecosystem Dynamics and Harmful Algal Blooms

Edited by Marcel Babin, Collin S. Roesler and John J. Cullen

Unesco Publishing

http://publishing.unesco.org

ISBN: 978-92-3-104042-9

Price: €56.00/2008

The proliferation of harmful phytoplankton in marine ecosystems can cause massive fish kills, contaminate seafood with toxins, impact local and regional economies and dramatically affect ecological balance. Real-time observations are essential for effective short-term operational forecasting, but observation and modelling systems are still being developed. This volume offers guidance for developing real-time and near real-time sensing systems for observing and predicting plankton dynamics, including harmful algal blooms, in coastal waters. It explains the underlying theory and discusses current trends in research and monitoring.

PUBLICATIONS OF INTEREST

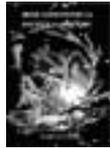


Irish Astronomical Society A History, 1937-2006

By James O'Connor

Available only from James O'Connor,
90 Acorn Road, Dundrum, Dublin 16.

Price: €14.00 (inc. p&p)/2006



I have always had a fascination and admiration for small independent societies that thrive on the dedication of its members and little or no funds. The Irish Astronomical Society is one of those and one of its long-serving members has research and published (as a personal/private initiative) the history of the society. This is a wonderfully frank account of the workings of a society over a period of 60 years. Despite the various tensions that would be common in any organisation, what comes through is that each person involved in the society had a love and commitment to astronomy. We learn about the reopening of Dunsink Observatory in 1945, which had closed in 1936 and was almost in total disrepair; how the publication of its journal "The Irish Astronomical Journal" in 1950 came about; as well as descriptions of various meetings over the years and the differences between members. The book refers to what happened in the field of astronomy around the country over the period. We also get a first hand description of twenty seven comet appearances, accounts of eclipses of sun, moon and other bodies, falls of meteorites, spectacular displays of the aurora borealis and rare planetary phenomena.

What was wonderful to learn is that John O'Connor still uses the telescope, which he made himself many years ago, to observe that other world!

One would hope this book would encourage others societies around the country to document their history, for the good and encouragement of future generations.

Jack's World Farming on the Sheep's Head Peninsula 1920-2003

By Seán Sheehan

Atrium (Cork University Press)

www.corkuniversitypress.com

ISBN-13: 978-0-9552261-1-3

Price: €39.00/2007



This is the story of the life and times of Jack Sheehan, a farmer of a small holding on the Sheep's Head Peninsula, in southwest Cork. He stayed on the farm all of his 83 years. He kept a diary from the early 1930s onwards and his nephew, Sean Sheehan, using these diaries, has given us a wonderful insight into the life of an extraordinary happy man. Jack had names for each of the 31 fields on his farm, such as Pairc an Leasa (field of the fort), Paird on Ti (the field of the house), Garral n bhfear (the field of the men). Jack recorded the happenings of nature in his diaries, when the swallows came and went, the crops he grew, the weather, when mackerel was seen in the bay. This was a book hard to put down because it is so much a record of life in rural West Cork for nigh on 80 years. Jack lead a simple, happy life, enjoying nature's world and the work he did

in his beloved fields. Again, a wonderful Christmas present.

Collins Complete energy-saving DIY

By Albert Jackson and David Day

Harpercollins

www.collins.co.uk

ISBN: 978 0 00 726672 2 (HB)

Price: £9.99stg/2008



This is a timely book for most people. It offers simple advice, with instructions, on how you can repair, maintain and improve your home and in doing so reduce your fuel bills. The author suggests how you can make a difference to your budget and help the environment, without having to make unacceptable sacrifices. The book has three sections:

- Insulation and ventilation
- Conserving power and water
- Efficient heating

There are dozens of suggestions, which are embarrassingly simple. This book should be in every home but especially in every school library so that children can be taught from an early age to conserve. Highly recommended as Christmas present for young and old.

Cool Waters/Emerald Sea Diving in Temperate Waters

By John Collins

Atrium (Cork University Press)

www.corkuniversitypress.com

ISBN-13: 978-0-9535353-8-5

Price: €29.99/2006



This book is a marine adventure through the oceans of the world, from around West Europe, North America and South Africa. John Collins has a special gift as a photographer. He brings us 120 wonderful photographs of marine life. Among my favourites are the Cuttlefish, Canary Islands; the Goose Barnacle, Vancouver Island, Canada; Sea Scorpion with pipe fish, Co. Kerry; Jellyfish detail, Aran Islands, Weedy Sea Dragon and Porcupine Fish, Tasmania, Australia; and the Great White Shark, South Africa (oh, those teeth!). This is a wonderful book as a present, especially for the younger members of the family and of course diving friends.

Extreme Birds from the fastest to the smartest

By Dominic Couzens

HarperCollins Publishers Ltd

www.collins.co.uk

ISBN: 978 0 00 727923 4

Price: £30.00stg/2008



This lavishly illustrated book brings together the extremes of the bird world. The bird that can sleep for 100 days, or the one that can fly without stopping for a mini-

mum of four years, the best energy saving bird, the one with the longest tongue, sexiest tail, the whitest, the smelliest. My favourite photograph is the craftiest builder – the southern masked weaver. The photograph of its beautifully constructed nest and the bird exiting from the underside, is just stunning. The text tells us the nest is suspended from the tip of an overhanging branch, and it sure is. But other photographs are also fascinating – The Tengmalm Owl and rodent and the photograph of the Cuban today.

For the long-suffering partners of bird-watchers, this book is the ideal present. But do use it first as a quiz book and see how "little" your partner knows about birds. A beautiful book!

Poverty Reduction that Works Experience of Scaling Up Development Success

Edited by Paul Steele, Neil Fernando & Maneka Weddikara

Earthscan

www.earthscan.co.uk

ISBN: 978-1-84407-601-7

Price: £22.95stg/2008



The Asia-Pacific region is home to more than half of the world's population, and more than 60% of the world's poor people. This book details a compilation of 20 innovative Global experiences, in 15 countries in the developing world, of poverty reduction intervention schemes that have shown good practice and the successes achieved.

These examples show the key problems and tensions faced in poverty reduction and how they were overcome; tackling the question what makes good practice for targeted poverty reduction and how can this

good practice be scaled up?

Many of the cases started out as small scale interventions by non-government organisations, donors or government pilots but now are being scaled up to form part of national policy or replicated in other regions across their respective countries.

This book contains a wealth of knowledge, evidence and ideas for those working to reduce poverty at the local level, while aiming to achieve a global impact.

Nano Nature Nature's spectacular hidden world

By Richard Jones

HarperCollins Publishers Ltd

www.collins.co.uk

ISBN: 978 0 00 727842 8

Price: £20.00stg/2008



Through the amazing technology of the scanning electron microscope (SEM), which can magnify objects up to 200,000 times, this book gives the reader an un-paralleled view into the staggering complexity and unimaginable beauty of the animal and plant structures which surround us every day but are far too small to be seen with the naked eye.

The fruiting head of a moss looks like the air-intake nozzle of a turbo-jet engine, an impenetrable forest of pine trees are the hairs on the body of a tarantula, the tip of a flies foot appears as intricate & delicate as an ornamental thistle and the foot-pad of a gecko resembles the fibres of a deep shag-pile carpet...slightly worn and faded at their tips.

Combining spectacular imagery with fascinating narrative, this book reveals an amazing world more surreal than works of abstract art or science fiction special effects.

SUBSCRIPTION FORM

SHERKIN COMMENT is a quarterly publication of Sherkin Island Marine Station aiming to promote the awareness of our natural resources, their use and protection.

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Photos © West Kerry BirdWatch Ireland Branch

John Lusby, Barn Owl Project, with one of the Kerry owlets 2008

West Kerry's BirdWatch Ireland Branch

By Jill Crosher

WHEN we went to live in Ballydavid nearly twenty years ago I looked out of the window and saw Chough and Hen Harrier floating past. I was curious. Were these endangered species Kerry breeding birds? And it wasn't just the breeding birds that drew the eye. Internationally important wetlands and harbours supported spectacular numbers of wintering wildfowl and waders. And Corca Dhuibhne is on a geographical cusp. Things can blow in from all over the place. In November 1999 I found a Brown Shrike (from China) sitting in the hedge next to my house. A first for Ireland it caused a stir. We became considered a bit of a Rarity Hot Spot

By the late 1990's popular interest brought requests for a wildlife group. We lacked most things you need to get a BirdWatch Ireland

group going. Specifically we knew nothing, had no funds and really no area to call our own. But we had one invaluable asset and this was the full support of Frank King, a longstanding world expert on Kerry wildlife and leader of the Kerry Branch of BirdWatch Ireland

With Frank's help our brief became raising awareness and pride in Kerry's natural heritage. It's a nice brief because you are on the side of the angels. A lot of people enjoy experiencing wildlife first-hand. We ran great birding events and printed a small newsletter, created bilingual exhibitions and these in the West Kerry dialect. We seemed to have habitats that supported very important bird breeding and wintering species. There were a lot of Chough. Sometimes Corncrake were heard. Barn Owl was reported regularly. Light Bellied Brent Geese and Hen harrier wintered. Frank King told us we had the

largest Storm Petrel colony in the world breeding off the islands of Kerry. It was confusing. Just how important were our bird species?

Determined to make sense of it all we made a commitment to survey work and logging records. At about the same time Michael O'Clery came to live here. Michael is the wildlife artist behind "The Complete Guide to Ireland's Birds" and the recent "Finding Birds in Ireland". Since his arrival we have produced three consecutive Dingle Peninsula Bird Reports. With Kerry Count Council we prepared 13 bilingual information boards highlighting the bird species in those habitats in key sites on the peninsula. Michael completed a two year survey of all the breeding birds of the islands in Tralee Bay.

We linked up with the National Corncrake Project and the Twite project. We supported the Seabird 2000 survey and national Chough survey both of whom spent many months here. We census the Brent Geese in our harbours, do iWeBs surveys, monitor winter Hen Harrier roosts. There seemed no end to the amount of work to be done if we were to get to grips with the birdlife on the peninsula.

These surveys started to confirm what we had previously felt. The Chough survey confirmed that the largest concentration of Chough in Northwest Europe lives on the Dingle Peninsula. Exactly! Seabird 2000



Joe Sheehan makes Barn Owl boxes in Ventry 2008



Frank King on a trip out to the Magharees.

survey found a previously overlooked but internationally important Manx Shearwater colony on Great Blasket Island. Excellent! Michael O'Clery found a previously unknown nationally significant number of European Storm Petrel breeding on the Magharee Islands. Incredible! In July we found a Barn Owl nest site. There is a Hen Harrier roost. And in August this year we were told that our Corncrake monitoring amounted to a breeding record in some years including 2008! Wow.

In the meantime Michael O'Clery picked up the Barn Owl issue and spent months surveying likely habitats. With the National Barn Owl Project's support we have set up a state of the art Barn Owl box project. It seems as though all over Kerry communities are getting behind their Barn Owls. In Glenbeigh the postman has told all his households to be on Barn Owl alert and within days Michael was rescuing a fallen fledgling.

Sadly of course this shows too what we have lost or are in danger of losing. No more breeding Yellowhammer, Corn Bunting, Lapwing, Curlew and Ring Ouzel. Barely any Twite any Red Grouse. Daily we see damage to habitats. The Olivia Crowe's Wetlands and their Waterbirds Survey lists fourteen threats to habitats around Smerwick Harbour alone.

We are now more or less at the limits of what we can manage. We may have won the 2008 Kerry Community Volunteers Award in the Heritage and Environment section for work done but we are still just a small group of volunteers who raise our own funds.

If you would like to receive the West Kerry Branch of BirdWatch Ireland's newsletters contact Jill Crosher at crosher@eircom.net



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The new "Dingle Peninsula Bird Report 2005-2007" by Michael O'Clery is now available.



With 94 pages, full-colour throughout, tables, graphs, colour maps and 74 colour photographs it gives the status of all the bird species recorded on the peninsula. It includes a Survey of all the Breeding birds of the Magharees and related islands 2006/7 by Michael O'Clery and a Dingle Peninsula Twite survey 2006 from Derek McLoughlin.

On sale @ €2 in Ventry Post Office; Dingle Bookshop, Green Street; Dingle; the Ballyferriter Museum and the Castlegregory Information Centre.

Available by post from Lucie Hankey, Monaree, Dingle, Tralee, Kerry, Ireland. email ldhankey@indigo.ie 066 9159904

Post and packaging to Europe and worldwide is €4.00. Cheques made payable to "The West Kerry Branch of BirdWatch Ireland", or through Paypal to Lucie's email

The publishers would like to thank the sponsors of the Bird Report, specifically from the Heritage Council under the Publication Grant Scheme 2008, Brian de Staic, Fitzgerald's Homevalue, and Blasket Islands Eco Ventures.

JUNIOR PAGES

The Intelligence of Octopi

Octopi have the largest brains of all the animals without backbones. They also have eyes as complex as those found in humans and are masters of camouflage, changing their colour and skin texture almost instantaneously, to blend in with their background.

Experiments conducted on an octopus named Frida at Munich Zoo have shown that octopi can be taught complex tasks, such as unscrewing a jam jar to get at the food inside, or even to work their way around mazes, the way a laboratory rat would.

Observations on the mating behaviour of octopi on a reef off Indonesia last year shows that octopi engage in sophisticated courtship rituals including flirting, passionate hand holding and even keeping rivals away at arm's length.

The male octopus carefully select a mate and then guards her den against all potential rivals until mating takes place, after which they live for only a short time until the eggs hatch, and then die.

Ireland has its own native species called the "Curled Octopus", which are normally very shy and difficult to find in the wild. But you can see them on display in many of the excellent public aquaria around the country at Galway, Bray, Fenit or Dingle.



Research conducted at the Hebrew University of Jerusalem shows that each arm of an octopus has, quite literally, "a mind of its own".

Each arm has its own intelligence, powered by some 50 million nerve bundles or "neurons" that allow it to perform complex movements set off by a simple command from the octopus's brain.

A severed octopus's arm was even made to move realistically on its own by tickling and stimulating the skin.



**Captain
Cockle's
Log**

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The largest ship in the world today is the supertanker *Knock Nevis* which is 458 metres long – almost twice as long as the *RMS Titanic* (shown in black). *Knock Nevis* can carry 650,000 cubic metres of crude oil and is easily big enough to carry the Eiffel Tower from Paris lengthwise on its deck. She sits 41 metres high out of the water when fully loaded and is 69 metres wide. Her large size makes it impossible for her to navigate either the Suez or Panama canals. She is currently moored as a permanent floating oil storage facility in the Qatar Al Sharee oil field in the Persian Gulf.



OLLIE SAYS - "Check out these cool websites at":
www.octopus.com/anatomy

www.en.wikipedia.org/wiki/Knock_Nevis

www.universityscience.ie/pages/scientists/sci_francis_beaufort.php

Sir Francis Beaufort – the famous hydrographer and scientist – was born in County Meath in 1774. He was virtually self-educated, and spent most of his early life at sea – in the merchant marine and the British Navy. As a lieutenant on *HMS Phaeton* he was wounded 19 times.

As a young man, Beaufort became interested in weather conditions having been shipwrecked. He kept a weather journal for most of his life and is most famous for his "Beaufort Scale" for measuring the weather at sea based on easily recognisable sea conditions.

He became Hydrographer for the British Navy and died at the ripe old age of 81.





A Selection of Winning Entries

Sherkin Island Marine Station's
Environmental Competition for Primary School Children in Munster 2008



Sponsors: Bord Iascaigh Mhara; City Print; Central Fisheries Board; Cork County Council; Cork City Council; Dept. of the Environment, Heritage & Local Government; Evening Echo; Janssen Pharmaceutical Ltd; Pfizer Ireland Pharmaceuticals



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A Garden Snail Tale

Use the words in the box (below left) to fill in the blanks in this story (answers on page 30):

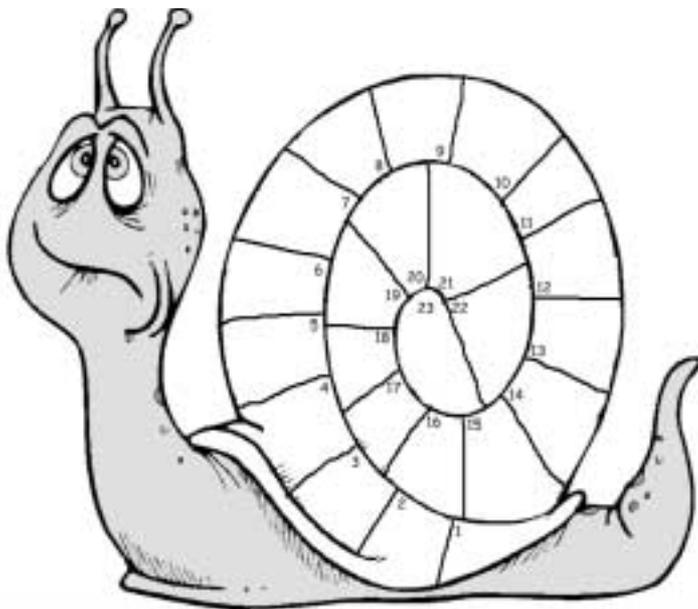
The Common Snail carries its home on its back. The hard, 1 shell is light brown, with darker brown bands. It has four 2 at the front end of its body. Two are for 3 and the longer two are 4. The snail's body is pale grey and its 5 is moist. To avoid drying up in really warm weather, it curls up inside the shell and 6 the entrance. It much prefers 7. Because the snail only feeds on such things as plants, fungi and lichens, it is known as a 8. The snail lays its 9 in the soil and they will hatch in about 14 days. Some gardeners consider the snail as a 10. The snail also has other enemies such as lizards, hedgehogs and 11.

tentacles * eye stalks * spiral * herbivores
 pests * eggs * damp weather * feeling
 skin * seals * birds

A Garden Snail Trail

With help from the words in the box (above) see if you can work out what each of the five answers would be to the questions below. The answers fit into the snail's shell, the last letter of the first word is the first letter of the second words, and so on. *Answers on page 30.*

1. One of these animals is an enemy.
2. The snail prefers this type of weather.
3. A gardener might think a snail is one of these.
4. The snail has four of these at the front of its body.
5. This is the shape of the snail's shell.



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Gaisce – The President's Awards

Defence Forces Annual Adventure Challenge 2008

By Aodh O'Duinn

I WAS chosen along with 26 other Gaisce – The President's Award participants from all over Ireland to take part in the Annual Gaisce / Defence Forces Adventure Challenge with the 2nd Field Artillery Regiment.

DAY 1: At 1000 hours I met other members of the group at McKee Barracks in the Phoenix Park. No niceties were observed as we were immediately plunged into the discipline of life with the Irish Defence Forces. On our acceptance onto the course we had been given a list of personal items we would need to bring with us; however a quick cull of bulging backpacks and hold all's resulted in our stashes of goodies and luxury items being impounded.

Obviously the army personnel of the 2nd Field Artillery Regiment had a different understanding as to what constituted 'essential items'! Trendy clothes and brand logos were banished as we were kitted out in army issue uniforms (fatigues). The novelty of the uniform added to an air of excitement among the group. With liberal application of camouflage paint our group was now unrecognisable as the students who had arrived to present themselves at the barracks only minutes earlier.

Before Army transport arrived to take us to the Wicklow Mountains, which was to be our base (home) for the next few days. NCOs gave a talk on the type of weaponry employed by the Irish Army. Naively we had assumed that the transport would deliver us directly to our base camp – a notion abruptly dispelled when, on reaching the mountains, we were ordered to leave the comparative comfort of our transport and begin to hike to base camp. Momentarily we were glad that the seizure of our heaving stashes of Mars bars and other goodies had lightened our load somewhat as we shouldered our packs to begin the long hike.

Trekking through the beautiful woodland terrain with glimpses of rushing streams and heather and furze cloaked valleys it was amazing to realise that such an unspoilt and rugged landscape existed within a short reach of the capital city, Dublin. Our arrival at the base camp brought a much needed, but brief, respite. Soon it was back to work as we set up our bivouacs for a night sleeping under the stars. There was an unbelievable buzz around the camp as everyone pitched in to help one another.

Having set up camp and with meal time approaching we set about preparing our first meal. We were all ravenous but we now faced the hurdle of the dreaded army rations. With marked reluctance we investigated the gourmet splendour of our ration packs. The NCOs watched with a mixture of displeasure and amusement as some students boiled their food twice over, in an effort to buy some more time before the inevitable tasting! A bit of 'rationing' never harmed anyone – I actually liked the stuff!

The evening of the first day was spent learning about survival in the wilderness. We were shown different methods of cooking, how to build a shelter, how to snare wild animals, and

how to fish. A fascinating demonstration taught us how to recognise edible plants and start fires. This was carried out by the Air Corps personnel – a lecture on how to choose a suitable area came too late for me as I was, painfully, to discover.

DAY 2: A 0600 hours start saw me unconscious to the world. The poor topographical situation of my sleeping site resulted in my sliding out of my bivy during the night and into the woodland below the base camp – nothing damaged except the pride! To add to my discomfort a root underneath my back seemed to have grown into my spine. Woken suddenly and none too tenderly at 0600 hours to brew up and face the joys of the 'All Day Breakfast' (Ration Pack) – a meal despised by all. This could only be stomachied by piking it back quickly, in a futile attempt to avoid the waves of nausea.

A special treat had been planned by the NCOs for the group – a hike to the mountain top. Despite the infamous 'All Day Breakfast' everyone was still alive and rearing to go. The uphill hike was difficult at times as the terrain was boggy with a lot of scrub and brush. We spotted deer and hare quite near the trail we were following. We were haunted with fine weather and the atmosphere was great as groups chatted as they hiked uphill, even the NCOs lightened up! We drank greedily from our canteens and soon were low on water. We could not replenish our supply as the ground water was too brackish to use. Arriving at the summit, ahead of schedule, we brewed up. I had to use the remaining orange-flavoured isotonic solution in my canteen to cook the noodles – definitely an acquired taste!

We then had an introductory class with Cpl Jackson on map reading and navigation where he explained the intricacies of triangulation and route planning. A planned hike through dense woodland was thwarted when it was discovered that the area chosen had fallen victim to deforestation! Note to Ordnance Survey on map updating. Army personnel awaited us with fresh water supplies at the end of the route and plain old Uisce was never more appreciated by our parched and tired group. There's no doubt that those of us who expected a holiday-camp were sorely mistaken. We were being put through our paces to the exacting standards of the army personnel, and we all responded to this by attempting to meet their expectations. There was no shortage of encouragement from our instructors and morale was high at all times.

The night time activity was a simulated raid on an enemy position under the cover of darkness. Our task was to scout out enemy position and gather information. Before setting out we had been briefed on the use of night-vision goggles which would be vital and our group was divided into teams for this task and everybody was high with excitement and nervousness. The area for the exercise was a new and unfamiliar territory, made doubly so by the concealing blanket of darkness. On arrival at the target area we crawled through the undergrowth to get into position. We had been



Aodh O'Duinn (the author of the piece) in the foreground with Gavin Leddy from Dublin sitting.

briefed on the enemy positions using co-ordinates already mapped out. Suddenly, flares illuminated the darkness. We remembered the stealth techniques we had learned as we crawled along the forest floor desperately trying to avoid detection. Adrenalin was flowing – it felt like the real deal! Knowing that 'the enemy' was Defence Force personnel did not take from the realism of the experience. Even the night sounds from the surrounding woods had our nerves on edge. It was an absolutely fantastic experience and afterwards we were all glad to relax our strained nerves and dissolved into laughter as individual experiences of the exercise were recalled. Despite exhaustion, the excitement kept us awake late into night.

DAY 3: The 0600 hours, call pulled me out of a deep slumber with the dreaded 'All Day Breakfast' waiting to be conquered. A vision of my stash of Mars Bars, back at McKee Barracks, was a recurrent and tantalising image.

The day's programme was pontoon building, an assault course which included rope crossing over ravines, zip-lines and a water challenge. The idea of the programme was team-building. Although individually the tasks were physically demanding and at times daunting, everyone in the group gained great satisfaction and confidence on successfully completing the challenges – due in no small measure to the encouragement and patience of our instructors.

By 1700 hours that evening we were physically drained and almost collapsed when the sergeant told us that we had to undertake a 10k run to the top of the hill. We almost collapsed with shock. Doggedly we set off and wearily rounded the first bend. Awaiting us was the surprise of the day – instead of the 10k run a Barbecue had been set up. Real food and plenty of it! We piked back masses of gorgeous food, had a night off to chat and relax – heaven!

This was our last night sleeping under the stars and we all felt a huge sense of disappoint-

ment that our time with the Defence Forces / Gaisce initiative was coming to an end. Everyone wished that we wouldn't have to leave so soon. Friendships had formed and we had really gelled as a group. Tomorrow everyone would return to the four corners of Ireland but we had shared a fantastic and unforgettable experience.

DAY 4: There was an air of sadness on the final morning as we dismantled our camp and set off on our final hike. As we ascended the hilly terrain we were presented with fantastic scenery from sweeping expansive fields against the backdrop of the blue and purple ridges of the mountains to the glistening lakes below bordered by swathes of rushes and sedges. Reaching a plateau we were stunned to see an Air Corps helicopter appear from the ridge and fly close overhead. Bundled inside the chopper we were soon airborne and heading for the Phoenix Park. A truly amazing end to a fantastic experience! Back at McKee Barracks we reluctantly handed back our uniforms and wiped off our camouflage paint. We hardly recognised each other back in civilian mode, and then it was onto the army transport to Heuston Station and home.

On behalf of myself and the other Gaisce Army Survival Training participants I would like to extend sincere thanks to Gaisce – The President's Award and the members of the Irish Defence Forces for their unstinting help and support during what was an unforgettable experience.

If you are interested in entering for a Gaisce Award please contact: Gaisce – The President's Award, The State Apartments, Dublin Castle, Dublin 2. Tel: 01 4758746. Email: mail@gaisce.ie or check out their website: www.gaisce.ie

ANSWERS FOR PAGE 29:

A Garden Snail Trail: 1. Bird; 2. Damp; 3. Pest; 4. Tentacles; 5. Spiral. A Garden Snail Tale: 1. Spiral; 2. Tentacles; 3. Feeling; 4. Eye stalks; 5. Skin; 6. Seals; 7. Damp weather; 8. Herbivore; 9. Eggs; 10. Pest; 11. Birds.

A Greener Focus on Youth

By Gavan Hennessy

I FIRST held a fly rod at the age of seven and from this early age I developed a respect for nature and a love for fly fishing that will stay with me for the rest of my days. This is one of the reasons I get emotional when I look around Ireland and absorb what is going on in relation to environmental issues and general lack of control surrounding all aspects of fly fishing and the places in which it is practiced. While thinking about this and chatting amongst friends, it became very clear to me, that we, i.e. our current adult generations and governments to date, are really not doing a very good job, both in caring for the environment or in the installation of good principles, values and practices in our youth of today.

This thought process was the driving force behind the set up of a new club with a very specific focus, and that is



Photos © Gavan Hennessy

Ready to go, watch out trout!

youth development. Quite often our younger members are excluded from some of the things that matter most. If we educate people from a young age, it will put them in a much stronger position when faced with making decisions, and debating, on difficult matters such as pollution, water quality and conservation. They will be able to take an informed stand for themselves on finer details of our sport such as catch and release, buzzer fishing and drogues with a sound background in what matters most, and that is healthy water systems. There

is a lot of good work done around the country by clubs and water protection groups etc but it is very difficult to make an impact at government / decision making levels until it is too late. Who knows what some of our youth will end up dedicating their careers to? Fisheries Boards, Biology, Tourism, Politics and many more all have connections to angling and it would be nice to think that the people in these positions may have developed the same respect for conservation and love of angling as I did as a boy.

We have structured our

approach to try and give our members a balanced view across various disciplines. We had 12 weeks of fly tying, but rather than just continually tie flies, we felt it was important for the kids to see what they were trying to imitate. So, in consultation with the WRFB, we brought in kick samples from a local stream, and some microscopes for use during the session. We were worried about the attention span of our youth members at first, but were really surprised when they spent two hours studying Trout Fry, Olive Nymphs, Chironomids, Cased Caddis, Fertilized Eggs, and an Alvin with the yolk sac still attached. They would have stayed there for a further two hours if we had let them. They have been lectured on the lifecycle of trout and have been made aware of the pressure our great lakes are under. They have been out on Lough Corrib, have begun to cast, some have caught their first fish and are well and truly hooked. So we are off to a great start with a lot more planned for the future in all

areas of angling and conservation. At present there are 29 youth members ranging in age from 6 to 14 and it's great to see them enjoying themselves so much. It really puts things in perspective and makes you realise that our sport is very limited in terms of satisfaction without some fun, and this is something that we lose sight of far too often as adults.

The development of our youth is not possible without the input of dedicated individuals throughout the country and I believe it is the duty of all adult anglers to support such activities in whatever way they can, however small.

This is especially important at a time when our water systems are under more pressure than they have ever been, and the politics in angling seem to be at an all time high. If we can develop a lifelong interest in angling and the protection of our Island's natural resources, through teaching our children about all aspects of our sport and the etiquette associated with it, then surely our fish stocks will be better cared for moving forward.

Gavan Hennessy, Greenfield's Angling and Social Club, Lough Corrib, Co. Galway.



Stream samples in the classroom are a very effective and practical way of explaining the lifecycle of the trout. Sessions like this also provide the foundations for more detailed lectures on entomology and pollution. Who knows, there may well be a budding David Attenborough amongst them!

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Rhubarb & other poisons

By Anthony Toole

ONE of the abiding memories of my teenage years is of my returning home from school, on several evenings during the summer term, to a dinner that ended with a plate of stewed rhubarb and custard. We had several plants growing in the garden at the time. I loved it then and I love it now. Yet what was often thought of as a cheap dessert, possibly even a poor man's pudding, appears recently to have become fashionable and hence much more expensive, probably as a result of its being advocated by television chefs.

At a younger age, my friends and I frequently chewed the leaves of a wild plant we called 'sour dock'. I now know this to be sorrel, once prized as a salad vegetable and sauce flavouring. Yet the sour taste of both rhubarb and sorrel is due to oxalic acid, also known as ethanedioic acid, a chemical that is given the same health

rating, i.e. extreme poison, as cyanide.

The name 'oxalic' comes, like 'oxygen', from the Greek 'oxys', meaning 'sharp' or 'acidic'. Though not the strongest acid, it is much stronger than the acetic (ethanoic) acid of vinegar. Its toxic nature, however, owes nothing to its acidity, but is due to its ability to combine strongly with metals. It is known for its capacity to remove rust stains from clothing and is responsible for rhubarb's dissolving of aluminium from cooking pans.

Inside the body, several metal ions, like those of sodium, potassium, magnesium, iron etc all perform important functions, which can be disrupted if they combine with oxalic acid, which can effectively remove them. The most serious consequences result from its combination with calcium ions.

While most of the 1.2 kg of calcium in the body is present in the bones, about 1% is nec-

essary for the control of blood acidity, hormone release and electrical activity in the nerves. Bones act partly as a reservoir from which ions can flow to maintain the balance in the blood, while bone calcium is replaced from food. Oxalic acid seriously compromises this calcium cycle. An early symptom of oxalic acid poisoning is the presence of microscopic crystals of calcium oxalate in the urine. If these crystals grow larger, prior to excretion, they can obstruct the tubules in the kidneys, resulting in painful kidney stones and even permanent kidney damage. Deposition of calcium oxalate crystals between the joints can cause the less serious, though equally painful gout. The removal of calcium and other minerals can also lead to nutrient deficiency.

The concentration of oxalic acid in rhubarb is well below the danger level, though it is much higher in the leaves and roots, which should never be

eaten. The well-known laxative effect of rhubarb is a safety mechanism by which the body rids itself of this toxin before much of it can be absorbed. Other foods that contain appreciable amounts include cabbage, grapes, beetroot, tomatoes, sweet potatoes, chocolate, nuts, berries and tea.

Spinach is often thought of as a rich source of dietary iron. However, nearly all of

this iron in spinach is combined with oxalic acid, which effectively prevents its being absorbed by the body. If large amounts of ascorbic acid (vitamin C) are eaten, most of the excess that the body does not use is excreted, but some can be oxidised to oxalic acid. If ethylene glycol, the main component in anti-freeze, is accidentally swallowed, it can also be converted to oxalic acid inside the body.

A technique known as titration, which is used extensively in analytical chemistry, involves measuring a very accurate volume of a liquid by sucking it into a long glass tube, known as a pipette. This is normally done safely using a manually operated pipette filler. As a young chemist, before such practice became commonplace, I was taught to do this using my mouth. When the liquid was oxalic acid, we were told simply, though forcefully, that under no circumstances were we to get any of it into our mouths. Nobody ever did.

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