SHERKIN COMMENT

Issue No. 52 Environmental Quarterly of Sherkin Island Marine Station *2011*

INSIDE

The Beetles of Sherkin Island & Roaringwater Bay

The beautiful iridescent Rose Chafer beetle.
Photograph © Tom Daguerre

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Editorial

Guardians of Our Lands

By Matt Murphy

WHAT a resource we have in our land. It fulfils a multitude of roles. It gives us food – such as dairy, meat, vegetables and grains – provides us with recreational activities and above all a landscape that is enjoyed and which attracts millions of people to our shores each year. There are a number of guardians of that resource, which are often taken for granted. Our farmers have the largest input.

So often the subsidies that farmers receive annually under various schemes, through the European Union, are criticised by the non-farming community and media. The IFA (Irish Farmers Association) in answering these critics on behalf of the farmers rightly point out that without those subsidies farming would be uneconomical for many now on the land. The knock-on effect would be much dearer food, which would effect society as a whole. Even with subsidies, many farmers would not make a reasonable living without some off-farm work.

These subsidies from Europe have more and more environmental conditions attached to them. These conditions are there to ensure that the landscape is being protected for future generations and are particularly strict about protecting our wildlife. One of the schemes is the Rural Environmental Protection Scheme (REPS 4), involving 30,000 farmers. When they joined REPS, farmers signed up to farm in an environmentally friendly way. The farmer must employ an independent planner to prepare a REPS plan for the period of the scheme. There are eleven measures, or sections, with sub-sections, some applicable only to diary or tillage farmers.

Farms taking part in the scheme are subject to REPS inspection. The Department of Agriculture inspectors do spot checks at farm level to ensure that farmers have done what they have undertaken to do in their farm plan. Farmers who are found not to have complied can be subject to penalties of up to 50% reduction on their grant.

Some of the measures within the scheme require the farmer to:

- Manage nutrients spread on their land.
- Protect and maintain watercourses, water bodies and wells with fencing
- Manage grassland and soil to include stock density during out wintering of animals.
- Drainage maintenance to improve the drainage of certain fields.
- Controlling of noxious weeds.
- Retain wildlife habitats.
- Maintain farm and field boundaries.
- Establish biodiversity buffer strips surrounding features of historical and archaeological interest.
- Maintain a 1.5m margin around the headland of each field. No ploughing, sowing, spraying or fertilising can be carried out.
- Maintain and improve visual appearance of farm and farmyard.
- Restrict the use of pesticides and fertilisers near field boundaries, ponds, streams and wells.
- Not burn straw and stubble.

Much of the above requires financial investment and labour input. The environment, without a doubt, gains in a very positive way from the requirements of REPS.

The semi-state body, Coillte, is another guardian that many do not realise has a huge stake in the sustainable management of our natural resource. It is a commercial company operating in forestry, land-based businesses and renewable energy. They own 445,000 hectares (over 1 million acres) of the land cover of Ireland, most of which is forested. The forestry side includes log sales, farm forestry services, plant sales. Within their forests Coillte give free access to miles of walking, hiking, cycling, orienteering, fishing picnicking and wildlife watching. It is to be hoped that if Government decides to sell off Coillte that free public access is retained for all time. Strict environmental guidelines must be laid down for any would-be purchasers. Coillte owns a huge amount of land (7% of the land of this country) and it is a very precious asset to be handing to others to manage without careful consideration. We cannot end up with another Eircom debacle. We must ask ourselves, is this road map the wisest for Ireland?

The National Parks and Wildlife Service (NPWS) is also a committed protector of our environment and plays a unique role in the guardianship of six very special landscapes – our National Parks. They also have around 10,000 hectares of small nature reserves. The parks:

- Ballycroy National Park in northwest Mayo, comprises 11,000 hectares of Atlantic blanket boy and mountainous terrain.
- Burren National Park in the southeastern corner of the Burren is 1500 hectares.
- Connemara National Park, in West Co. Galway covers some 2,957 of mountains, bogs, grasslands and woodlands.
- Glenveagh National Park in north-west Co. Donegal with over 16,000 hectares of rugged mountains, pristine lakes and peatlands.
- Killarney National Park with mountains, lakes, wood and waterfalls, covers 10,236 hectares.
- And finally, Wicklow National Park covers part of a mountain range that extends over most of Co. Wicklow.

The National Parks are of special scientific, educational and recreational interest and contain a natural landscape of great beauty, which visitors can access for free.

There is now development of national and local walks throughout the country, which are helping to get us outdoors, to appreciate the landscape and above all to help us to be more health conscious. They feature both coastal and inland walks, taking in archaeology and historical sites, local flora and fauna and villages. The Beara and Sheep's Head walks in south-west Cork Millennium Stone Loop, which explores the unspoilt Glen of Aherlow, the Spink Look walk in Glendalough, the Cavan Way and the Kerry Way are but a few. There are many local and some national groups such as Birdwatch Ireland and An Taisce that contribute to the protection of Ireland's National Resources.

We have a very precious natural resource in our land and we should all be interested in its protection. Throughout the world there are many people suffering from famine because continuous droughts has destroyed their meagre lands. What these people would give for this wonderful green landscape to feed their families and the health to enjoy it.

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

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STAFF: Editor, Matt Murphy; Editorial Assistant, Susan Murphy Wickens; Typesetting, Susan Murphy Wickens; Publisher, Matt Murphy.
ISSN 0791–2447 © 2011
Sherkin Island Marine Station website: **www.sherkinmarine.ie**

Mediterranean Gulls

By Oscar Merne

THOSE of us interested in wildlife conservation have become used to reading depressing news about loss and destruction of habitats and more and more species being listed as threatened or endangered. However, not all is doom and gloom, as some species are doing very well, and extending their ranges. Here in Ireland we have seen a number of birds arriving here in recent decades and establishing breeding populations. Some good examples are Collared Dove, Reed Warbler, Little Egret, Great Skua, Great Spotted Woodpecker …. and, the subject of this article, the Mediterranean Gull.

Mediterranean Gulls are restricted to the Western Palearctic Zone, with the core breeding area in the Ukraine, on the northern side of the Black Sea and in the Sea of Azov. In the latter half of the 20th century the population underwent a rapid increase in numbers, now estimated to be between 120,000 and 320,000 breeding pairs – the wide range is due to movements of major Ukrainian colonies from year to year, making population estimates difficult. With the increase in numbers there has also been a breeding range expansion, and the species has spread north-westwards as far as Denmark, The Netherlands, Belgium, northern France, England and Ireland. It is believed the great majority of these gulls spend the winter months in the Mediterranean Sea – hence the English name of the species. But with the range expansion outlined above, non-breeding, overwintering birds were also found increasingly in north-west Europe, including Britain and Ireland. Before 1966 there were only four records of vagrant Mediterranean Gulls in Ireland, but between then and 1980 the species turned up almost annually in very small numbers, mainly on the east and south coasts. Thereafter, non-breeding birds increased in numbers and during the last decade flocks of 50–100 have been seen, and a few (up to 15 pairs *per annum*) have been breeding regularly in mixed gull and tern colonies in Cos. Wexford and Down, and occasionally elsewhere.

Courtesy of Oscar Merne

Mediterranean Gulls, Sandycove

Courtesy of Cian Merne

Mediterranean gulls in second summer plumage (left) and adult plumage.

Courtesy of Oscar Merne

Sandycove where the birds congregate.

Adult Mediterranean Gulls in full breeding plumage are usually easy to distinguish from the somewhat similar and much commoner Black-headed Gulls, even in flight at long range. The two species resemble each other superficially, but the Mediterranean Gulls are larger and bulkier-looking than the Black-headed Gulls, have a black head rather than the dark brown of the Black-headed Gull's head, and the black on the head extends further down the nape. Both perched and in flight, the Mediterranean Gull's wings can be seen to be pure white, while the wings of the Black-headed Gull have a prominent white leading edge and blackish trailing edge. In winter plumage, the black or dark brown head of the two species are lost, but the wing patterns remain a good way of separating the gulls. Close up, the bill of the adult Mediterranean Gull is "heavier" than that of the Black-headed, is mainly red, with a yellowish tip and a narrow black band separating these colours. The bill of the Black-headed Gull is slimmer, and red with a dark tip. Both gulls have red legs. Before the gulls moult into their adult plumage described above, they progress through several plumage phases from juvenile to first winter, first summer, second winter and second summer. Field identification becomes progressively less difficult as they approach adulthood.

Courtesy of Cian Merne

A gull in juvenile plumage.

Courtesy of Cian Merne

A Mediterranean gull in first summer plumage.

Since 1999, when 25 Mediterranean Gulls were present at Sandycove (between Dun Laoghaire and Dalkey, on the south side of Dublin Bay) from August to December, this location has become the premier site for the species in Ireland. Numbers of gulls have increased there annually, reaching a peak of 101 in autumn 2010. Observations throughout the year are showing that the gulls are present for much of the year, not just in the winter months. Adults in full breeding plumage, immature birds, and even recently-fledge juveniles, are now appearing as early as the end of June, with many staying until late April or even early May of the following year. At Sandycove, the gulls spend most of the day time loafing on the granite rocks between the East Pier at Dun Laoghaire and the Forty-foot swimming place at Sandycove, apparently doing very little if any foraging for food, except taking bread thrown to them by local people. Recent studies have shown that the gulls fly inland to feed on worms and other soil invertebrates at parks and playing fields up to 10 km from the coast. Many do so early in the morning, but if the ground is waterlogged by heavy rain they can be seen at any time during the day. Another activity that has been noticed recently is the flighting of Mediterranean Gulls to freshwater stream outfalls on the south side of Dublin Bay, between Sandymount and Booterstown. What the gulls do at night is still a mystery…

Ornithologists have been ringing many Mediterranean Gulls (both chicks and adults) in colonies in Europe in recent decades. Together with standard numbered metal rings, many birds have been fitted with brightly-coloured plastic leg rings with alpha-numeric codes that can be read in the field with binoculars or telescopes. Each year a number of these marked birds have been seen in Ireland – mainly at Sandycove and in Cork Harbour – and from these we know that Mediterranean Gulls are coming here from as far away as Hungary, Denmark, The Netherlands, Belgium, northern France and England. We also know that they are not simply passing through on passage migration, but are often staying for long periods (some from July through the winter to April), and also returning to the same place in successive years. It will be interesting to see what other findings about these attractive and enigmatic gulls emerge over the coming years.

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

Wood Ships and Iron Men

By Daphne Pochin Mould

HOW ever did they do it? Forge engines and the GPS. These days it will guide you from your own front door to your favourite pub, though maybe not your staggering route back. But I am thinking of harbours full of wooden sailing ships, all powered by the wind; no engines but travelling and trading with the world. Could you, modern sailor, on sail alone, and only with an outline of a map, get yourself to Iceland to raid the Westman Islands and carry a load of slaves back to Africa? Yet the Algerian "pirates" (explorers/empire builders?) did, as well as taking Baltimore in Co. Cork and many other places one presumes. They were good sailors, as were the Icelanders who went to Africa to try and get the captives back. But think of sea travel without radio – no word from land till you came into a port or anchorage. Had the "Titanic" not been fitted with that new fangled gizmo, the wireless, used to call for help in Morse code, we would never have known what had become of her. Icebergs tell no tales.

But the origins of navigation are distant. At the beginning of human evolution, when like all animals curious about their environment, humans looked up at the stars and asked "Why stars, why the moon, light and dark and the great fire of the sun, which blinds those who look at him/her? And they move about, mobile bodies. Helios the sun god sinks into darkness at evening and rises into light at dawn. How? Why?" But in those early days of humans on this planet there were some illiterate and very clever people who watched and remembered, so they could tell you when the Moon was likely to try to gobble up the sun and turn the world's lights off. That was a total eclipse and they knew enough about the movements of sun and moon to know when it might happen. Every fine night, the heavens blazed with fire; there was no light pollution then, so you could watch and learn. From very, very early times, there was a lot of knowledge of the stars – astronomy was born. These very clever people had brought the lights of the sky down to earth, so you knew when to sow your crops, or in which direction to steer your little boat.

It was a world without compasses and instruments, or paper and pens, but they knew how to shift very large stones and lay out their findings in stone circles, which virtually became stone calendars. I doubt clever people in modern times would be able to lay out Newgrange, so many centuries old, yet still working. Or Stonehenge –anyone who has seen an autumn sun at the equinox line itself up with the marker stones will wonder at this science, which seems to have grown out of nothing. Now we seem to need so much to do very little.

But navigation starts with knowing about the planet on which we live and its relationships with other bodies moving in space. The world is more or less round and geographers have drawn lines from pole to pole – longitude – and another set circling the earth's circumference – latitude. Combining the two gives a position on earth, your modern-day Sat/Nav works on it. Latitude is easy to measure, the Vikings knew about it. But longitude is harder, unless you have a very accurate clock. At certain positions of sun and moon, and the right lunar table (no longer published), you can calculate the longitude. Long haul sailing ships used it and many captains still use "lunars" instead of the new method of using an expensive chronometer.

But one way or another the old ships sailed, loaded with cargo to sell and return with a new load. They were tough fellows, with years of learning the sea; all the small things that nobody heeds today but which brought so many back home.

Boys used to shout "Bring us back a parrot" at the Guinness barges on the Liffey. Often the parrot did arrive though from further off than the port of Dublin. In the case of "T'aint a bird" the lost American plane, which landed at Clonakilty during World War II, it was a monkey. But when the "Golden Grove" sailed into Cork Harbour, it was a kangaroo. The wind was from the south, when the "Golden Grove" sailed past Roches Point to enter Cork Harbour. It was Thursday, May the 15th, 1789. Captain Sharp has been part of the "First Fleet" that had gone out early in 1788 with a party of convicts, and other things to begin the settlement of the new country. Now his was the first ship to arrive back in Ireland since then, and give all the news of their adventures and the new settlement. The "Golden Grove" had sailed back in ballast. Australia had yet to have exports, but she also carried an important exhibition of CURIOSITIES FROM BOTANY BAY. This had been made for the private museum of a gentleman in Dublin. However he agreed to let Cork have first sight of it. And it went on show in the heart of the old walled city, near the exchange and in the house that had been the Gibraltar Tavern. It opened on the 20th of May, 10am to 3pm admission 2s 8.5d. But for 8s 1d you could go and visit as often as you liked. There was plenty to see. With maps and charts, it covered Birds, Beasts and Fishes and included some live kangaroos. It also gave an account of the native population and their weapons – fishing lines made of bark and hooks made from shells. There was plenty for Cork to wonder at. It had taken some six months to get to Ireland, for she had left Jackson's Bay in Australia on the 20th of November last (1788). She made only one stop en route, at the Falkland Islands, for water.

Centuries of sailing made men aware of the glob wind systems sweeping the globe (top). Knowledge of the stars played an important role in the history of navigation (*left*); Sextants have been used for centuries as a navigational instrument (*above*).

Sailing ships lived on dried and salted food and were often sick with scurvy from want of green fresh items. Running out of water was the great hazard, like running out of fuel for an engine.

Centuries of sea going had made men aware of the great global wind systems that sweep round the globe – the Trade winds – and how to use them. They knew too about major ocean currents, such as the "Gulf Stream" (which is why tropical shells end up on our shores as well as messages in bottles). Men too had become aware of the earth's magnetism. Compasses were made and this allowed you to determine a direction and try to keep your ship on it. Various simple forms of sextant were devised to measure the sun's position at mid-day and so work out the latitude. When you knew the latitude of your destination, you could sail to that latitude and then kept on it. "Running your easting down" was the phrase used (if your target lay to the east).

A ship's speed (and an aeroplane's) is measured in knots and the water under her keel in fathoms. A fathom is six feet. A weighted rope marked in fathoms, was let down from the vessel and when it touched bottom, the depth read off. To calculate speed, another rope with evenly spaced knots, originally tied to a log but later a weight, could be armed to bring up samples of the sea floor. You threw the log or weight as far ahead of the ship as you could and then waited till she came up where it had fallen. The rope was now vertical and by counting the knots gave you the speed. A nautical mile is longer than a statute one. A knot is one nautical mile per hour. All these very old and simple things, part of our far off ancestors' activities with ropes and logs, have given birth to countless log books.

Every ship keeps its log book, and log books from old sailing vessels make fascinating reading. "From here I take my departure" (from a known point, say the Old Head of Kinsale) and then working on dead reckoning. But the sea is no millpond but very much on the move, so a canny captain would factor in "I allow for the heave of the sea"

An article in the Hibernian Chronicle of 1801 describes how these little ships were able to put a girdle round the earth and go on doing it. The writer says that not so very long ago people thought the accounts of great voyages, even of Sir F. Drake, were read with interest but disbelief. Now for real, the ships set out from Ireland across the Atlantic and would arrive at the Brazils. They would then turn eastward, round the Cape of Good Hope, and keep south of India and its islands, going on for Australia – that is if they were not to pick up items from India or tea from China, in which case they diverted to do this. Otherwise they picked up the Australian coast and sailed along to Port Jackson and Botany Bay. Leaving for home, they went east across the Pacific, round Cape Horn to the Atlantic and eventually Ireland. The southern part of their trip took them into those seas where the waves drive unbroken round the world. Cold, mountainous and iceberg strewn they move around lands of the albatross and the penguin. You had to be tough for that sort of life. What the emigrants and convicts thought of it all, we can only guess at – perhaps the road to fortune and the excitement of a new world? Whatever they dreamed of, they made the tough, proud Australian nation. Sadly, as in other newly colonised countries, they had no time for the native people and their culture, and treated them brutally.

Now it is hard to imagine Cork Harbour full of sailing ships, travelling and trading worldwide – convoys of 100 sailing ships, protected by naval, armed war ships, setting off for the East or West Indies, for Australia and America. Then, in the first years of the 1800s, a small barge on the Forth and Clyde canal was given a steam engine and it worked. Ships and engines got bigger. For a while captains of "steam kettles" could be left far behind as a fast sailing ship swept past. Captain Richard Roberts steamed "Sirius" of Cork across the Atlantic and back, hotly followed by Brunel's "Great Western". The age of large, engine-powered ships had begun. Advising a young friend on choice of career, Captain Roberts who had worked both in sail and early steamers, told him the future lay in steam, but SAIL IS PLEASANTER. As indeed it is, and may yet make a comeback as some freighters are experimenting with auxiliary sails or kites. When wind power is there, why not use it. Meantime, virtually all the world's trade is carried in big ships. These are the world's life line. Airfreight is making steady growth. Fifty years ago, it was described to me as "the sleeping giant". Today the giant is very much awake and steadily growing. But unlikely ever to carry all the heavy, bulky things the sea can. And for those of us who love the sea in all her ever-changing moods, Captain Roberts words still have meaning: SAIL IS PLEASANTER.

The Beetles of Sherkin Island & Roaringwater Bay

Photo: Robbie Murphy

Caring for the collection.

By T. R. Daguerre

History of the Collection: 1981 to 1995

Since surveys began in 1981 Sherkin Island Marine Station has compiled a truly stunning collection of beetles. It contains 550 different species in fifty separate boxes with well over 1000 individual specimens. There have been five contributing Coleopterists (someone who studies beetles) that have put this impressive collection together over the last thirty one years.

The first to survey beetles and the founder of the collection was Rosemary Moore. She began work in 1981 and 1982, recording an astounding 358 different species in the two years of her survey – a most remarkable achievement. Of these species 49 were new records for Cork, 14 new to Munster, and 4 new species to Ireland. She set the bar for all future work, laying the foundations for all who have followed her.

After Moore's amazing discoveries ten years went by until the next Coleopterist arrived at Sherkin Island Marine Station and in 1991 and 1992 Simon Bird took the reins and added 104 new species of beetle to the collection – 34 new to County Cork and 8 new to Munster. He was instrumental in starting to expand the number of islands included in the survey, recording species from nine other islands of Roaringwater Bay. In 1993 Anna Wood added a further 20 species to the checklist and in 1995 Stuart Munro added 6 more, also surveying three other previously unsurveyed islands and expanding the records of species distribution.

Photo: Tom Daguerre

Seven-spot Ladybird (*Coccinella septempunctata*)

2010

In 2010 the project was resurrected. It was designed to increased the knowledge of distribution of beetles across Roaringwater Bay as well as to discover species that had been over looked in the last decade and a half.

It was successful in compiling 187 new records of 107 species from nine islands of the bay, also recording from two previously unsurveyed islands. Of these records 15 were new species to the marine station's checklist taking the total to 550 species recorded from across 15 islands. 5 species were seemingly new to Co. Cork and 1 new to Munster.

2011's Additions

In 2011 further work has been done to expand the recorded distribution of species across the islands of Roaringwater Bay. Eight islands were surveyed, two new to the study. 167 new records of 93 species were recorded across these islands with twelve new species added to the checklist, currently subject to confirmation.

The additions of 2011 will take the overall number of species recorded by the Sherkin island marine station to 562 with records of distribution from 17 islands, an amazing and unequalled survey in south west Cork. From the distribution records it has been possible to identify the most common and the rarer species across the bay's islands.

Sherkin's Modern Day Beetles

Approaching the project in 2010 it was apparent that no work had been done on the population numbers of Sherkin's larger and most abundant beetle species for fifteen years.

Photo: Tom Daguerre

Violet Oil Beetle (*Meloe violaceus*)

Photos: Tom Daguerre

Rose Chafer (*Cetonia aurata*)

The Station has compiled a collection of 550 different species of beetle.

Assessment of the of the abundance of certain indicator species across varied habitats on Sherkin was undertaken to explore whether these habitats still supported populations that compared to numbers recorded in past research. It was found that the relative abundance of the selected species was comparable to results of the previous surveys from 1991, 1993 and numbers were even up on 1995 suggesting that the island is ecologically healthy. Good news for beetles and the other wildlife associated with them.

Unique and Biologically diverse

The amazing diversity and high abundance of beetles recorded by the Sherkin Island Marine Station is a clear reflection of the abundance and variety of plants and other wildlife of the area. Invertebrate life has been shown to indicate the over-all health and quality of the wider ecosystem. This diversity in beetles alone illustrates the value of the islands of Roaringwater Bay and qualifies them as some of the richest natural habitat in Ireland. If the other factors such as the rare plants, animals and people are taken into consideration its apparent this area is a wealth of natural phenomenon that is prevalent in every aspect of day to day life, a culmination of wildlife and culture that is thoroughly unique.

The beetle collection resides in the archives of Sherkin Island Marine Station.

Tom Daguerre volunteered at Sherkin Island Marine Station in 2010 and 2011, documenting the island's beetles and other insects.

The Global Shark Fin Trade

Image © Linda Pitkin

The Blue Shark Prionace glauca is the most heavily fished oceanic shark species, with estimates of up to 20 million caught each year.

By John Richardson

THE Northeast Atlantic – including the waters around Ireland – is home to a remarkable diversity of sharks, with thirty-five species either resident all year-round or seasonal visitors. Of these some nineteen are more commonly encountered, including the Porbeagle Shark, Basking Shark, Shortfin Mako, Blue Shark and Thresher Shark – as well as Angelsharks, Tope and Spiny Dogfish (also known as Spurdog).

Healthy shark populations are crucial in maintaining diversity amongst other species by keeping populations in equilibrium, playing a critical role in regulating the health, balance, and structure of marine ecosystems. The removal of shark populations through overfishing can upset this balance, producing a cascading effect throughout the marine food-web, with impacts documented from the pelagic to the benthic[1].

This position as apex predator gives rise to a common misconception – that sharks, and shark populations, are highly resilient to human activities. Sharks, in fact, display remarkably vulnerable biological traits: slow growth, late sexual maturity, relatively few offspring and longevity. In short, they do not fare well in the face of commercial fishing – a vulnerability magnified by the wasteful practice of shark finning which has emerged to exploit this increasingly lucrative resource.

Shark finning

To many people in the UK and Ireland, shark finning is something that happens in the faraway Pacific Ocean or South China Sea. The reality, however, is much closer to home: Spain, an EU Member State, is the world's third largest shark fishing nation, while approximately one third of all shark fins sold in the Hong Kong market, the largest shark fin market in the world, come from the EU.

In the twenty-first century shark fins have become a commodity in a global trade worth billions of euros each year, supplying the incessant demand for shark fin soup. And with the fins of up to seventy million sharks passing through the fin trade on an annual basis, shark finning is now the greatest threat to sharks[2]. However the issue is far more complicated than an easy media headline would have you believe.

Shark fins are worth significantly more than the meat – a disparity creating an economic incentive for fishing vessels to retain shark fins and discard the carcass: this is 'shark finning'. The fins are easy to store, requiring no refrigeration, and demand is higher than ever. Trading in shark fins is legal. But the act of shark finning – keeping the fins but discarding the carcass at sea – is prohibited in many countries and by Regional Fisheries Management Organisations who have the remit to manage areas of the high seas. However many of the finning 'bans' are weak, often permitting the removal of shark fins at sea under the proviso that the carcass is retained in accordance with a fin:carcass ratio – a complicated mechanism intended to ensure fins and carcasses are landed in proper proportion.

Image © Shark Cornwall

The elusive Porbeagle Shark Lamna nasus: the Northeast Atlantic population of this species has experienced an acute decline, with less than 10% of original biomass estimated to remain.

Fin:carcass ratio

A fin:carcass ratio (figure 1) is usually set at around five per cent – that is, the weight of the primary fin set (dorsal fin, lower caudal fin and two pectoral fins) is regarded as making up five per cent of the weight of an individual shark. However, depending on which legislation you are covered by, this ratio could be set at 5% of the live weight of the shark, or five per cent of the dressed weight (head and organs removed) – and with a sharks head and organs accounting for thirty-to-fifty per cent of the sharks weight, five per cent dressed weight is a very 'generous' ratio.

The best research suggests the fins of an average shark make up approximately two per cent of its live weight, so a five per cent fin:carcass ratio could enable less scrupulous operators to land two-to-three times the amount of fins to carcasses. Now considering many finning bans also allow the landing of fins and carcasses in separate ports and, as for trying to identify the finless, headless trunk of a shark… well the enforcement nightmare begins. It is no real surprise then that there are three-to-four times more fins on the market than can be accounted for through FAO fisheries statistics.

How is this resolved?

Sharks will be caught in fisheries – this is an unavoidable truth. But the wasteful and unsustainable practice of shark finning must be addressed and an effective first step would be to ensure all finning bans are upheld, that shark fins are not removed at sea under any circumstance – that sharks are landed with their fins naturally attached (figure 2). And why the emphasis on naturally? There have been cases where sharks were required to be landed with their fins simply 'attached' – and sharks were then landed with fins attached to carcasses with rope, fins which seemed significantly larger than the carcass.

Prohibiting the removal of shark fins at sea seems the obvious way forwards – no need for complicated rules or ratios. Enforcement would be simplified – any fins found on a vessel without a carcass would be illegal, and the ability to identify the species landed would aid data collection and species-specific management. An increasing number of countries are adopting this option.

Europe has had a finning ban since 2003, but there is the option to derogate – for Member States to issue permits allowing the removal of shark fins at sea, providing the carcass are retained in accordance with the fin:carcass ratio. While Ireland did not issue these permits, until late 2008/early 2009 Germany and the UK did, until governments were swayed by rational debate and now require sharks to be landed with their fins naturally attached. Spain and Portugal still remove fins at sea, and with Spain the third largest shark fishing nation in the world this is a significant issue. The EU finning regulation is currently under review and the Shark Trust, working with the Shark Alliance, will be heavily advocating for the EU Finning Ban to be tightened and enforced according to its original intent – that no shark fins are removed at sea.

To find out more about shark finning visit www.sharktrust.org/campaign and select Stop Shark Finning.

Image © Seaboozoo

Shark fins: a global commodity.

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[2] Clarke *et al.* 2006. Global Estimates of Shark Catches Using Trade Records from Commercial Markets. Ecology Letters, 9: 115-126

John Richardson is a Conservation Officer with The Shark Trust and was a volunteer at Sherkin Island Marine Station in 2007.

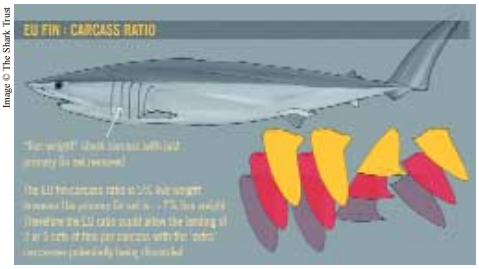


Image © The Shark Trust

Fin: carcass ratio. © The Shark Trust

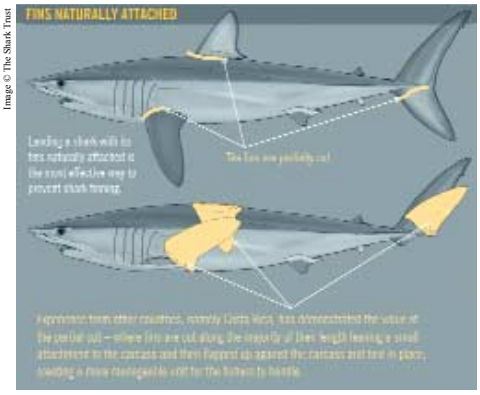
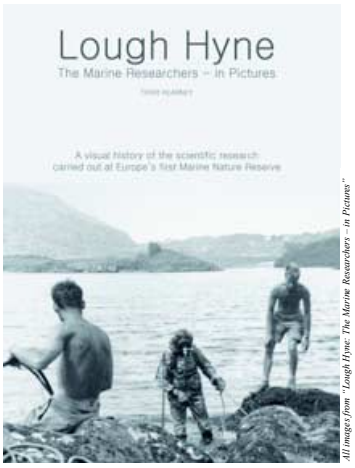


Image © The Shark Trust

Fins naturally attached.

Lough Hyne

The Marine Researchers – in Pictures



All images from "Lough Hyne: The Marine Researchers – in Pictures"

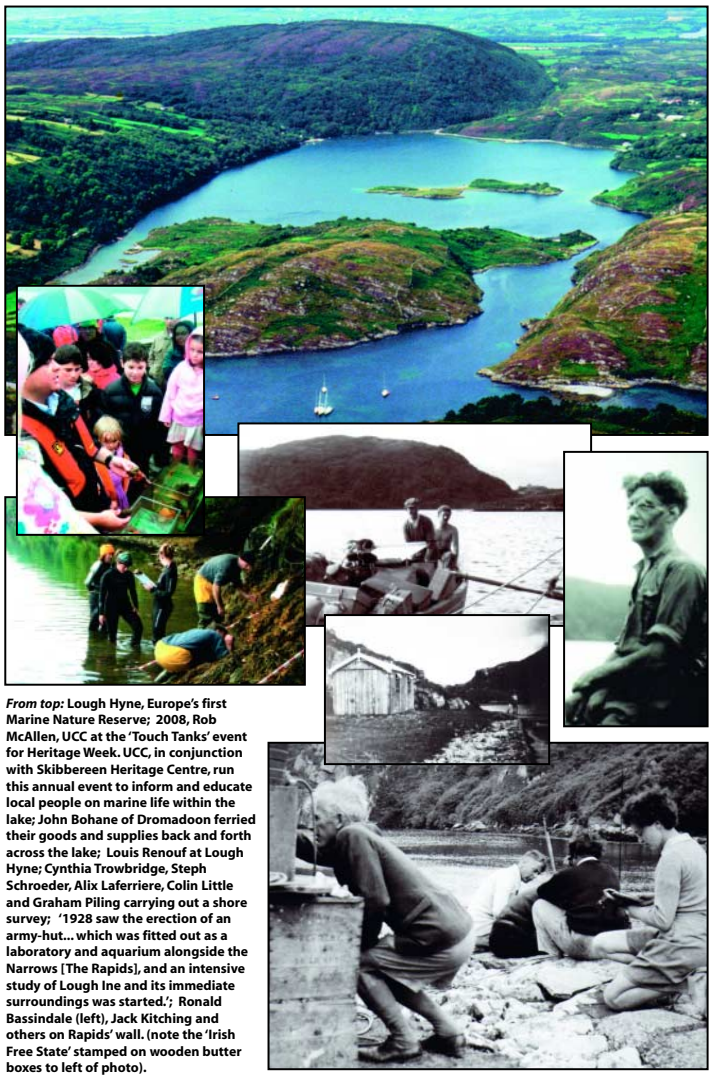
Reviewed by Matt Murphy

USUALLY the history of a place is in the written word, however in a unique and accessible way the scientific research history of Lough Hyne, Europe's first Marine Nature Reserve, is presented in a fascinating book of photographs and captions by Terri Kearney. The Reserve is a saltwater lake situated 5km south-west of Skibbereen in West Cork.

This visual archive spans over a century, from 1886 when scientists on a Royal Irish Academy was forced by rough weather to take shelter in Barlogue Creek just outside the lake. Little research was undertaken until 1923 when Prof. Louis Renouf of the Zoology Department of University College Cork made his first visit. Thus began a life-long dedication to promoting this unique salt-water lake.

Prof. Renouf's first "field laboratory" in 1926 was amazing and is photographed in the book. It was a large timber packing case placed on its side, with the lid supported by two columns of stones. In 1928, the Professor erected a timber army hut at the Rapids, which was fitted out as a laboratory and aquarium. Early photographs show the Professor's family, including his wife Nora. The photographs bring us through the 1930s, documenting the arrival of scientists from Britain who helped Prof. Renouf establish Lough Hyne as a unique marine site. The photographs are intertwined with local people and scenes. One of "Dancing at the platform just behind the North pier" shows couples in their Sunday best, with all the men in suits and wearing caps!

Through those early years of the 30s, 40s and 50s, the visiting university groups from the UK camped in their beautiful bell-type tents. A new laboratory was built in the early 50s, with the help of the students. Louis Renouf is seen placing the "time capsule" in the foundations.



From top: **Lough Hyne, Europe's first Marine Nature Reserve; 2008, Rob McAllen, UCC at the 'Touch Tanks' event for Heritage Week. UCC, in conjunction with Skibbereen Heritage Centre, run this annual event to inform and educate local people on marine life within the lake; John Bohane of Dromadoon ferried their goods and supplies back and forth across the lake; Louis Renouf at Lough Hyne; Cynthia Trowbridge, Steph Schroeder, Alix Laferriere, Colin Little and Graham Piling carrying out a shore survey; '1928 saw the erection of an army-hut... which was fitted out as a laboratory and aquarium alongside the Narrows [The Rapids], and an intensive study of Lough Ine and its immediate surroundings was started.'; Ronald Bassindale (left), Jack Kitching and others on Rapids' wall. (note the 'Irish Free State' stamped on wooden butter boxes to left of photo).**

Photographs are abundant of students and scientists working in the outdoors. One of sampling on the rapids with Jack Ketching and Ronald Bassindale, shows them using butter boxes as an outdoor "lab". A number of pages will bring back memories for local people of the mobile creamery at Ballymacrom, with the donkey and horse carts. The great Denny Salter of Salter's Bar (now Bushes) in Baltimore is featured, with the present sailing club being built in the background.

It is amazing that there are now over 450 scientific papers based on studies carried out at Lough Hyne. None of this research would have happened but for the vision of Prof. Louis Renouf and his family's support, especially his wife Nora, who would feed and entertain the many visitors in those early years. This is an extraordinary story brought so alive by Terri Kearney of Skibbereen Heritage Centre. I hope it will be an inspiration to present-day students and scientists that the finest of science can be carried out without luxurious laboratories and expensive "tools".

The final pages of the book have two gems: the first is Prof. Renouf's timber hut lab. This was swept into the lake by a high tide many years later. Neilly Bohane recovered it and brought it to his farm at Dromadoon, where it is still in use today. The second: the first boat used by the Professor in 1923 is still used nearly 90 years later by Denis O'Driscoll near Goleen. The boat was built by Skinners' Boatyard at Rath in 1915 for £1 per foot by Denis' father.

This wonderful book of photographs, which includes many local people and views would be a marvellous Christmas present.

Lough Hyne – The Marine Researchers – in Pictures. A visual history of the scientific research carried out at Europe's first Marine Nature Reserve By Terri Kearney. Skibbereen Heritage Centre. www.skibbheritage.com Price: €18.00 (inc. p&p). 2010. ISBN: 978-0-9568863-0-9

Dwarf Minke Whales

By Pete Atkinson

MY favourite time of year on the Great Barrier Reef of Australia is November, when the trade winds are lighter and the grey and rain of cyclone season have yet to arrive. But if you want to see dwarf minke whales you need to be there in June and July, when the trades are usually at their strongest. In the southern summer (December to March) this subspecies of *Balaenoptera acutorostrata* – one of the smallest baleen whales – is found in the sub-Antarctic around 60 degrees south feeding largely on krill. They come north to calve.

I lived in Cairns in northern Queensland for six years, which had the advantage that I could watch the weather maps looking for the short breaks between the high pressure systems that generate the trade winds, and then phone around to see who had space on their boat. One year I was lucky to get the last bed on Undersea Explorer, more a floating commune than a dive boat, with minke guru John Rumney as skipper. There were minke researchers on board too, which added to the party atmosphere.

Queensland is highly regulated when it comes to interactions with marine mammals. When I first heard about what you must do to be in the water with minke whales I was incredulous. Thick floating lines trail from the drifting boat, the snorkellers must hang on to the lines at all times and wait for the minkes to approach them. Yeah, right!

I was suitably chastised by the whales' behaviour. Although 9m long as adults, they are shy and take a while to get comfortable with people. People apparently attached to the boat are not much to fear, and the inquisitive whales circled, first at the limit of the 30m visibility, then closer. They vocalise to one another making a noise like pigs grunting. Over two and a half days of perfect weather and five knot winds, 58 different individuals were identified by the researchers Dr Alistair Birtles and the late Dr Peter Arnold. The boldest whales came within a metre, rising vertically right next to the snorkellers clutching the line. Sometimes there were half a dozen whales around the boat at once. Once they had found the boat, the whales would hang around for hours. Sometimes they will stay with the boat all day. During a single short season, more than 350 individuals have been identified using photo i.d. and some return repeatedly.

Permits for swimming with whales are tightly controlled and the code of practice that the operators adhere to is rigorous, but it certainly seems that the industry has no impact on the whales, yet creates thousands of ambassadors for whale conservation every year. By enforcing respectful and discreet behaviour by boats and people in the water, it seems that at least in this whale watching industry great encounters occur without adverse impact on the whales.

Pete Atkinson was a volunteers at Sherkin Island Marine Station over 30 years ago. Pete studied marine zoology at Bangor University, continuing a life-long obsession with the natural history of the oceans. In 1982 he bought Eila, a 1935 classic yacht, which he sailed all over Polynesia, writing articles and taking photographs. After 17 years and 45,000 miles, he bought Vigia, a 13.5m aluminium yacht to continue his travels in the Pacific. In 2004 Pete sailed to Cairns, bought a house, sold Vigia and married the Thai photographer Darin Limsuansub. They now live in Phuket, Thailand.
www.peteatkinson.com

West Cork, a hotspot for rare Irish plants

Photos by Robbie Murphy

Lilac-flowered Scarlet Pimpernel (*Anagallis arvensis* var. *lilacina*).

Spotted Rockrose (*Tuberaria guttata*), a West Cork speciality.

By John Akeroyd

THE Wild Plants of Sherkin, Cape Clear and adjacent islands of West Cork (1996) was a milestone in the study of the plant life of Roaringwater Bay. Now the publication of its *Supplement* is an opportunity to reflect on the special wild plants of Sherkin and other islands, and the flora of this far western district of West Cork. For 'Carbery's Hundred Isles' and the adjacent mainland have emerged as a veritable botanical hotspot, and a refuge for rare and threatened Irish plants.

Some islands – Sherkin, Cape Clear and Heir or Inis Uí Drisceoil – are easily visited. Others, such as Castle, the Calfs and the Skeams, are remote, unpopulated and seldom visited, except by Sherkin Island Marine Station biologists. Each has its own botanical riches, although Sherkin has almost all the 635 plants recorded from the islands in Roaringwater Bay. An unkind person would say that's because we've been recording there so busily! – in fact Sherkin has a much-indented coastline and varied topography and habitats. It's rich in the habitats that are particularly good places to look for plants, including the rarest: rocky coastal pastures and heaths, blown sand and disturbed ground.

Other islands too have plants not found on Sherkin, such as Little Robin (*Geranium purpureum*) on a shingle strand on Long, otherwise largely restricted to walls in Cork City. This and other rarities are included in the Irish Red Data Book: the islands in Roaringwater Bay have 14 such rare plants, while three more occur on the adjacent mainland.

Spotted Rockrose (*Tuberaria guttata*) is West Cork's floral 'jewel in the crown'. It occurs in West Galway and Mayo, but its Irish headquarters is here: islands in Roaringwater Bay, on and around Mizen Head, and Bere Island in Bantry Bay. Recorded in the 1930s, it was refound in 1992 – it's rarely more than 5 cm tall, usually much smaller. Since then we've discovered it on Castle and Long, with new populations on Heir. A plant of rocks among stunted heather, on thin peaty soil that dries in summer but remains wet in winter. It may have survived the Ice Age in the area, along with some mountain plants, and later grew on bare ground after the ice melted – it's really more a Mediterranean plant.

Rocky places in heathy pastures are home to rare Irish clovers and related 'peaflowers'. Like Spotted Rockrose, these sub-Mediterranean plants need a mild climate but also habitats that dry out in summer. The most important is Hairy Bird's-foot Trefoil (*Lotus subbiflorus*), which often grows with the more widespread Bird's-foot (*Ornithopus perpusillus*) – West Cork and Co. Wexford are their main areas of Irish distribution. Both Soft Clover (*Trifolium striatum*) and Bird's-foot Clover (*Trifolium ornithopoioides*) persist sparingly, especially around Horseshoe Harbour on Sherkin. We don't see them every year, yet they never quite disappear! A plant of damper heaths near the sea is Pale Dog-violet (*Viola lactea*), with large whitish-violet flowers in May. This West Cork speciality has a few scattered sites elsewhere in Ireland.

Cultivated and disturbed ground is another place to seek rare plants. Most are less competitive than the usual docks and thistles of cultivated land, and they've decreased nationally since the 1950s. Five fumitories, plants almost restricted to cultivated land, occur on Sherkin and other islands, including the nationally rare Purple Ramping-fumitory (*Fumaria purpurea*) and White Ramping-fumitory (*F. capreolata*), the latter more a plant of hedge-banks than gardens. Fumitories, with feathery leaves and pinkish flowers, are hard to distinguish, but both these species have rather showy flower-clusters and down-curved fruit-stalks. Other rare plants of disturbed ground are two miniature snapdragons, purple- and yellow-flowered Sharp-leaved Fluellen (*Kickxia elatine*), once widespread but today restricted to Cos Cork, Dublin and Wexford, and the larger, erect, pink-flowered Lesser Snapdragon (*Misopates orontium*), which has appeared sporadically for over 60 years on Cape Clear.

Hairy Bird's-foot Trefoil (*Lotus subbiflorus*)

An exciting find in disturbed ground on Sherkin this last year was Corn Marigold (*Chrysanthemum segetum*), otherwise only on Cape Clear but not seen for over 10 years. Other weeds, former colonists of vegetable patches, newly recorded since the 1996 Flora, are Dwarf Spurge (*Euphorbia esula*) and Small-flowered Catchfly (*Silene gallica*, not recorded since 1948), both on Horse. Also on Horse, another plant of disturbed places, the elegant red-flowered Deptford Pink (*Dianthus armeria*) persists at its only station in Ireland – we found it new to the country in 1992. One of the most pleasing records in recent years has been a lilac-flowered variant of Scarlet Pimpernel (*Anagallis arvensis* var. *lilacina*), near the community centre on Sherkin – new to Ireland!

Other rare weeds, including old medicinal plants, persist around buildings and on waysides, vulnerable to improved road-verges and tidiness. In particular, Elecampane (*Inula helenium*), a robust 1–2m-tall yellow daisy, and Marsh Mallow (*Alcaea pallida*), a hairy miniature hollyhock, survive here and there on Sherkin and Cape Clear. Both were once remedies for coughs and other illnesses of cold damp farmhouses.

There are plenty more examples, an astonishing richness of rare plants in need of our protection. Not only are Marine Station botanists recording all these plants and others, but also they are monitoring their ecology and numbers. The data from this long-term project will be published in due course.

Dr John Akeroyd has been visiting and recording plants on Sherkin and Roaringwater Bay for 25 years. He edited The Wild Plants of Sherkin, Cape Clear and adjacent islands of West Cork *(1996), co-authored a* Supplement *(2011), and is author of* A Beginner's Guide to Ireland's Wild Flowers *(2008).*

Cleaning up the mess we made

Part 1 of a 3-Part Series

By Walter Mugdan[1]

FROM time immemorial, a fundamental issue confronting human society has been how to dispose of our wastes. For the most part we have done a pretty bad job of it. The series of articles will focus on the witch's brew of toxic chemical wastes that are the bitter fruits of the Industrial Revolution. The series will explore how we got into the mess we are in, and how we are now starting to try to get out of it.

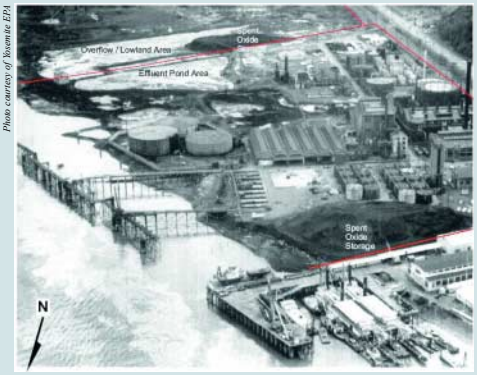
From the time our first hominid ancestors tamed fire, the amount of waste each individual human makes has exceeded that made by any other animal of comparable size, and the disparity has only continued to grow. Over the millennia we learned how to make and use tools, grow food, domesticate animals, make implements from bone, wood, stone, clay, metal and glass, and build ever larger and grander structures. With every technological advance, our per capita waste "footprint" expanded also.

And what we have done with our wastes has almost invariably been to throw them away.

Archaeologists are delighted that ancient societies often threw their wastes onto piles or into pits near their habitations. Ashes from cooking fires, food wastes, flakes from flint knapping and the making of arrowheads, ceramic shards, and broken items from totems to toys all found their way into these ad hoc landfills. They have proven to be an important window through which scientists can catch a glimpse of how our ancestors lived.[2]

So where do we tend to put all our waste materials? Two favoured locations have been holes or depressions in the ground; and what we now call wetlands and used to call swamps. We know now that wetlands are among the most productive ecosystems on earth (along with coral reefs and tropical rainforests); but in the past they were often dismissed in as pestilential quagmires that served no useful purpose. Throughout the world, wetlands near agricultural communities have been drained to expand farmland, while wetlands near towns and cities have been filled – often with with wastes – and then converted to what people considered to be better uses. Large parts of London were swamps in Celtic times. Similarly, the islands that make up New York City are considerably larger today than four centuries ago when Henry Hudson first saw the area. Indeed, much of Manhattan's current shoreline is hundreds of feet further out than it was in Hudson's day; and all three New York area airports, as well as the World's Fairs of 1939 and 1964–65, were built on filled wetlands.

Photo courtesy of Yosemite EPA



A Manufactured Gas Plant in the mid 1950s.

Photo courtesy of US EPA

Toxic waste discharges from mining operations.

Still, for most of human history the amount of waste each person created and discarded was relatively small, and was primarily organic and "natural" in origin – think food and agricultural wastes, wood debris, ash, etc. Construction materials such as quarried stone and fired brick, and metals like copper and iron for implements, were difficult to extract and work, and so they were used and reused and reused yet again.

But this rapidly began to change with the onset of the Industrial Revolution. In the 18th century coal replaced wood, peat and dung as a primary source of energy, and in the 19th and 20th centuries oil and gas augmented or replaced coal. The amount of energy available to human societies increased exponentially over the past 300 years, allowing the creation of the disposable consumer society prevalent today in most of the developed world. In consequence, the amount of waste generated by each person – directly and indirectly – has also increased exponentially. The average American generates about 4.5 pounds of garbage each day, and this doesn't count the wastes generated by the industries that support that American's lifestyle, from automobiles to electronics to processed foods.

Along with an incredible increase in the volume of wastes that we as individuals and as modern societies create, the nature of those wastes has also changed dramatically … and invariably for the worse. In fact, the Industrial Revolution has also been a Chemical Revolution, as we have created a staggering number of compounds that never existed in nature, and to which earth's organisms therefore never had a chance to adapt.

> *"... the Industrial Revolution has also been a Chemical Revolution, as we have created a staggering number of compounds that never existed in nature, and to which earth's organisms therefore never had a chance to adapt."*

Every modern industrial (and, for that matter, agricultural) enterprise generates a waste stream that must be managed. Each type of enterprise has its own suite of waste products, each creating different risks to human health and the environment, and posing unique challenges for safe – or at least safer — management.

Among the first industries to experience a massive expansion at the start of the Industrial Revolution were mining and metal smelting. These were the enterprises necessary to extract and use the coal, and make the metals, on which the developing industrial society came to depend. These industries leave behind large quantities of wastes at every step of the way, from mine tailings to coal ash, smelter slag and foundry sand. Moreover, these wastes concentrate and expose chemicals that in nature are inaccessible. For example, coal is laden with impurities such as sulfur, mercury and other metals, which are then released as air pollutants when the coal is burned, or remain as residual contaminants in the ash. Similarly, many ores of desirable metals also contain undesirable substances. As an example, arsenic is commonly found in iron ore, and can become accessible and/or concentrated in mine tailings and smelter slag. Often, industrial chemicals never seen in nature are used to work the materials, such as harsh acids that are used to liberate metals from their ore

matrix. These, too, end up as waste products. And of course, many useful metals are themselves hazardous, such as lead, mercury, and chromium.

A significant frontier in waste generation was crossed in 1792, when the Scottish engineer William Murdock pioneered the process of commercial coal gasification – that is, turning the solid lumps of hard, black mineral into gaseous form. Murdock, a colleague of James Watt of steam engine fame, heated coal in the absence of air, converting most of the coal to methane gas. This gas is very similar to the natural gas that many of us use today to heat our homes or cook our meals.

Initially, Murdock's technique was employed mainly to produce gas for lighting. Within just a few years gas lighting became common in many factories in Britain. By 1814, gas streetlights were being installed in London and by 1819 close to 300 miles of pipe had been laid in that city to supply some 51,000 burners. In 1816 the first coal gasification operation started in America, also primarily for use in lighting. For many decades, coal gas was the dominant fuel for indoor lighting, and for nearly a century it was dominant for urban street lighting. More than 1500 "manufactured gas" plants operated in the U.S. in the past. New York City alone had several dozen; the last such plant in New York State closed as recently as 1972.

In due course, gas gave way to electricity as a means of producing light, but gasification of coal continued to be important for many other industrial purposes. Indeed, we learned how to use some of the wastes from coal gasification as the raw materials for the predecessor of what today we call the petro-chemical industry. Coal gasification is an extremely messy business, leaving behind large volumes of coal tar – a thick residue loaded with hazardous or toxic compounds such as polyaromatic hydrocarbons (PAHs) that are known or suspected carcinogens. In 1834, German chemist Friedlieb Runge isolated from coal tar a chemical later called aniline, the basis of the aniline dye industry from which sprang corporate giants like BASF, GAF and IG Farben. Many other compounds that today we make from petroleum were first made from coal tar.

Coal tar continued to be a major feedstock of the chemical industry well into the 20th century. Nazi Germany, with plenty of coal but not much oil or natural gas, depended on gasification to create some of the substances on which its chemical, fertilizer and armaments industries depended. During World War II, Britain and France also used the technology, for similar reasons.

Alas, the same coal tar which spurred much of this chemical ingenuity also created an enduring legacy of toxic waste sites. The gooey stuff never really hardens, and when dumped on or in the ground (as it usually was) it oozes downwards until it reaches an obstruction like bedrock, and then keeps moving sideways. It severely contaminates everything in its path – not only the soil, but also any groundwater or surface water with which it comes into contact. For example, the mud underneath New York City's infamous Gowanus Canal, home for over a century to three manufactured gas plants, contains nearly 5% coal tar waste!

Over the course of the 20th century, the petrochemical industry supplanted the coal tar-based chemical industry (although the process of heating coal to produce coke and gas is still used today in the metallurgical and other industries). The oil and gas industry, of course, has left its own legacy of pollution and toxic wastes to rival and eclipse that of its coal-based predecessor. These include massive oil spills like the 2010 BP spill in the Gulf of Mexico or the Exxon Valdez spill in Alaska two decades earlier; and wastes from the refineries and chemical plants fed by the industry that include pollutants like benzene, toluene, xylene and others far more exotic, many of them carcinogenic or otherwise hazardous.

The plastics industry traces its roots to 1868 with the invention of celluloid by the American printer John Wesley Hyatt. Three decades later Dr. Lee Baekeland introduced phenolics, a more versatile class of plastics, made from coal tar or petroleum, which could be liquefied and formed into myriad shapes. Today, over 100 billion pounds of plastic, of dozens of different types, are produced each year in North America alone, primarily from petroleum. Much of that plastic ends up as waste – think, for example, of the vast numbers of water and soda bottles we toss out each day. And, of course, the manufacturing processes that make the plastics have their own waste streams to contend with.

Since the dawn of agriculture, humans have fertilized their farms. For most of the past 10,000 years this was done through application of animal wastes – manure and urea. In the early 1800s, we learned how to extract a new class of phosphate fertilizers from rocks, which of course had to be mined and processed. A century later German chemist Fritz Haber discovered a way to extract ammonia from atmospheric nitrogen for subsequent transformation into synthetic fertilizers. This chemical process revolutionized agriculture (and a number of other industries as well), helping to make possible the unprecedented increase in human population over the last century, from less than 2 billion in 1910 to over 7 billion today. The manufacture of both phosphate- and nitrogen-based fertilizer creates hazardous wastes, often in large quantities. In addition, excessive use of the synthetic fertilizers themselves also poses serious environmental threats.

As long as people have had farms they have feared agricultural pests. People have used pesticides of one sort or another for over 4000 years. The earliest known use was in ancient Sumeria, where elemental sulfur was used to protect crops. But the modern pesticides industry traces its roots to the first half of the 20th century with the invention of chemicals like DDT (implicated in world-wide population declines of eagles and other large birds), dieldrin, aldrin, the infamous Zyklon-B used in Nazi extermination camps, and the herbicide Agent Orange used by the U.S. in the Vietnam war which was found to be contaminated with dioxin, among the most toxic chemicals known. The purpose of most pesticides is to kill living organisms, so it is no surprise that wastes from the manufacture of these products, as well as their use, can pose serious risks to human health and the environment.

Coming in Part 2: more about the major industries that have shaped our lives, the toxic legacy they have too often left behind, and the steps we have taken to start to clean up the mess.

Photo courtesy of Ohio EPA

A contaminated site in Northwest Ohio.

Photo courtesy of US EPA

"Valley of the Drums" toxic waste dump site in Kentucky, USA.

Walter Mugdan, Director, Emergency & Remedial Response Division, U.S. Environmental Protection Agency, Region 2, New York City, New York, USA. October, 2011

[1] Any opinions expressed herein are the author's own, and do not necessarily reflect the views of the U.S. Environmental Protection Agency.

[2] Like every other animal we humans also produce bodily wastes, with which every society throughout time has had to contend. This aspect of human waste management is not, however, the focus of this series of articles. Nevertheless, it is worth noting that inappropriate management of human sewage has been a major vector for the spread of diseases, at least during the ten or twelve millennia since people started to gather in larger, permanent communities. Ancient Rome was distinguished among cities of its time by, among other things, its use of underground conduits to carry away sewage. The wastewater didn't go very far, however – it simply emptied into the Tiber River with little further thought given to the impact on those living downstream. It was not until the 20th century that we began to treat sewage; and not until the latter part of that century that we started to do it well.

Fishing Salmon Sustainably

By Ciaran Byrne

INLAND Fisheries Ireland (IFI) is the State agency responsible for the conservation, protection, development and enhancement of the inland fisheries and sea angling resource, and quite logically it reports to the Department of Communications, Energy and Natural Resources, as our inland fisheries are a significant national resource, there to be sustainably exploited. The habitats and the fish themselves form part of Ireland's rich culture and biodiversity and they also play a key part of Ireland's tourism offering.

In looking at the various species that make up our native fish stocks, the salmon is the one that most Irish people can immediately relate to. Generations of children have learned about the salmon of knowledge, and the salmon is an iconic symbol of Ireland having previously featured on the florin (2 shilling piece) first struck in 1928 and later the 10 pence coin. The rationale behind choosing the salmon for the florin was because salmon represented both the sea and freshwater game fishing and was considered very important to the Irish economy.

In this regard not a lot has changed, it is estimated that all overseas anglers contribute approximately €105 million to the Irish economy and domestic anglers also contribute significant millions. In a 2003 study by INDECON it was reported that overseas salmon anglers had an average daily expenditure of €203 each, while a domestic salmon angler spent €136 per day. Thus, in the midst of one of the worst recessions the country has ever seen, where there has been a significant refocusing on the importance of tourism as a driver of economic growth, we have a natural resource which, if sustainably exploited can deliver a massive boost to the Irish economy. Most importantly, most of the economic benefit from angling is generated in rural communities which have been hardest hit in the downturn.

You would think that with such an important resource that people would do all in their power to protect it and ensure it is sustainably exploited. Unfortunately this is not the case. Inland Fisheries Ireland is currently tackling a scourge of illegal fishing. "It was only a few fish for the freezer", "why don't you go and get real criminals" "There are plenty more fish in the river" "I'm entitled to take them aren't they free", "The guy in the big house owns all the fishing and he is never there" these are just some to the sound bites which IFI officers regularly hear from people apprehended while illegally fishing. Some consider it to be a 'past-time', 'doing no harm', and as much part of our heritage as the fish themselves, however illegal fishing is an *environmental crime*. It is a crime against the Irish people and the Irish economy.

Each and every angler generates a positive return for the Irish economy, they keep ghillies and guides in employment, support many local tackle shops, accommodation providers and restaurants especially in rural communities. Unfortunately the corollary to this statement is also true each person illegally fishing is taking from the economy and the local community. Like all crimes there are different scales, and in the case of illegal fishing they range from the top end, organised poaching gangs who target specific rivers or lakes to the individual recreational angler who takes a 'few extra fish' or who do not quite 'stick to the rules'. Let's be clear, in both cases people are guilty of committing environmental crime and breaking the law, it is not a case of 'I have only done a small thing, and it is really the other guy that is guilty'.

Photo courtesy of Inland Fisheries Ireland

Gear and fish seized by Inland Fisheries Ireland personnel on routine patrol on Corstown Lough, Co. Meath, Summer 2011.

There is a large suite of fisheries laws in place ranging from national legislation to local bye laws. What each of these laws is designed to do is to ensure that people can enjoy and exploit the fisheries resource sustainably, as this is the basis of all recreational angling. So clearly when a person puts a net across the river they are breaking the law but so too is the angler who does not tag a salmon or breaches the coarse fish bye laws.

It is important that the economic benefits generated by angling are closely linked with the negative economic effects of illegal fishing and this is done at the local community level. In this regard IFI are currently commissioning economic surveys to actually quantify the loss to local communities from illegal fishing. Thus when a person comes around to the local pub or goes door to door selling illegally caught cheap salmon, coarse fish or trout, it is not just €10 or €20 spent on fish, which typically provide the seller with money for a few drinks, but anything up to €1,000+ which is lost from the local economy and this translates directly into jobs lost or curtailed. Why does the local restaurant only do one sitting on a Saturday night? Why does the local B&B owner have a shortened season? Why is the tackle shop not doing as well as previous years? How likely is it that a tourist will return to an area to fish if he or she finds a net across the river or witnesses illegal fishing activity or flagrant abuse of the laws by individual anglers? For sure illegal fishing is not the sole cause of the economic problems we are currently facing, but in small local communities reliant on tourist angling it can have a disproportionate negative effect on service providers.

So, what can you do about it? IFI have a large number of highly professional and trained fisheries officers who are protecting our rivers, lakes and coastline however they rely on information to target illegal fishing hotspots. This is where you come in, IFI operate a manned 24 hour hotline (1890 34 74 24) to report all illegal fishing issues, be it reporting an illegal net, an angler in breach of the law, a person or commercial establishment offering illegally caught fish for sale or to report any other fisheries offence, this hotline is how the public help eliminate illegal fishing from their communities. Since its establishment in December 2010 it has proved remarkably successful and has led to a number of prosecutions, and it is IFI's intention to continuing developing the hotline and working with local communities to overcome illegal fishing.

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Russian Leather from a Watery Grave

By Anthony Toole

THE link between an eighteenth century shipwreck off the south-west coast of England and a tiny, recondite workshop in the north-east of the country would seem to be very tentative indeed. That this link has to do with Russia leather stretches the credulity to its limits. Yet the story holds together, for it is as remarkable as it is unlikely.

Austin Winstanley's workshop is not easy to find. It is one of a number that hide away in a small courtyard off the main shopping street in Hexham, Northumberland. Even as one stands within the courtyard, the workshop does not advertise itself, and its constricted space and somewhat cluttered interior conceal the fact that its owner is a designer and manufacturer of extremely high quality leather goods.

"As a teenager," he says, "I made a leather bag for my sister's birthday. That was followed, over the years, by various pieces made as a hobby." After attempts at careers as a cowman and an engineer, and even a period in teacher training, he made a sitar case for a musician friend, then a guitar case, and the seeds of a life's work were sown.

During the early 1970s, Austin Winstanley operated from a workshop in Birmingham, and later in Darlington, before finally settling into his present premises more than twenty years ago. In that time, he has made cases for a variety of musical instruments, attaché cases, handbags and overnight bags. These are nearly all made to his own designs.

"One customer for whom I made a case recently asked me to make him another. He had used the original case virtually every day for fifteen years, and it was still in good condition."

A typical attaché case requires some forty hours' work, about a fifth of which are devoted to the moulding and stitching of the corners.

Photo: Anthony Toole

Austin Winstanley in his workshop with a roll of Russia leather.

Photo: Austin Winstanley

A case made by Austin Winstanley from Russia leather.

" One of the special features of my cases is an integral hinge, which prevents wear-and-tear on the leather and so increases the life of the case."

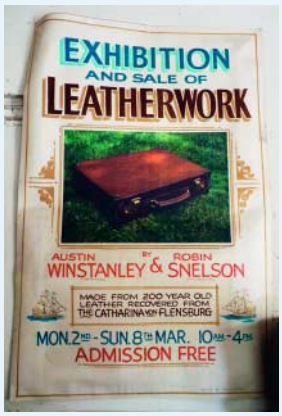
Often, he designs and makes objects according to specifications given him by customers who have been told of his skills by other satisfied clients.

"A lady once brought me a design she had drawn up for a handbag. This particular bag required seventy-two separate pieces of leather."

Austin Winstanley's connection with the shipwreck is hinted at in a poster hanging on the workshop wall, advertising a joint exhibition of leather craft with another craftsman, Robin Snelson. "I read about Robin in a Sunday supplement, and later met him at a conference. We held our exhibition in Hexham in the early 1990s." On a shelf beneath the poster is a piece of a wooden beam from the ship.

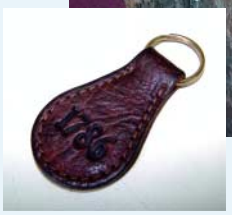
The story begins in 1786, when the Danish brigantine, *Frau Metta Catharina von Flensburg* sailed from St Petersburg bound for Genoa, carrying a cargo of hemp and Russia leather. On the night of 10th December, a violent storm drove it aground on Drake's Island, in Plymouth Sound, where the ship sank. There it lay, buried under mud and thirty metres of water, for nearly two centuries.

In June 1973, members of the Plymouth Sound Sub-Aqua Club discovered the ship's bell, and subsequent research revealed the history of the wreck. Returning to the site, the divers found a strange object protruding from the mud, which proved to be a piece of leather in surprisingly good condition. Thick layers of silt and debris meant that excavation and salvage would be extremely difficult, but eventually the problems were solved, and the first of many rolls of remarkably well-preserved hides was brought to the surface.



Poster advertising exhibition by Austin Winstanley and Robin Snelson.

Part of a wooden beam from the *Frau Metta Catherina von Flensburg*.



Key ring made by Robin Snelson from Russia leather.

The Duchy of Cornwall was established as owner of the wreck, and Prince Charles granted permission for the Sub-Aqua Club, through the agency of leather craftsman, Robin Snelson, to sell the hides in order to finance the excavation of the wreck.

Though he lives in Cornwall, Robin owns a house on Sherkin Island, and indeed sold his first piece of leatherwork there in 1977, just a few months before he learned about the wreck. Since then, he has enjoyed a career based largely on the Russia leather from the *Frau Metta Catharina.*

In addition to making his own leather goods he supplies hides to a small, select group of skilled craftsmen, one of whom is Austin Winstanley. Another of his customers is G. J. Cleverley, a bespoke shoemaker of Bond Street, London, whose own customers have included Winston Churchill, actors Laurence Olivier, John Gielgud and Ralph Richardson, Hollywood stars like Gary Cooper and Clark Gable, and more recently, Daniel Day-Lewis and Elton John.

The high quality, characteristic odour and rich colour, suppleness, water resistance and insect repellence of Russia leather are due to the lengthy processing it underwent, which included immersion for a week in birch oil, which penetrated fully into the leather. Marco Polo mentioned its use by Asian Tartars in the thirteenth century, and during the next half millennium, it came to be regarded as the finest leather in the world, and was used extensively for shoes and for binding books. The Russian Revolution brought its production to an end, so that the leather preserved for two centuries beneath the mud of Plymouth Sound in now virtually the sole remaining source.

"I generally buy a single hide at a time," says Austin. "I average four or five in a year, depending on commissions. In addition to larger objects, I also make items such as jewellery boxes, from smaller off-cuts from a hide."

Some of Austin's commissions are unusual, and cause him to draw on reserves of ingenuity.

"One particularly tricky job," he confides, "was a small watch case with a sliding door, which required an intricate opening mechanism."

Others reveal often sad and poignant histories.

"I was also asked to make a carrying case for a clock that had been buried by a Jewish family for the duration of World War II. Most of the family died in Auschwitz, and the heirloom had been retrieved by the few survivors."

Using a variety of leathers, he has made bell muffles for Hexham Abbey, bellows for Northumbrian pipes, upholstery for the seats of a reconstructed 1940s airplane and a toolbox for a 1904 Progress Voiturette motor car. He has supplied Beamish Open Air Museum with steam engine pipe covers, blacksmith's aprons and belts for machinery.

"One of my most recent commissions was for an assassin's case for actor Bill Nighy, in the 2010 comedy thriller film, 'Wild Target'."

Sadly, supplies of Russia leather are coming to an end, though there are stocks for the time being, sufficient to see Austin Winstanley and Robin Snelson through to retirement. Ian Skelton, the diver who has been largely responsible for salvaging the leather from the *Frau Metta Catharina* has now retired, with no forthcoming successor. This means that the site is likely to silt up very quickly, leaving the remaining hides to sink back into their muddy grave.

This will undoubtedly add scarcity value to the leather creations of Austin Winstanley and Robin Snelson. Indeed, G. J. Cleverley advertises some of his Russia leather goods as 'limited edition'. This should see them appreciate considerably in value over the coming years.

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Planning & Environmental Law in Ireland

Reviewed by Matt Murphy

A MOST important guide to planning and the environmental in Ireland has recently been published. The author is Dublin solicitor, John Gore-Grimes. He has extensive knowledge and experience of the topic, as a solicitor over many decades. His main audience may be the legal and planning professionals, however anyone with an interest or involvement in planning and the environment should consult it. Mr. Justice Ronan Keane, the former Chief Justice, in his foreword states "It reflects the extremely complex legal structures which now govern Irish planning and which demand treatment on this encyclopaedic scale." He further states "One cannot help being depressed by the message which emerges from this book, that, during the years of recent prosperity, the huge arsenal of planning measures spectacularly failed to ensure that planning decisions, particularly those involving the rezoning of land for housing were taken in the public interest."

In *Chapter One*, the alteration of zoning is discussed. During the Celtic Tiger years 40,000 plus hectares were zoned for residential development when the requirement was 12,000 hectares, for a period of eight years from 2008. The over zoning, in terms of dwelling units numbers, amounts to enough zoned land for 1,500,000 houses and apartments.

Development occurred on flood plains, the principles of sustainable development were frequently overlooked and it appears that nobody thought to look at the figures to establish just how many dwelling houses the market required.

It is to be hoped that the new principles of a "core strategy" will ensure that future development will be more controlled and will promote sustainable development and support economic renewal by harmonising development permission and directing it towards areas already targeted by the National Spatial Strategy (NSS) for development and for investment in infrastructure. The concern must be as to whether or not the NSS has been sufficiently thought out and advanced to give best advantage to the "core strategy" principle.

The legal implications for the development plans of local authorities lays out what the objectives must include under the Planning and Development (Amendment) Act (PDA) 2010. They are eighteen in number, which include surface and groundwater, habitat, infrastructure, preservation, improvement and extension of amenities and recreational amenities. The "core strategy" of the Act requires planning authorities to provide evidenced-based information statements to demonstrate how both the development plan and the housing strategy are consistent with Regional Planning Guidelines and with the National Spatial Strategy.

The Department of the Environment, Heritage and Local Government's Planning Guidelines (No. 15), dealing with development plans, are discussed in detail and a number of important legal cases are summarised. Other issues include contents and making of development plans, taking in Planning and Development Act 2000. In chapter one there are 327 subsections, which shows the detail of the legal implications of PDA 2000 and PDA 2010.

Chapter Four. The decision of a planning authority either to grant permission with or without conditions or to refuse permission, or the right to appeal to An Bord Pleanala, are addressed. The issues include – Jurisdiction of the Board to hear appeals, limits for lodging an appeal, time limits, Minister's entitlement to vary the time limit, submissions or observations, oral hearings, reports and documents of the Board.

In *Chapter Six,* there is strong criticism of the lack of progress made in terms of social and affordable housing and of the social integration principles involved. The quotation from Sister Stanislaus Kennedy is still applicable and that paragraph is undoubtedly controversial: "It is shocking to see the level of shortfall in the delivery of social housing during the boom years. This is largely a direct result of a conscious decision by successive governments to, in effect, cut back on provisions of social housing while the level of need was rising year on year."

There is another controversial statement in paragraph 6.05, which suggests that the market does a poor job in regulating land prices. This is backed up in the preface with the following sentence:

"All in all there is some recognition that land is becoming too scarce and too valuable to allow its worth to be accessed by the wild and irresponsible forces of a merry-go-round market economy. If we are to move towards a just and integrated society in Ireland price control of land may become inevitable, no matter how repugnant such a concept is to many of our citizens."

Chapter 10 discusses the statutory ground rules for environmental impact assessment (EIA) and also deals with environmental impact statements (EIS). EIA is defined as a process of anticipating the effects on the environment caused by development. This is an assessment, which is required in certain public and private projects, and the process has been incorporated into Irish Law.

Chapter 11. The PDA Act 2006 provides a special planning application procedure for strategic infrastructural development whereby the planning authority is bypassed and the planning application is made directly to An Bord Pleanala. The author addresses development proposals by a local authority, state authorities, energy, transport, environmental and health infrastructure. There are 13 categories of energy infrastructure, 4 categories of transport, 11 of environment and one of health. The requirements for the applicants, according to the various sections of the PDA 2006 Act, are explained and include submissions and observations, applications, the Boards decision and time limits.

Chapter 12. The author addresses the warranty which a house seller must give to say that all planning and environmental matters are 100% in order. In his view, the author believes that very few would have been advised of the obligations which this warranty imposes. However to date it has not had serious consequences but these consequences are around the corner and waiting to happen. Further he states that there is an absolute necessity for a planning amnesty after 15 years (for example) for properties without planning permission, after which time permission must be assumed. It is, he states, impossible to examine the planning history of development over the past 47 years and to give it a completely clean bill of health. That is what we are asked to do under the present legislation and as time passes that situation gets worse and worse.

The thoroughness of the book is shown in the various tables listed, and which are referred to, summarised and discussed in the over 2980 subsections.

- Court cases – over 400 listed.
- Statues in over 160 acts – from the Planning and Development (Amendment) Act 2010 to the Dublin Corporation Act 1890.
- Statutory Instruments – over 56 Planning and Development Regulations.
- European Legislation – Council Directives.
- Treaties and Conventions – EC Treaty, European Convention or Human Rights; Transboundary Convention, UN ECE Espoo Convention on EIA.
- Constitutions – Constitution of Ireland.

This book is essential reference for planners and lawyers on planning and the environment. John Gore-Grimes has the rarest of gifts; he has succeeded in bringing to the reader many complex issues in a very readable form.

Though largely a reference book and quite a hefty tome of 1153 pages, lay people, outside of the professionals, will find much to help and guide them on issues such as house purchasing or selling, how to challenge planning decisions, the workings of An Bord Pleanala and development plans for a local authority.

Planning and Environmental Law in Ireland By John Gore-Grimes. Bloomsbury Professional. ISBN: 978-1-84766-365-8. Price: €175.00/2011

Issues addressed in the book

Chapter 1: *Plans, Policies, Guidelines and Directives*
Chapter 2: *Development and Exempted Development*
Chapter 3: *Control of Development*
Chapter 4: *Challenging Planning Decisions*
Chapter 5: *Enforcement and Planning Injunctions*
Chapter 6: *House Supply – Social and Affordable Housing*
Chapter 7: *Compensation and Compulsory Acquisition*
Chapter 8: *Additional Planning Controls on Land and on Buildings*
Chapter 9: *Substitute Consent and Appropriate Assessment*
Chapter 10: *The EIA Directive*
Chapter 11: *Structural Infrastructure Development*
Chapter 12: *Planning and Environmental Law for Conveyancers*

Supporting Conservation in the Amazon

By William Milliken

IN Ireland, when an area is declared protected, one can reasonably assume that its future is secure. This is not the case in so many other parts of the world. For the last few years our team has been working with Brazilian partners to help strengthen the scientific basis for conservation in northern Mato Grosso. This area, on the southern fringe of the Amazon basin, lies in the 'arc of deforestation' where cattle ranching, soya farming and logging are pushing northwards into the forest. The scale of destruction in the region over the last four decades has been staggering, and whilst in recent years the Brazilian authorities have made improvements in the control of Amazon deforestation, Mato Grosso remains a major problem.

In the Cristalino State Park, for example – a relatively small protected area that's been the focus of much of our work in the region – substantial areas of forest have been cleared since the Park's establishment in 2001. The authorities responsible for enforcing its protection are under-resourced, and the forces driving its destruction too powerful to combat them effectively. A heady cocktail of political corruption, greed and desperation.

Kew has been helping support conservation in the area by providing some of the information necessary for management planning. The essential first step – in a region previously unstudied scientifically – is to find out what's there: mapping and cataloguing the vegetation and identifying priorities for conservation. Analysis of satellite imagery gives a useful overview and helps to identify targets, but it's only by getting onto the ground that one can generate meaningful, reliable information.

In practice, this work differs little from what botanical explorers have been doing in the Amazon for the last two centuries: travelling up rivers by canoe, dodging rapids and rainstorms, establishing forest camps, and hacking our way with machetes through dense vegetation with plant presses and bundles of newspaper on our backs.

Technology, of course, has moved on since Richard Spruce was paddling his way up the Rio Negro. With Global Positioning Systems we now know where we are, our specimens are collected and our observations are made, to within a few metres on the Earth's surface. Aluminium canoes and outboard motors have made access easier and quicker, digital cameras and laptops have allowed virtually instantaneous data management, and satellite telephones offer the possibility of help in case of emergency. Nonetheless there remains little one can do about bees, mosquitoes and galloping foot-rot except grin and bear them.

Our expedition teams, the greater part Brazilians, include scientists, students, park managers and local people with key knowledge and skills. In the course of these surveys we've found ourselves in extraordinarily beautiful, cathedral-like forests, hellish tangles of vines and shrubs where it can take half an hour to move fifty metres, spectacular outcrops of sun-baked granite clothed in colourful orchids, and isolated patches of savanna that seem to have been frozen in time since the last Ice Age.

Coming round the bend of a river at dawn, the morning mist and the scents of night-flowering plants lying heavy on the water, unknown revelations at every turn in its twisting course, never loses its excitement. Sitting on a sandbank as the sun sets over the river, fresh piranha grilling on the fire and the last pairs of scarlet macaws making their noisy way back to their roosting trees, is an unforgettable privilege.

Our plant collections and studies, including the discovery of several species new to science, are helping to fill gaps in our knowledge of the Amazon. Maps and reports have helped to plan management strategies for new and existing protected areas. But in a region such as this, conservation will only be effective in the long term if it fits with the needs of the local people. Environmental education clearly has a role to play, and we've been working with a local non-governmental organisation to develop programmes that help to foster a sense of pride in, and responsibility for, the region's biodiversity, particularly among children.

Addressing economic reality, however, is equally critical. The Brazilian land settlement agency, INCRA, has brought large numbers of immigrants to the region in recent years – often from poor parts of the arid northeast of the country – allocating them small plots of forest on poor soils on which to make a living. With little understanding of how to manage forest sustainably, these settlers soon find themselves in a wasteland of unproductive pasture, their water courses drying up and few options left on the horizon apart from laying claim to, and destroying, another patch of forest.

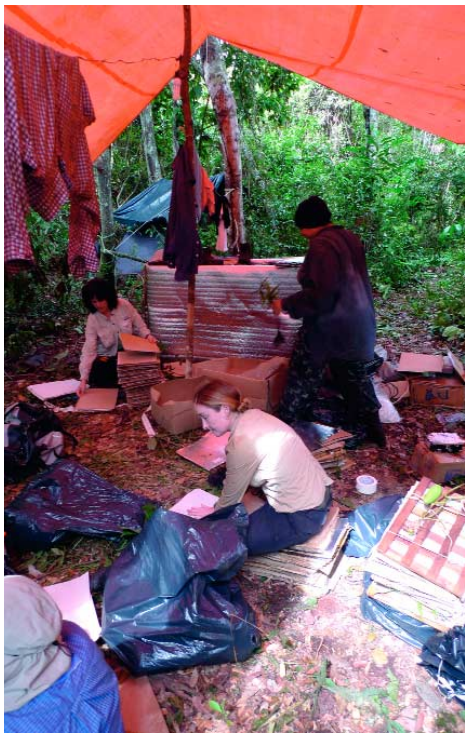
Agroforestry systems, which draw together sustainable forest management with cash and subsistence crop production, have been shown to offer a viable option in other parts of the tropics. Where people are involved, this is the only kind of reforestation that's likely to be successful in the long run. We're now working with another local organisation to help develop reforestation systems that meet the needs of landowners, restoring water supplies and supporting livelihoods whilst benefiting the region's biodiversity. The understanding that our botanical studies have generated – of the species that make up the forest – is vital to this process.

There's another holy cow out there, which is 'Payments for Ecosystem Services'. At its most basic level this evolving mechanism for reducing global carbon emissions and conserving forests involves payments, from developed countries (with high carbon footprints) to developing countries with threatened tropical forests, specifically to support measures to reduce forest loss. Given that the burning of tropical forests contributes almost 20% of global carbon emissions, this is potentially hugely significant. The challenge will be to ensure that any such payments make their way to the families scratching out a meagre existence in the forest. If they do, then the incentive for preservation could outweigh that for destruction. If they don't, they might well find themselves sharpening their chain saws again.

Images: William Milliken

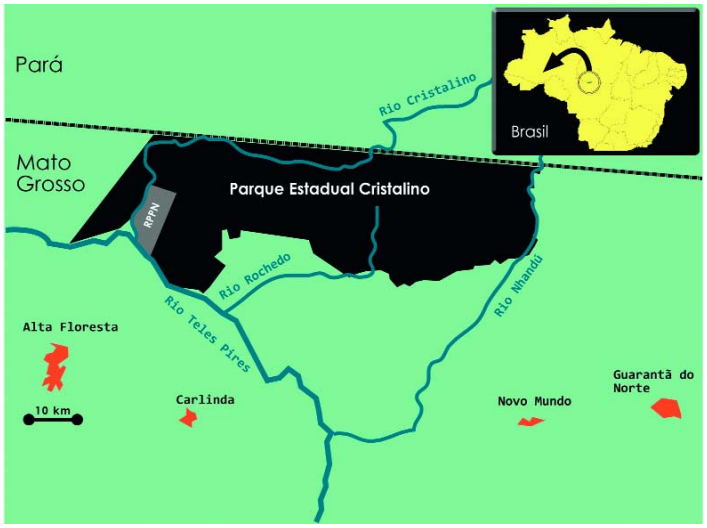
In the rainy season, wading up to your chest through flooded forests is often unavoidable, and a good way to keep cool!

Expedition vehicles, spattered with the red soil of the Amazon, crossing a river on a barge.



Pressing and drying plant specimens in a forest camp.

Thunder clouds over the Xingu River.



The Cristalino State Park in Mato Grosso, a relatively small reserve in the Amazon context but relatively large by European standards.

William Milliken, a former volunteer at Sherkin Island Marine Station, is Head of Tropical American Botany at the Royal Botanic Gardens, Kew, UK.

(See centre spread on pages 16 and 17.)

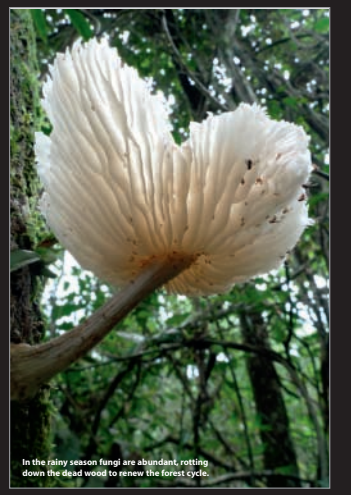
Supporting Conservation in the Amazon

Photography by
William Milliken

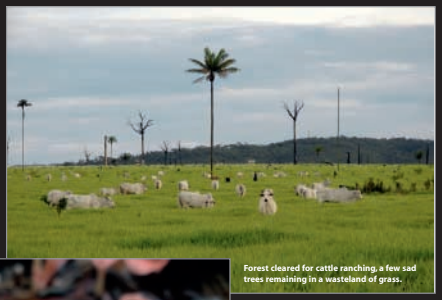
(See article on page 14)

Sunset on the Xingu River.

Xingu River from a hill top; much of the Amazon basin is flat, and views such as this a rare pleasure.

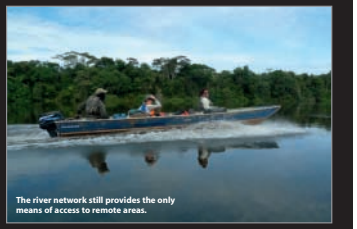


In the rainy season fungi are abundant, rotting down the dead wood to renew the forest cycle.



Forest cleared for cattle ranching, a few sad trees remaining in a wasteland of grass.

A species of passion flower collected in 2011, yet to be identified.

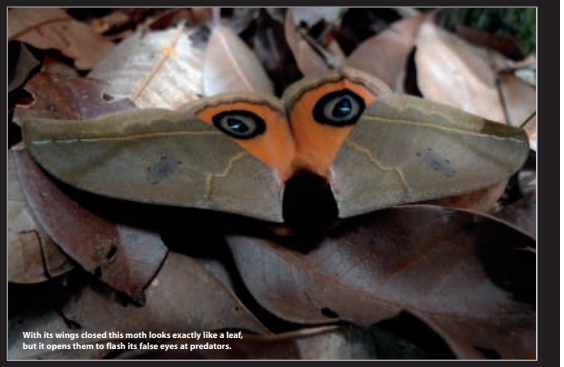


The river network still provides the only means of access to remote areas.

Typical tall forest; the palms in the foreground produce edible fruits.

A beautiful Trimezia flower, in the lily family, growing in a patch of savanna.

In the rainy season fungi are abundant, rotting down the dead wood to renew the forest cycle.



With its wings closed this moth looks exactly like a leaf, but it opens them to flash its false eyes at predators.

Rabbitfishes, Chimaeras & Ratfishes

(*Holocephali*: *Chimaeriformes*) in Irish Waters

By Declan T. Quigley

RABBITFISHES, Chimaeras and Ratfishes belong to a primitive subclass of fishes (*Holocephali*) dating back to the Devonian Period (416–359 million years ago) which share many morphological characteristics with sharks, skates and rays (Subclass: *Elasmobranchii*) indicating a common albeit unknown ancestor. For example, in common with sharks, they have a cartilaginous skeleton, and reproduce using internal fertilization, the males bearing clasper organs (males of some species, e.g. *Chimaera monstrosa*, also have an additional frontal tentaculum on the head that is used to grasp the posterior edge of the female's pectoral fin during copulation). However unlike sharks, *Holocephalans* have a single operculum covering the gill arches and their upper jaw is fused to the braincase (*Holocephali* = "*whole heads*"). The first dorsal fin, with its poison-laden spine, is erectable, not fixed and the body lacks scales or denticles. Chimaeras have three pairs of hypermineralised tooth-plates in the upper jaw and a large pair of mandibular tooth-plates on the bottom (hence the name "*Rabbitfish*"). The anterior plates are blade-like, whereas the posterior plates are flattened for crushing hard-bodied benthic invertebrates on which they mostly feed (e.g. molluscs, crustaceans, echinoderms and anemones). The body generally tapers posteriorly to a pointed tail, hence the alternative common name "*Ratfish*". In Greek mythology a *Chimaera* was an imaginary monster constructed of incongruous parts.

Extant *Holocephalan* species represent a small fraction of a previously successful and diverse group. Although only 43 living species (including 3 families) are currently known worldwide, several others remain to be described. The increasing commercial exploitation of deep-water fishes and scientific surveys of deep-sea biodiversity, aided by improved knowledge about the taxonomy of the group supported by recent DNA barcoding techniques, has facilitated the description of several new species. Indeed, since 1990, at least 17 new species have been described, including three from the NE Atlantic: Pale Rabbitfish (*Hydrolagus pallidus*), Lusitanian Chimaera (*H. lusitanicus*) and Opaline Chimaera (*Chimaera opalescens*). At least 9 species (including 2 families) are currently known to occur in the NE Atlantic; 8 of these from Irish waters (Table 1).

Photo: Dr Samuel Iglesias

Chimaera opalescens

Photo: Dr Jean-Pierre Louaste

***Hydrolagus lusitanicus* – male**

Photo: Dr Elena Lucchetti

***Harriotta raleighana* – male**

Photo: Dr Leonel Gordo

***Chimaera monstrosa* – male**

Photo: Dr Elena Lucchetti

Hydrolagus affinis

Photo: Dr Elena Lucchetti

Harriotta haeckeli

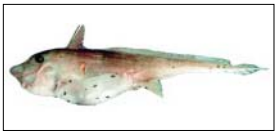


Photo: Dr Elena Lucchetti

Hydrolagus pallidus

Photo: Dr Samuel Iglesias

Hydrolagus mirabilis

Photo: Dr Elena Lucchetti

Rhinochimaera atlantica

Although rabbitfishes are found in all oceans and are mostly deep-water species, inhabiting benthic regions from continental slopes down to abyssal depths (80–3000m), relatively little is known about their general biology and natural history. Young rabbitfishes often occupy deeper water than adults, the latter partaking in seasonal, inshore breeding migrations. Adults range in size from 60 to 200cm, with females often larger than males. Rabbitfishes are oviparous, laying only a few egg cases mainly during spring and summer which take 5–10 months to hatch, so the species are highly vulnerable to over-exploitation.

Following a number of exploratory research surveys of deep-water fish resources off the west coast of Ireland and Scotland during the 1990s, there was a brief, albeit intensive period of commercial fishing effort directed towards exploiting a number of deep-water fish species (including rabbitfishes) during the early 2000s. However, it soon became clear that exploitation levels were both biologically and economically unsustainable. Many species were found to be highly vulnerable to over-exploitation due to their slow growth rate, late maturity, low fecundity and longevity. There were also growing concern about the damage caused by commercial trawls to these highly sensitive deep-water habitats, particularly the newly discovered extensive areas of cold-water corals. Furthermore, continuing EU reductions on Total Allowable Catches (TACs) and individual member state quotas for some deep-water species, along with relatively low fish prices and increasing fuel costs have made deep-water fishing increasingly uneconomic. Consequently, European landings of rabbitfish species (mainly *C. monstrosa* & *H. mirabilis*) declined by 50%, from a peak of 1170 tonnes during 2004 to 575 tonnes during 2009. French (63%), Norwegian (27%) and Spanish (10%) vessels accounted for almost all European landings during 2009. Although the exploitation of several species of deep-water sharks is currently subject to EU TAC & Quota restrictions, there are none for *Holocephalans*.

Considering their high vulnerability of over-exploitation, there is clearly a strong case for introducing robust management plans to specifically protect all *Holocephalan* species in European waters.

Although European landings have been declining, elsewhere global landings of *Holocephalans* have been increasing exponentially since the early 1950s (Figure 1). Indeed, over the last 60 years, global landings increased by 10-fold, from 1100 tonnes in 1950 to 9565 tonnes in 2009. Five countries, all located in the southern hemisphere, accounted for 94% of global landings during 2009 (Table 2): New Zealand (46.2%), Argentina (29.1%), Chile (10.7%), South Africa (6.5%) and Australia (1.5%). Five individual species of rabbitfish accounted for almost 87% of total landings during 2009 (Table 3): Plownose Chimaera (*C. callorynchus*) [39.8%], Dark Ghost Shark (*H. novaezealandiae*) [20.8%], Ghost Elephant Shark (*C. milli*) [17.3%], Cape Elephantfish (*C. capensis*) [6.5%] and Rabbit Fish (*C. monstrosa*) [2.3%].

Declan T. Quigley, Dingle Oceanworld (Mara Beo Teo), The Wood, Dingle, Co Kerry. Mobile: 087-6458485 Email: declanquigley@eircom.net

Table 2. Global Landings of *Holocephalans* by Country (FAO 2009)

Country	Tonnes	%
New Zealand	4418	46.2
Argentina	2781	29.1
Chile	1023	10.7
South Africa	623	6.5
France	360	3.8
Norway	156	1.6
Australia	145	1.5
Spain	57	0.6
Denmark	1	0.01
Iceland	1	0.01
Totals	**9565**	**100.0**

Figure 1. Annual Global Landings of *Holocephalans* (FAO 1950-2009)

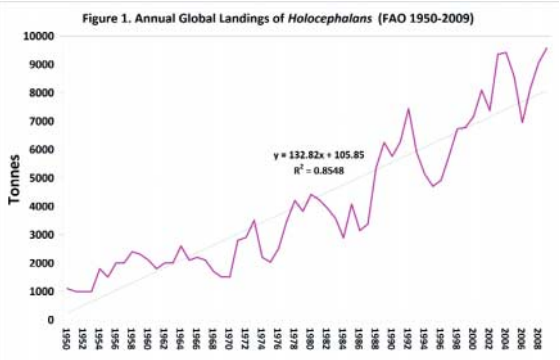


Table 3. Global Landings of *Holocephalans* by Species (FAO 2009)

Common Name	Scientific name	Tonnes	%
Plownose chimaera	*Callorhinchus callorynchus*	3804	39.8
Dark ghost shark	*Hydrolagus novaezealandiae*	1993	20.8
Ghost (Elephant) shark	*Callorhinchus milii*	1651	17.3
Ratfishes nei	*Hydrolagus* spp	1154	12.1
Cape elephantfish	*Callorhinchus capensis*	623	6.5
Rabbit fish	*Chimaera monstrosa*	218	2.3
Chimaeras, etc. nei	*Chimaeriformes*	122	1.3
Totals		**9565**	**100.0**

Table 1. *Holochephalan* species recorded from the North-East Atlantic

Family	Common Name	Scientific Name	Portugal	Spain	France	UK	Ireland	Scotland	Iceland
Chimaeridae	Opal Chimaera	*Chimaera opalescens* (Luchetti, Iglesias & Sellos, 2011)			X	X	X	X	
Chimaeridae	Rabbitfish	*Chimaera monstrosa* L.	X	X	X	X	X	X	X
Chimaeridae	Pale Rabbitfish	*Hydrolagus pallidus* Hardy & Stehmann, 1990		X	X	X	X	X	X
Chimaeridae	Lusitanian Chimaera	*Hydrolagus lusitanicus* Moura et al., 2005	X						
Chimaeridae	Small-eyed Rabbitfish	*Hydrolagus affinis* (de Britto Capello, 1867)	X	X	X	X	X	X	X
Chimaeridae	Large-eyed Rabbitfish	*Hydrolagus mirabilis* (Collett, 1904)		X	X	X	X	X	X
Rhinochimaeridae	Pacific Longnose Chimaera	*Harriotta raleighana* Goode & Bean, 1895		X	X	X	X	X	X
Rhinochimaeridae	Smallspine Spookfish	*Harriotta haeckeli* Karrer, 1972					X	X	
Rhinochimaeridae	Straightnose Rabbitfish	*Rhinochimaera atlantica* Holt & Byrne, 1909		X	X	X	X	X	X

Sheep-eating plants

at the National Botanic Gardens, Glasnevin

By Matthew Jebb

IF I told you that there is, in Ireland, a living plant that can catch, kill and eat a sheep you might well be sceptical – but none the less you would probably be more than curious to know what the ploy is in this claim. But let me assure you it is perfectly true, and if you come to Glasnevin, and better still download one of our free audio tours to bring with you, you can see and hear about it at first hand…

The sheep-eating plant is just one of 30 short stories featured in three new audio tours and a smartphone 'app' for the National Botanic Gardens. They include some of the gardens' hidden treasures, its oldest plants, famous glasshouses, and one of the world's great plant hunters, and come complete with a recording of 'The Last Rose of Summer'. Some of the stories we tell in the guides are unashamedly provocative and bizarre – who on earth has heard of a tree with no leaves, a plant that grows inside out, to say nothing of the sheep-eating plant! – but they're all here – plants that have changed history, cured cancer and beautified the world and these stories are packaged so as to bring the visitor to the plant or building, and bring its history to life.

Images courtesy of National Botanic Gardens

The collection of three audio tours – the Green, Yellow and Red tours – help to share the importance of the plants with visitors.

Every plant in our collection has a story to tell, and audio tours present us with an excellent way to bring these stories to every visitor without cluttering up the collections with panels of text. Mary Mulvihill of Ingenious Ireland, a science writer and broadcaster conceived the audio tours idea. Mary is a broadcaster, a writer and a storyteller, and is passionate about sharing Ireland's hidden heritage, especially its scientific brilliance and industrial archaeology. Mary had made a radio series about the work of the herbarium for RTE in 2007, and as she says "I knew there were lots of great stories in the gardens, and an audio tour is the perfect way to tell them to a wider audience, but in a way that doesn't intrude at all on the plants or the historic gardens. The beauty of our audio tours is that you don't even have to be in Dublin– you can enjoy these from the comfort of your own home, wherever you are." The tours were made possible with a grant from the Department of Tourism, Culture & Sport under its Cultural Technology Grant Scheme in 2009. Best of all, this has enabled us to make the audio tours available for free.

Until a few years ago, such tours were complicated and expensive, involving renting large and cumbersome players, the payment of hefty deposits, not to mention the major financial investment required by the institution. But a remarkable (but far from silent!) revolution has taken place in the last few years, which means that the majority of the Irish population now possess their own audio players – ipods and iphones are everywhere (or MP3 players and smartphones if you want to escape the hegemony of Apple Inc.). By last summer it was reckoned there were in excess of 500,000 smartphones and over 2.5 million MP3 players in the country.

There are three tours in the collection, each with 40 minutes of audio commentary. The Green tour explores the famous glasshouse and palm house, and is suitable for cold or wet days; the Yellow tour is an easy stroll around the gardens historic highlights; and the Red tour is an extended walk to the river, for wildlife, roses and even some philosophy. At each listening stop on the tour, there is a prominent label matching the tour colour. Each stop is only about 2 minutes or so of audio allowing the visitor a chance to hear the story and admire the plant or building. The stories were written and narrated by Matthew Jebb and Mary Mulvihill, as well as the gardens' orchid expert Brendan Sayers, and wildlife guide Glynn Anderson.

The tours were launched in April this year by Presidential hopeful Senator David Norris.

At each listening stop on the tour, there is a prominent label matching the tour colour.

In order to bring the tours to as many people as possible they were packaged in a number of ways. Firstly, and most simply, they can be downloaded as podcasts from one of the two websites or, if you have a smartphone, you can download the app, which includes extra images, directly to your phone. But Mary recognised that not everyone owns these new-fangled gadgets and was therefore anxious to 'past-proof' the tours also. To achieve this we have combined a selection of 16 stories from the green, yellow and red tours on a delightful little souvenir player. David Norris described the souvenir players as 'cute as a button' at the launch. And they are indeed enchanting little pieces of technology – they are essentially small audio players with the audio files hard-wired into them. They have sufficient battery power to give 4 or more tours, and are for sale at just €5 at the visitor centre, with a nicely designed box and map. For an extra €2 you can even buy a dual adaptor, allowing you and a friend to hear the tour together. And when the batteries do die they can always be replaced – a great little souvenir for a visitor.

It is central to our mission to share the importance of plants with our visitors, both local and international, and I hope that this is just the start of many more interactive ways to highlight the value of plants to humanity, and remind everyone just how remarkable the plant world is.

Visitors can access the tours on www.ingeniousireland.ie & www.botanicgardens.ie/audio

The app was designed by ZiggiApps and is now available for free download from the Android app store or iTunes – simply search for Botanic Gardens.

The National Botanic Gardens were established at Glasnevin in 1795 by the Royal Dublin Society, on the site of a Georgian estate and villa, the gardens have been run by the State since 1878. Since 2003 the Gardens have been managed and run by the Office of Public Works. They cover nearly 20 hectares, with over 17,000 different species and cultivars, including many rare and endangered specimens, along with thousands of dried and pressed plants in the 'herbarium'.

Ingenious Ireland: a new company specialising in unusual audio tours and hidden heritage, its next project is a 'blood and guts' walking tour of Dublin's medical history. Other tours include a look inside the Royal Irish Academy and its hidden history on Dawson Street; a geology walking tour of Dublin city; and the history, landscape and heritage of the Hill of Tara, all available to download at www.ingeniousireland.ie

Matthew Jebb, Herbarium, National Botanic Gardens, Glasnevin, Dublin 9, Ireland. ww.botanicgardens.ie

QR code for Android Users

QR code for iPhone users

QR codes – you can photograph these codes with your mobile phone and the app will automatically be downloaded. You will require the appropriate QR software to be loaded on your mobile first.

STOP Food Waste Campaign

You can shop successfully with children in tow!

By Odile Le Bolloch

THE term 'family shop' can lead to a series of violent expletives from even the most placid of parents. The very suggestion can bring up visions of children nagging for sweets, temper tantrums, nosey onlookers peering from other aisles and the trolley filling up with all sorts of food that end up in the bin within a few days. When there are children involved it can be more difficult as food waste and kids often go hand in hand.

The Stop Food Waste Programme funded under the EPA National Waste Prevention Programme is advising that a little planning can go a long way to making the family shop a reduced waste, cost-saving and more enjoyable experience.

Children love helping with the shopping especially by throwing things into the trolley. It is worth spending 5 minutes before the shopping trip to let the children assist you in making your shopping list or let them make a short one of their own – they can then get a small trolley for themselves. You will save money and cut down on food waste this way.

Feed 'em up – never shop hungry: When it comes to food our eyes are definitely bigger than our stomachs. Hitting the supermarket with a rumbling tummy is a sure way to build a mountain of nutrient deficient, sugary snacks that we don't need. Shopping hungry means you and especially the kids are looking for a sugary quick fix, short-term energy boost and those sweet treats look too appetising to resist and just leap magically into the trolley. Not feeling hungry when you shop will mean not picking up snacks you don't need in the house.

Make a list – check it twice: Following a list is a sure way to stay on track. Have the children make their own list and let them pick the items from the shelves. Choosing items and explaining how they fit in to the family meals will keep children interested and aware of the importance of a balanced diet in family cooking.

Bulk buying makes cents: Don't buy expensive individual packs of children's items, such as yogurts, when you can buy a large container and share the spoils. This reduces over buying, over eating and over packaging! It's a winner in every sense of the word. But do watch for bulking up on some perishable items that will never be eaten before they go off – 20 apples at a knock-down price with an immediate best before date is not a bargain but a recipe for disaster as you'll have to discard at least 50% of them in a few days.

Small but mighty: Kids get turned off food if they feel overwhelmed by the amount in front of them. Smaller portions on a plate or correctly sized lunches with smaller fruit mean they do not feel threatened or frightened they are going to miss playtime by having to work through the mountain on their plate. Let them ask for more if they are hungry – and wallow in your success as you dish out more vegetables to the masses. You'll soon see the kitchen shelves emptying instead of scooping the remains of left over dinners into the bin.

Know your children... know your trolley: Experience goes a long way to removing excess and saving money in your shop. Get to know the quantities you and the children eat comfortably and use measuring implements in the kitchen to ensure you cook the right amount. Get the children involved in the cooking – it may be messy but you won't be cleaning food off plates later. Children are more likely to eat a healthy meal if they have prepared it – diligently mixing ingredients and using the right amounts will reduce food waste enormously. Children can become top class smoothie makers with slightly overripe fruit that would ordinarily disappear into the rubbish.

Prep School: Take your planning to the next level by actually putting a meal planner in place – know what you intend to cook for lunch and dinner each day in advance and stick to it. This will reduce the guess work at the supermarket and allows you to cook more than one meal from the ingredients you have. Then you can freeze some for another day, instead of the usual scenario of using half a tray of mince, leaving the rest sit on the shelf until you find an opportunity to make another Bolognese and then that normally ends up in the bin during a busy week as you never found the time. For a full range of recipes that will help you create a weekly meal plan see the website of Stop Food Waste supporter Donal Skehan, www.donalskehan.com.

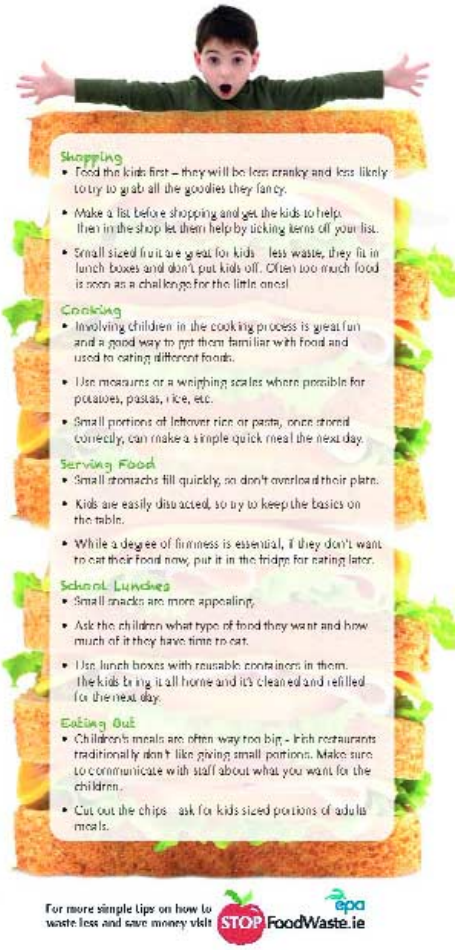
The STOP Food Waste programme is funded under the EPA National Waste Prevention Programme (NWPP). Waste Prevention is the preferred waste management option in Ireland. By not generating waste, we can eliminate the need to handle, transport, treat and dispose of waste. We can also avoid having to pay for these services. In light of the significant issues arising from the disposal of food waste, and the realisation of the costs associated with this, the NWPP Prevention Plan 2009–2012 set out to promote food waste prevention and home composting.

For more information for parents on avoiding food waste, visit the 'tips for parents' section on www.stopfoodwaste.ie.

Odile Le Bolloch, Resource Use Unit, Office of Climate, Licensing and Resource Use, Environmental Protection Agency, Johnstown Castle Estate, Co. Wexford. www.epa.ie

Images courtesy of EPA

A little planning can go a long way to making the family shop a reduced waste, cost-saving and more enjoyable experience.



Peadar McArdle

My Life as a Geologist

By Peadar McArdle

I RECEIVED my training in geology during the 1960s in the then relatively small Geology Department of University College Dublin, which provided a balanced and comprehensive foundation on which to build a professional career. It particularly emphasised the value of field work in evaluating geological problems and this was something that held a special appeal for me. The Head of Department, Professor James Brindley, was an acknowledged granite expert, having honed his skills on the nearby Leinster Granite, the largest in this part of Europe. So it will come as no surprise that my postgraduate research was based on a segment of this batholith, a linear strip running along the eastern margin of the Tullow Lowlands Pluton. This was a very satisfying study not only of granite and its newly–discovered lithium-tantalum pegmatite veins, but of the surrounding sedimentary and volcanic rocks in which it was emplaced.

Many geologists start their careers overseas and I was to be no exception. Funded by the UK Ministry of Overseas Development, I was assigned to the Geological Survey Department of the newly-independent Republic of Malawi. The country straddles the East African Rift System, a fundamental split in the Earth's crust which displays a spectacular range of carbonatites (unusual igneous rocks composed of carbonate). My work involved evaluating the mineral resource potential of the extensive Precambrian schists, gneisses, and their intrusions. Although its mineral resources are limited, my targets included uranium, nickel, copper, gemstones, industrial minerals and urban brickfields. I considered myself fortunate to experience field work under safari conditions that are rarely available nowadays.

Back in Ireland once more, I spent a couple of years at the Silvermines zinc-lead mine in the mid-seventies. One of a number extracting base metals from limestone-hosted deposits, it provided me with an unrivalled opportunity to understand their architecture and geological controls, as well as introducing me to the engineering skills involved in extracting and processing them.

Such mineral resources formed the basis for the first half of my career at the Geological Survey of Ireland (GSI). My role was to advise our parent Department on technical aspects of mineral exploration and mining, which brought me into contact with all dimension of the industry throughout the country. I remain deeply impressed by the skill and dedication of the spectrum of professionals and workers involved, not least by the resourceful and self-reliant coal miners of the 1970s and 1980s. These extracted coal of varied quality from a series of small operations based on narrow seams and often in difficult working conditions. The Avoca mines also took on a special significance for me and this was partly because of its nail-biting struggle for survival (it had 225 interested geologists on its payroll whenever new exploration drilling took place!). But it was also because of its fascinating geology which evolved along a chain of volcanoes on an ancient ocean margin, all of 450 million years ago.

But new horizons beckoned to me with my appointment as Director of GSI in 1992. My purpose now was to lead a dedicated team of scientists, technical and administrative staff in producing suitable information products required by our diverse range of customers. These extended beyond mining to include regional planning, water supplies, environmental protection, heritage, tourism, education, construction and quarrying. The digital revolution meant we also had to develop new ways of providing access to our maps and databases. An important event was Government's decision that GSI undertake the National Seabed Survey, a major initiative that demonstrated the power of geoscience to deliver value to the maritime sector – fisheries, engineering, environmental concerns, shipping and coastal zone management. The second phase of seabed mapping, the Infomar Programme, is currently underway and I am delighted that it is being jointly undertaken with our colleagues in the Marine Institute.

Cooperation with the Geological Survey of Northern Ireland has long been an important activity for GSI, starting with collaboration on completing the various cross-Border bedrock map sheets. This evolved to joint projects concerned with tourism, mineral exploration and offshore surveys, and has culminated in the recent Tellus Border Programme. This will, on a cooperative basis, complete important geophysical and geochemical surveys in the counties bordering Northern Ireland and the results will be important for mineral exploration, groundwater resources and regional planning.

These surveys are just one dimension of an expanding range of geoscience initiatives which GSI is undertaking, thanks to funding under the National Development Plan, and which are addressing issues such as landslide susceptibility, aggregates potential mapping, carbon-capture-and-storage and the quality of our urban environment. In parallel, GSI has funded a range of high-priority research projects designed to underpin sustained research at universities in Ireland and Northern Ireland, and very interesting results are emerging already. I have been fortunate in my career to see an expansion of the range of applications where geoscience can make a valuable contribution, and to have worked with so many dedicated and gifted scientists in delivering those applications for the benefit of our country and communities.

Dr Peadar McArdle retired as Director of the Geological Survey of Ireland in November 2010.

Gold Frenzy – *The Story of Wicklow's Gold* by Peadar McArdle, has just been published & is available from www.gsi.ie. Price €20.00. ISBN: 0-906002-08-7

If not *Now*, WHEN?

By Alex Kirby

CLIMATE CHANGE has gone off the boil, stopped being sexy, disappeared from the headlines and the TV screens. It's hard to realise that just a couple of years ago the world was agog to learn the latest science, to see the most up-to-date footage from the Arctic and to grill government ministers about how they were planning to confront the threat. Threat? Climate change is soooooo yesterday. Get real.

Except that it isn't yesterday's story at all. It's today's, and even more tomorrow's (though what we do and don't do today will decide the shape of tomorrow for our children and grandchildren). If reality is what you want, look at the November bombshell from the normally staid and not at all sensational International Energy Agency (IEA), the 2011 edition of its *World Energy Outlook*.

Primary energy demand will increase (on present trends) by a third between 2010 and 2035, it says. Fossil fuels (which enjoyed $409 billion in subsidies in 2010) will still account for 75% of consumption, a drop of 6% from today. But oil demand rises from 87 million barrels a day to 99 million, and the use of coal – the most polluting fossil fuel – is set to go up by 65%.

And here's the real humdinger. The world, according to the IEA, has until 2020 to act to keep atmospheric carbon dioxide emissions rising beyond 450 parts per million (ppm), the threshold after which climatologists expect the changes will become unpredictable and there will be no chance of moderating the human influence on the climate.

Fatih Birol, the IEA's chief economist, said: "As each year passes without clear signals to drive investment in clean energy, the 'lock-in' of high-carbon infrastructure is making it harder and more expensive to meet our energy security and climate goals.

"The door is closing. I am very worried – if we don't change direction now on how we use energy, we will end up beyond what scientists tell us is the minimum [for safety]. The door will be closed forever."

It doesn't come much plainer than that, nor from many sources with greater credibility. But, of course, the possibility of actually being able to make the sort of changes he suggests is unimaginably remote, isn't it? And the cost would be absolutely prohibitive, surely.

Well, no and no, actually. According to one scientist I met recently, the changes are practically possible, and the cost is entirely affordable – we would quite likely save money.

That word "scientist" is a notoriously useful one for journalists, of course. You can stick a white coat on anyone, credit them with bogus qualifications and outrageous opinions, and claim that they have divined the truth that has escaped all their peers.

But my scientist was worth listening to. He's Dr Paul Werbos, who works for the US National Science Foundation as a program director in its Office of Emerging Frontiers in Research & Innovation. He draws a careful distinction between his work for the NSF and his private interests, and has his own website (http://www.werbos.com/).

Dr Werbos – speaking for himself, not for the NSF – lists energy, growing dependency on oil and gas imports, and nuclear proliferation into unstable areas as together one of the three big challenges threatening human survival. In his view, a witches' brew of import dependency, a Middle East conflict, and the spread of nuclear weapons really could constitute a human extinction risk.

But – and this is the arresting part – he insists that the future does not have to be like that. Instead, he says, the technology exists to allow the US to become entirely independent of fossil fuels within 20 or 25 years. And if the US should do that, could the rest of the world afford to be far behind?

Dr Werbos' recipe for foreign fuel freedom is based on converting road transport to reliance on plug-in hybrid vehicles able to recharge their batteries as quickly as we take to fill our cars' tanks, and three-way fuel flexibility – the use of the GEM fuels, gasoline plus ethanol plus methanol.

He believes new-generation biofuels would avoid the criticisms the earlier versions have attracted, that smart grids could cut electricity distribution losses, and that there is a practical possibility of generating renewable electricity from space.

Perhaps Dr Werbos is on the further edge of belief in what's possible. Perhaps he leaves too many questions unanswered – like how we could hope to generate the electricity that will be needed.

But contrast his can-do approach (he even thinks new batteries will make electrically-propelled aircraft feasible) with the IEA's warning of where we shall be within a decade if we go on in the same old way.

So why are we all set to go on exactly as we are? What is stopping us from starting on the changes we know we have to make?

An easy target for blame is the big battalions of climate sceptics, or deniers, or whatever word you use for them (I don't like calling them sceptics, because it seems to me that it is scientists and journalists who are professional sceptics, and who wear the label happily as it describes the only way they know how to work. Those who question the climatologists don't like being called deniers, because they say it's a name that puts them on a par with Holocaust deniers.)

I'm not at all sure anyway that those who challenge the Intergovernmental Panel on Climate Change (the IPCC) and the many climate scientists who say the threat is real can claim much credit (or blame) for the lethal inertia of so many of the rest of us.

A recent study by the Reuters Institute for the Study of Journalism at the University of Oxford looked at climate doubt (to try to use a neutral term for the deniers/sceptics), and among its findings was one that struck me. Doubt about the mainstream (IPCC) case is much stronger in the Anglo-Saxon countries of the UK and the US than in the other four countries studied – France, China, India and Brazil. So I think the doubters may have local rather than universal factors to thank for their apparent success in persuading electorates that far greater uncertainty exists than the facts bear out.

I think probably most of us go on as we always have done for two reasons: because we don't think change is possible, and because we're too afraid to try anything different anyway.

That may possibly make some sense in a situation where you can hope that persistence may eventually pay off, that a dogged refusal to change offers some prospect of survival. But it makes no sense at all when the stakes are as clear as they are now.

Neither Fatih Birol nor Paul Werbos is a headline-seeker. Neither of them says things for effect: apart from anything else, they would both have far too much to lose to risk doing that. If they say things are as stark as they are, and if they also say really radical change is within our grasp, we should listen to them. And then act.

Alex Kirby is a former BBC News environment correspondent.

Life in a Russian Lake

View of Lake Baikal, which is situated south of Russian region of Siberia. (Inset: The Research Boat *Titov*.)

Courtesy of Geraldine Reid

By Geraldine Reid

I HAVE been working on Lake Baikal for the past 14 years, studying and documenting the benthic diatom diversity of the lake.

Lake Baikal is a special place; in fact it is a truly amazing place full of spectacular scenery and a vast array of wildlife which you will only be able to find at Baikal. It has around 1,900 species living there. The description of the lake always makes impressive reading as it is the deepest lake in the world at 1,642 m (5,387 ft), it has an area of 31,500 km^2 and is 636 km long. It holds nearly 20% of the world's unfrozen surface fresh water. It contains the largest volume of freshwater in the world, 23,615 km^3.

It is situated in southeast Siberia and was formed within a series of rift zones some 30 million years ago. It is unique amongst deep lakes in that the water is fully oxygenated owing to regular replacement of the deep water every spring and autumn which allows it is easily the oldest lake in the world coupled with the fact its water is oxygenated to great depths has allowed and offered plenty of time for evolutionary diversification of many plants and animals.

One of the amazing things is its vast diversity of wildlife both within the lake and in the surrounding landscape. It is home to the exclusively freshwater seal – the Baikal seal (*Phoca sibirica*). The landscape as you go around the lake is amazingly diverse resulting in the great variety of plants in the lake basin. The northern part of the Lake is covered by deciduous forests; the eastern part is predominately pine forests and the western part is occupied by coniferous forests and mountain steppes. It has extreme weather conditions with an average of -25°C in January rising to a mean of +19°C in July. The Lake freezes every winter with a thickness of between 80–120cm. Depending on which part of the Lake you are in it is frozen from late December until June in the north basin and January until May in the South basin.

The group of organisms I am interested in are called diatoms. Diatoms (Bacillariophyta) are a diverse and large group of photosynthetic single-celled eukaryotes, with their cells encased in a silica shell. Diatoms live in both marine and freshwater and are extremely important for all other animals as they form the basis of the food chain on our planet. Viewed under the microscope they appear in a wide variety of shapes, the silica shells forming many interesting and beautiful patterns.

The aim of the project is to study, document and explain the benthic diatom diversity of Lake Baikal. Lake Baikal has one of the most diverse diatom floras in the world. This remarkable flora has received little attention since the 1930s, when almost 200 taxa were recorded, two thirds of which were endemic – only being found in the Lake.

As part of this study I became interested in a couple of very unusual looking species of diatom called, at the time, *Eunotia clevei* and *Eunotia hispida*. Investigating these species further (together with my colleague David Williams at the Natural History Museum London where I was based) we noticed that these species were quite unique and belonged in a new genus of their own, *Amphorotia*. Examining more specimens we found 6 new species which we felt belonged in *Amphorotia*. As we examined the distribution of these unusual specimens we found the species in the genus are both fossil (extinct) as well as living; previously having had a much wider distribution. Those that we found in deep lakes being living representatives and have been called 'living fossils', relics from the past still thriving in this unique and ancient habitat but extinct elsewhere.

This precious habitat, which has World Heritage status, is being closely watched because there are concerns about its future environmental quality. The Baikalsk paper and pulp mill has recently reopened in 2010, it previously closed down in 2008, and has been responsible for pumping its waste products into the Lake. Here the concern is real as the retention time of water in the Lake is high a staggering 400 years, this means that pollutants entering the lake now will take 400 years to leave. There has been an increase in the industrial growth within the Baikal catchment which has lead to localised contamination of the water. There is increasing run off from mining activities and changes in the population around the Lake with increasing in pressure from tourism which pose a threat with untreated sewage entering the water.

Diatoms being single cells are very fast to respond to environmental changes and as such are used to monitor changes within Baikal's ecosystem. Diatoms can also be used to show how the Lake has changed over the years as they preserve in the sediments extremely well as they are made out of silica. By taking sediment cores from the bottom of the Lake you are able to look at slices through these cores and map any changes within the Lakes populations. These can be use to reconstruct past environmental change in the Lake and build up a history of its previous environments.

Baikal Diatoms: *Amphorotia hispida, Didymosphenia dentate, Amphorotia lacusbaikali*

Courtesy of Sergey Gabdurakhmanov

Baikal Seal

Geraldine Reid is Head of Botany at National Museums Liverpool, William Brown Street, L3 8EN, UK. She was formerly a volunteer at Sherkin Island Marine Station.

PUBLICATIONS OF INTEREST

Between Rocks and Hard Places: Discovering Ireland's Northern Landscapes

By Paul Lyle

Geological Survey of Northern Ireland/TSO Ireland

www.tsoshop.co.uk

ISBN: 978-0-337-09587-0

Price: €16.99/2010

At the heart of this beautifully illustrated book is the spectacular landscape of Northern Ireland. Not only does Dr. Lyle show the regional picture – Ulster, with digressions into Cos. Sligo and Leitrim – but also he takes the reader on an exciting journey into Earth's structures and processes. At University, one of my geology lecturers (himself with links to Northern Ireland) queried why so few of my fellow botanists studied geology. So I welcome this book, with its unashamedly popular presentation of geology, demonstrating why this field-based science is so important to us all.

Northern Ireland is blessed with great diversity of rocks and scenery. Some of the landscapes are spectacular and famous worldwide: the fantastical hexagonal basalt columns of the giant's Causeway, the noble granite Mourne Mountains, and the Glens and Coast of Antrim, where dark basalt overlies baked chalk, a far cry from the chalk Downs of southern England. The author tells how the Donegal Highlands and Sperrin Mountains are ancient fragments, in places up to 1800 million years old, of the Caledonian Mountains of Scotland. He describes the glacial events that created the hummocks and lakes of the drumlin county of south Ulster and Strangford Lough; he explains the origin of the elegant hard porcellanite tools of ancient Ireland; and he shows how later generations built up this geological legacy to mine coal, iron, chalk, gypsum and salt. He notes how always 'the present is the key to the past', comparing for example the active volcanic landscape of Ireland with similar events in Co. Antrim some 60 million years ago. Above all, he illustrates how people and the heritage of buildings and monuments they leave behind are an integral part of the landscape, its rocks and physical structures. He discusses the dilemmas involved in protecting cultural landscape while making wise use of their natural geological riches and resources.

John Akeroyd.

Rivers of Belfast – A History

By Des O'Reilly

ISBN: 978-1-906578-75-6

Colourpoint Books

www.colourpoint.co.uk

Price: £20.00/2010

This book opens with a chapter on the geological history of the Belfast Rivers. It goes on to look at the River Lagan, the main river to flow through Belfast, and its many tributaries that today have been diverted and hidden away – running silently beneath the city. Each of the 12 minor rivers has a chapter devoted to its river system. It also looks at the Lagan Navigation, which once linked Lough Neagh to Belfast via a canal.

The River Lagan rises in the hills of mid-Down. As it flows towards Belfast, we read of its natural and human history, of the landscape and of the towns and villages it passes through. The industrial growth of the city of Belfast is described from its early beginnings to the present day, all the while referring to the influence from the river systems. Ship-building once gave employment to 25,000 people and the importance of the linen and cotton industries on the Belfast rivers receives special mention. In 1838, cotton weaving alone had up to 15,000 workers.

Progress was not always positive and pollution from the various industries and from sewage on the rivers in the 19th and 20th centuries was very severe. In places the pollution had a very serious effect on the flora and fauna of the rivers. Thankfully today the rejuvenation of the rivers of Belfast and their valleys has helped to shape the physical and human landscape of the City of Belfast and it surroundings.

Over 250 photographs and illustrations are beautiful and help to bring this book alive. The history of the rivers of Belfast is worthy of a place on our bookshelves and the ideal introduction for those of us who may be less familiar with the city of Belfast.

Woodland creation for wildlife and people in a changing climate – Principles and practices

By David Blakesley and Peter Buckley

Pisces Publications

www.naturebureau.co.uk/pisces-publications

ISBN: 978-1-874357-44-5

Price: £24.95/2010

This guide considers the many environmental issues of the day, which contribute to the success of woodland creation initiatives in Britain and how they might feature in forward planning.

The book is divided into two main sections. The first part "General Principles" looks at the issues underlying woodland creation and the different woodland community types. It looks at climate change, biodiversity, planning and planting strategies for woodlands.

Part two give practical information on planning a woodland creation project. The various issues that need to be addressed are covered, such as grants, soil and habitat surveys, designing and planting new woodland and selecting the trees and shrubs. There is excellent advice for post establishment management, including pruning, thinning, coppicing and providing additional resources for wildlife.

As many of the issues would be the same in Ireland, this book would be of great interest to anyone involved in managing woodlands – from planners, who advise farmers under EU grant aid, to foresters to conservation and community groups. Above all it is a guide for the beginner, interested in creating a new woodland, however small.

The Dingle Peninsula Bird Report

2008–2010

Corca Dhuibhne (West Kerry) Branch, BirdWatch Ireland

Price: €14.00 (inc p&p)/2011

Yet again another wonderful Bird Report for the Dingle Peninsula, from the Corca Dhuibhne (West Kerry) Branch of BirdWatch Ireland. This is the 4th Bird Report from a dedicated group of BirdWatch members, whose activities focus on raising awareness and pride in the area's natural heritage. This report includes a systematic list of the birds of the Dingle Peninsula 2008–10 and what a list it is, with over 270 species. There is a brief description on each bird, whether it is common, scarce or rare, together with the sightings in the peninsula over the three years. For the non-birders with a love of nature these descriptions are written to hold the reader's interest.

There is a very interesting article on the Co. Kerry Barn Owl Survey. One learns 17 Irish counties are without any confirmed nests – Kerry does have them, being the highest in Ireland with 32 nest sightings. Now to the special wine, what beautiful colour photographs of birds dotted throughout the report. Birdwatchers and anyone interested in nature will love this beautifully produced report and if a Christmas present is needed, this is ideal.

The Dingle Peninsula Bird Report 2008-10 is on sale at €12.00 in Ventry Post Office; The Dingle Bookshop, Green Street, Dingle; and the Castlegregory Information Centre. Dingle Pensinsula Bird Reports are available by post from Lucie Hankey, Monaree, Dingle, Tralee, Kerry, Ireland. Email ldhankey@utvinternet.com

Cheques made payable to The West Kerry Branch of BirdWatch Ireland. €14.00 includes p&p Europe and worldwide or via PayPal to Lucie's email.

The Story of Irish Museums 1790-2000: Culture, Identity and Education

By Marie Bourke

Cork University Press

www.corkuniversitypress.com

ISBN: 978-185918-475-2

Price: €49.00/2011

Ireland can be proud of her contribution to the origin and growth of museums. Co. Down physician and naturalist Sir Hans Sloane (1660-1753) left his 'cabinet' of extensive collections to establish the British Museum, and by the end of that century the Royal Irish Academy and other Dublin institutions had founded museums. This great public legacy from the Enlightenment was too often neglected in the 20th century, and the remarkable revival and development of Irish museums we see today again faces economic constraints.

This wide-ranging, comprehensive narrative overview of Ireland's museums emphasises how much they matter, to people, to the economy and society, and to Irish identity. The author roots museums firmly in their historical, political and global context, showing how their collections are no mere objects of curiosity – but have educational, cultural and economic impact far beyond the 'museum space'. She writes about buildings, personalities, collections, presentation, the arts and sciences, including botanic gardens and, centre stage, Ireland's rich archaeological heritage. The book is beautifully illustrated (including many paintings), and there are 95 pages of notes and bibliography.

John Akeroyd.

Wild Mayo

By Michael Viney

Mayo County Council

heritageofficer@mayococo.ie

ISBN: 978-0-9555429-0-9

Price: €15.00/2009

"Wild Mayo" is a celebration of Mayo's natural heritage. It takes the reader on a wonderful journey of discovery through the county. It explores how Mayo's landscape came to be and why it is so special. The diverse flora and fauna of the various habitats are described in 14 chapters. In 'The Peatlands' we get a wonderful explanation of how peat has evolved over the centuries. One has to be surprised at the range of animals and birds that use the bogs. The plant life there is special too, and it includes the beautiful flowering Bogbean and the rare Pipewort. And there are over 40 kinds of spiders! Mayo has a myriad of lakes, such as Corrib, Conn, Mask and Carra, which are rich in plant aquatic life. In the chapter about the lakes we learn how the feral mink had a severe effect on native waterbirds, gulls and terns which were long established on the islands in the lake from the Corrib to Carrowmore. Other chapters include 'The Rivers', 'Woodlands and Forestry', 'Rocky Shores', all of which describe the rich wildlife and flora of a remarkable range of habitats, from the mountains to the Atlantic shore. This book, with the help of over 100 colour photographs, brings to life a county with very special natural heritage.

Planet Dancing

By Patrick McCusker

Open Gate Press

planetdancing@gmail.com

ISBN: 978-1-871871-70-8

Price: £7.99/2011

Planet Dancing is an unusual book on nature conservation, as it gives suggestions on how we can become directly involved. Through stories, largely based on the author's experiences of time spent in national parks and nature reserves, the author shows us how we can re-acquaint ourselves with nature. The story "Meeting again with old friends" is a gem. The author tells us "But before we can begin to attempt to make things better we need to rethink our relationship to nature. We must approach this calmly. There is too much hysteria and there are too many doomsayers around the issues of conservation..... We need to find in our lives a place for nature."

The description on "The 9000km egg" of the flight of the Cuckoo from South Africa to Ireland is a beautiful story. The author carries us along as the cuckoo crosses of the Kalahari Desert, over the Congo River and Lake Chad, on to the Bay of Biscay and then as she crashes exhausted down into a soft field in sweet grass in Ireland. The book is filled with wonderful stories of nature told in a way that would give the reader a new perspective. In all there are over 30 stories, each showing us the magnificence of nature, many enticing us to embrace a number of unusual conservation ideas. A lovely present for someone with an interest in nature.

The River Shannon
A Journey Down Ireland's Longest River

By Aiveen Cooper

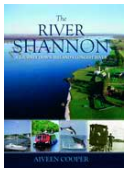
The Collins Press

www.collinspress.ie

heritageofficer@mayococo.ie

ISBN: 978-0-9555429-0-9
978-1-8488910-7-4

Price: €24.99/2011



This is a journey down the longest river in Ireland and Britain. Its catchment area is 15,000 sq km, which makes up one fifth of Ireland's land mass. The author brings us from where it rises in the Cuilcagh Mountains, Co. Cavan to the Atlantic Ocean. We learn of the wonderful natural history throughout its length – the otters of Lough Allen, the bird life listed for special protection, such as Greenland White-fronted Goose, Corncrake, Teal, Wigeon, and the rare plants, such as Bird's Nest Orchid, Tootwort, Alder Buckthorn and Bird Cherry. Islands are in abundance on Lough Ree, over 50, which include Goat, Bush, Little, Inchenagh, Claninch and Inchcleaurn – the latter with its various ecclesiastical buildings dating from the Early Christian period. Religious communities inhabited many of the other islands in the Lough.

There is a special chapter on the monastic city of Clonmacnoise, established by St. Ciaran around AD544. We get a wonderful history of this unique place. The discovery of the remains of a wooden bridge spanning the river dated to AD804 and also nine dug-out boats from the 8th and 9th centuries were precious finds. The Shannon Callows of 3500 hectares, along a 40km stretch of river, are very special with its plant life and bird directive lists of protected species.

Further downstream is Lough Derg, the largest lake on the river, and the author's journey in and around it, would make one want to spend many days exploring its islands, landscapes, towns and villages, such as Portumna, Mountshannon and Killaloe. This book has nearly 200 wonderful photographs, which bring the river alive – indeed within the book the photographs tell their own story of the river. I have enjoyed reading this book as it has brought back many memories for me, from nearly 60 years ago, when a friend and I canoed from Bellantra Bridge, near Drumshambo to Clonmacnoise.

New species of Fucus honours Prof. Michael Guiry

A NEW species of *Fucus*, that most common of intertidal brown algae in the North Atlantic and North Pacific, has been named by Portuguese researchers from the University of the Algarve, *Fucus guiryi* "... in honour of Emeritus Prof. Michael Guiry, Ryan Institute, NUI Galway (see *Sherkin Comment* No 46), in recognition of his great contribution to phycology by creating AlgaeBase." (see *Sherkin Comment* No 51). This most surprising of new species is a common intertidal species ranging from Scotland in the north to the Canary Islands in the south. It is zone forming over much of its range, and it has long being confused with *Fucus spiralis*, Spiralled Wrack.

This is not the first time that Michael Guiry had been recognised in this way: *Guiryella repens* is a red alga described by two eminent Australian botanists from the Abrolhos Islands, and now known from from Western Australia and South Australia; *Cordylecladia guiryi* was described by scientists from the Universita di Messina from the subtidal of Sicily; and *Gloiocladia guiryi* is a rare subtidal species in Pacific Russia, described by a botanist from the prestigious Russian Academy of Sciences at Petropavlovsk – Kamchatski.

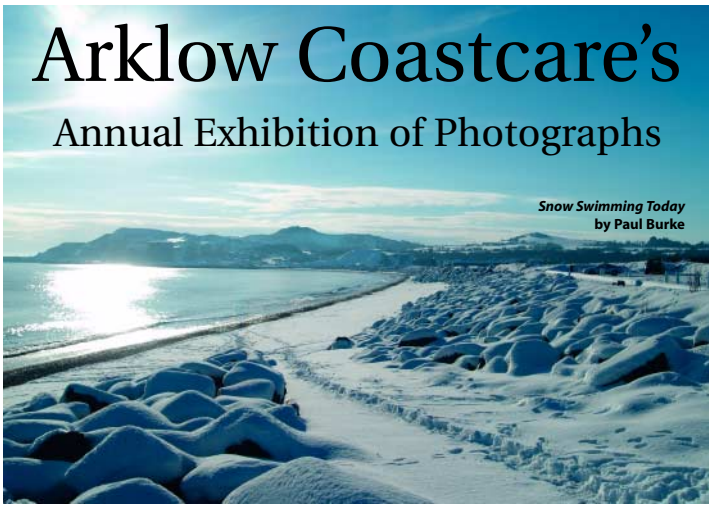
Last year, Michael was given the Phycological Society of America's annual Award of Excellence, was made an Honorary Life Member of the British Phycological Society and an Honorary Lifetime Member of the International Phycological Society. This level of international recognition is a reflection of the incredibe international impact of the on-line database "AlgaeBase", of which we wrote in the last issue, and the value placed on it by the international community.

Matt Murphy

Fucus guiryi

Arklow Coastcare's

Annual Exhibition of Photographs



***Snow Swimming Today* by Paul Burke**

ARKLOW Coastcare hold an annual photographic competition and exhibition to encourage people to explore the wonder and beauty of their local coastline. The competition is open to everyone and each year the organisation is amazed by the imagination and inspiration shown in the pictures.

This year's exhibition of photographs was opened in August, in conjunction with National Heritage Week. Photographer Brian McIlvenny, who judged the competition, found it difficult to choose winners and was forced to split first prize between 'Snow Swimming Today' a stunning study of the beach by Paul Burke under last year's snow and 'Prowling Around' a dramatic close up shot of a sea gull in flight by Ian Mc Cann. Arklow Coastcare is grateful to everyone who took the time to enter and is especially grateful to the friendly people at the Phone Booth in Arklow who donated the very appropriate prizes – camera phones.

Check out Arklow Coastcare's new website for more pictures at www.arklowcoastcare.com.

***Prowling Around* by Ian McCann**

Ideal Gifts

A Beginner's Guide to Ireland's Wild Flowers

Have you ever wanted to put a name to the wild flowers you see about you every day, or while on a walk, or on holiday? With the help of this pocket-sized guide, you will be able to do just that. Beginners of all ages will be introduced to the many common wild flowers found around Ireland.

Published by Sherkin Island Marine Station

Price: €7.50 plus €1.00 p&p ISBN-13: 978-1-870492-23-2 Softback: size 140mm x 100mm 208pp

A Beginner's Guide to Ireland's Seashore

A pocket-sized guide, suitable for beginners of all ages. With the help of this book you will be able to explore the wonders of marine life on the shores around Ireland.

Published by Sherkin Island Marine Station

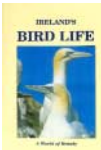
Price: €7.00 plus €1.00 p&p ISBN-10: 1-870492-96-X ISBN-13: 978-1-870492-96-6 Softback: size 140mm x 100mm 208pp

The Natural History of Sherkin Island, West Cork – An Introduction

Perhaps you haven't been to Sherkin Island before, or maybe you're coming back again, as many people do. This book will introduce you to some of the wonderful wildlife and flowers on this beautiful and peaceful island, which lies just 10 minutes by ferry across the busy little harbour of Baltimore, West Cork. *Published by Sherkin Island Marine Station*

Price: €4.95 plus €1.00 p&p ISBN-13: 978-1-870492-38-6
Softback: size 208 mm x 98 mm - 72 pp

Ireland's Bird Life. A World of Beauty



Ireland's Bird Life - A World of Beauty contains photographs from the vast collection of Richard Mills, who is recognised as one of Europe's finest photographers. The book contains 200 colour photographs from his vast collection which show the great talent of a man who is a craftsman with his camera. *Published by Sherkin Island Marine Station*

Price: €12.00 plus €1.00 p&p. ISBN-10: 1 870492 80 3 ISBN-13: 978-1-870492-80-5 Softback A4 160pp

Available from: **Sherkin Island Marine Station, Sherkin Island, Co Cork**
Tel: 028-20187 Fax: 028-20407 sherkinmarine@eircom.net www.sherkinmarine.ie
Books can now be purchased using Paypal.

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JUNIOR PAGES

Sticking Around – The Wonderful World of Barnacles

Barnacles – Upside Down Crabs?

Barnacles, like many insects, belong to that vast group of animals, the phylum Arthropoda. Within this, they are members of the same sub-phylum as crabs and lobsters. Indeed, a barnacle may be considered to be a crab that, instead of using its legs to run around and hunt for things to eat, has chosen the easier option of lying on its back and waving its legs in the water to trap passing morsels of food. To protect themselves, barnacles have developed external shells made of six calcareous plates and two moveable plates, which protect the animal inside when it is not feeding.

Barnacles – the Curse of Pirates Everywhere!

As well as bad food, scurvy and the risk of sudden death in bloodthirsty battles, pirates everywhere had to deal with the threat of barnacles. Like seaweed, tube worms and other encrusting marine life, barnacles cling to the bottoms of ships and slow them down, making them easier for the authorities to catch. To keep barnacles at bay, pirates would regularly run their ships aground and scrape the bottoms clean. Richer navies would go to more elaborate measures, like sheathing the bottoms of their ships in copper, which is toxic to marine life.

Barnacles – A Medical Breakthrough?

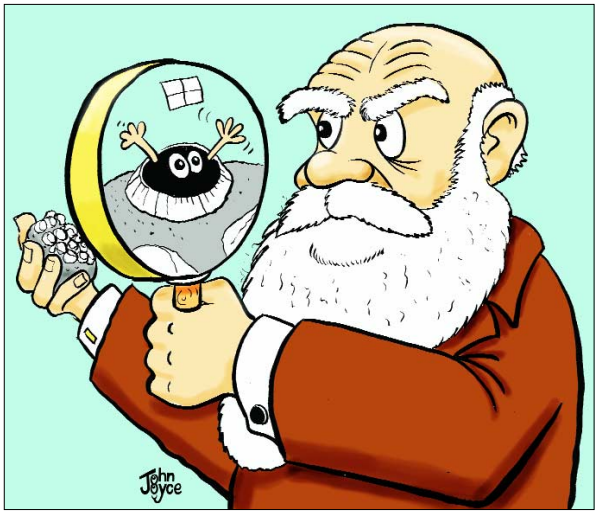
A series of experiments by the Zoology Departmental NUI Galway are looking at the natural super glues used by barnacles to attach themselves to rocks or floating objects. If these experiments are successful, then we'll know a lot more about creating a natural superglue that can be used to mend bones in human surgery or, on the other hand, how to create ways of preventing barnacles clinging to ships and lowering their fuel efficiency.

Captain Cockle's Log

Log onto
www.captaincockle.com

Barnacles – A Subject of Study for Charles Darwin

The first person to fully study and classify barnacles was the world-famous biologist Charles Darwin, who published a series of scientific papers on them in 1851 and 1854, before he published his groundbreaking book – 'On the Origin of Species'. Some historians have suggested that Darwin studied barnacles as a way of putting off work on his great study of evolution. But it has been shown more recently that he studied barnacles at the recommendation of his friend Joseph Dalton Hooker so that he could understand at least one species of animal in depth. This was in order to test his theories about natural selection and the natural world in general.



MAKE A BIRD HIDE
in the Classroom or at Home

Why a hide is useful...

It may help your work to watch birds from your home or the classroom, but the birds can be frightened by people moving around. The challenge is to make a place for watching that hides you from the birds. That is why it is called a 'hide'.

Designing a hide

Before you begin, think about the area outside your house or the classroom that you will be watching.

- Do birds already visit the place you will be watching? If not, can you attract them in? You may need to do this first.
- Are there trees, bushes or other safe perches nearby? Will birds be disturbed by other activities around the school?
- Will it be possible to provide a bird table, feeder or bird bath?

A place for people

Next, think about the space inside the house or the classroom. To work well your hide must:

- Let you see the birds without them seeing you.
- Have room for more than one person.
- Have space for people to write down what they can see.
- Allow everyone in the house or class to use it (although not all at once!)
- Include a place to pin up notes or bird pictures. It may need to be screened from the rest of the house or classroom, to stop other activities disturbing the birds.

Planning and making the hide

Decide with the help of your parents or teachers:

- Which part of the house or classroom can be used as a hide.
- How large is the hide to be.
- How to screen off part of the house or classroom (if necessary).
- The best way of screening the window.
- What material to use for screening.
- How much space is needed.
- The best place to pin up your observations and art work.

Evaluating your work

- Did you have enough space and materials to make the hide?
- Was there enough room?
- Has the hide made it more difficult to use the rest of the house or classroom?

The above information is from "Working with Birds around your School" on the BirdWatch Ireland website. For more tips and ideas, visit the Kids' Zone at www.birdwatchireland.ie.

Using the Hide

Trial run

Try out the hide. Watch for about fifteen minutes.

- Which birds come to the area you are watching?

Here are some things to try and find out by using the hide:

- Do birds come any closer to the classroom than they did before you made the hide?
- Do birds stay longer?
- Are birds close enough for you to see their bills clearly?
- Which birds come most often?

Other observations you could make

- Does the time of day affect the birds that come to the place you watch?
- Is there a link between this and what people are doing around school?

Evaluating the hide

- Were you hidden from the birds?
- Did you see birds either more closely or for a longer time?
- Will your observations help you in science or other classes?
- Have you been able to pin up some of your work?

Learn about birds with BirdWatch Ireland

Feeding Wild Birds Leaflet
Download this leaflet from the Learn about Birds section on BirdWatch Ireland's website at www.birdwatchireland.ie

Learn how to identify the birds in your garden with our **Free Garden Bird Charts**. Send a SAE to: *BirdWatch Ireland, P.O. Box 12, Greystones, Co. Wicklow.*

BirdWatch Ireland has over 10,000 members and has branches throughout the country which organise events and outings in your area. Why not get your school to join? Write to us or visit our website for details: www.birdwatchireland.ie

BirdWatch Ireland has two educational web sites, catering for learning about birds in schools.

- Visit the Working with Birds web site to learn about watching and feeding birds

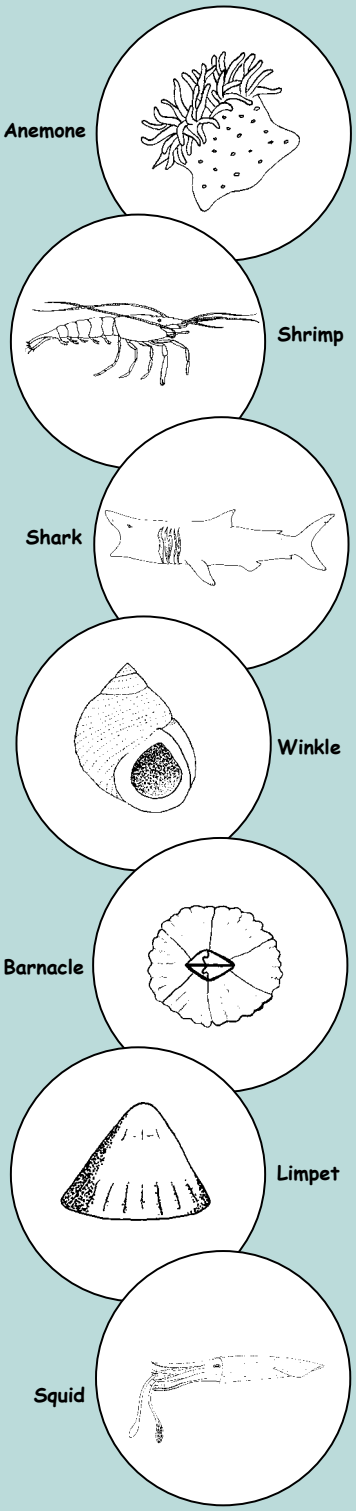
Simply go to **www.birdwatchireland.ie** and go to the 'learn about birds' section

BirdWatch Ireland, P.O. Box 12, Greystones, Co. Wicklow.
Tel: 01-2819878 Fax: 01-2819763
Email: info@birdwatchireland.ie

Website: www.birdwatchireland.ie

Who could live in a rockpool?

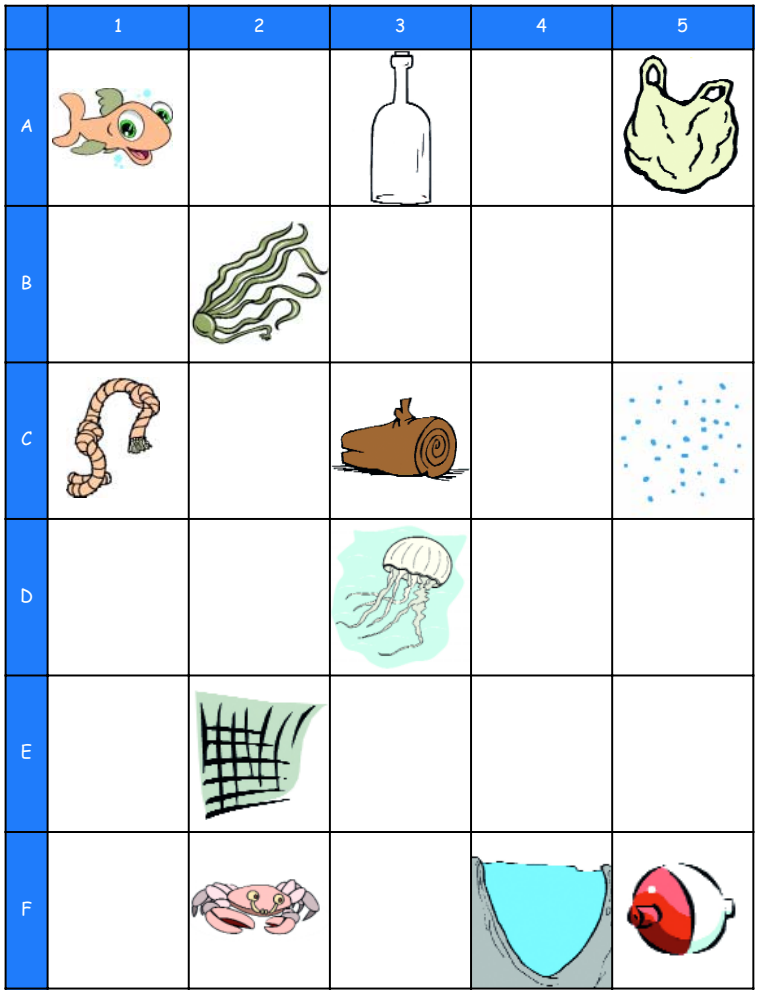
Colour the blue background of all the creatures that might be found in a rockpool. Colour the rest in lovely bright colours.



Answer: The shark and squid are too big to live in a rockpool.

• Puzzle pages • Puzzle pages • Puzzle pages • Puzzle pages

Rockpool Chase



Freddy the Fish is finding it hard to swim through the debris on the shore, to reach the rockpool at the edge of the beach. Can you follow the instructions to bring him safely to the pool, where he can find shelter from the crashing waves? Help him to collect food, squeeze through rocks, avoid rubbish and meet other creatures as he goes along the way.

Column 1, row B&C = bits of rope are thrown overboard and are eaten by marine animals. Colour the squares orange.

Column 2–4, Row C = a tree falls off a cliff and breaks up in the sea. Colour the squares brown.

Column 3–5, Row A = plastic bottles and plastic bags are left on the beach and mix into the food chain. Colour the squares grey.

Column 2–4, Row E = a fish box and fishing net are washed overboard in a storm. Colour the squares green.

Column 5, Row E–F = a buoy lifts fromits mooring. Colour the squares pink.

When you have coloured in all the obstacles, draw a path to the rockpool.

WORDSEARC

R	Z	D	S	K	C	X	T	I	G	M	I	J	I	E
X	O	B	H	S	I	F	L	I	A	O	E	C	E	S
T	M	G	I	W	T	Z	W	S	N	L	L	L	P	R
D	B	A	V	Z	N	Z	T	V	L	C	T	M	L	U
E	U	U	S	E	P	E	J	Y	T	T	A	P	A	P
E	O	M	C	T	J	J	F	M	O	V	K	N	S	S
W	Y	T	P	A	O	I	O	B	M	E	E	R	T	D
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E	L	K	H	S	U	K	B	R	S	S	D	Z	A	R
R	G	L	A	S	S	B	O	T	T	L	E	K	G	E
R	X	L	S	H	E	L	L	S	K	U	T	Z	Q	M
G	P	L	T	J	J	K	G	E	I	M	E	D	D	W
F	J	M	U	O	F	M	J	H	T	Z	N	W	I	M

BUOY
CUTTLEFISH BONE
FISH BOX
FLOTSAM
GLASS BOTTLE
JELLYFISH
JETSAM
LOG
MERMAID'S PURSE
NET
PLASTIC BAG
PLASTIC BOTTLE
ROPE
SEAWEED
SHELLS
TIN CAN
TWIG

(Over,Down,Direction): BUOY (2,4,S), CUTTLEFISH BONE (14,9,W), FISH BOX (7,2,W), FLOTSAM (8,9,NW), GLASS BOTTLE (2,12,E), JELLYFISH (13,1,SW), JETSAM (6,6,NE), LOG (12,3,NW), MERMAIDS PURSE (15,13,N), NET (12,15,N), PLASTIC BAG (14,3,S), PLASTIC BOTTLE (2,14,NE), ROPE (4,8,SW), SEAWEED (1,10,N), SHELLS (4,13,E), TIN CAN (8,1,SE), TWIG (6,3,W).

Sherkin Island Marine Station's

Environmental Competition for Primary School Children in Munster 2011

Sponsors: Bord Iascaigh Mhara; City Print; Cork City Council; Cork County Council; Dept. of the Environment, Heritage & Local Government; Evening Echo; Inland Fisheries Ireland; Nature's Web (www.naturesweb.ie); Janssen Pharmaceutical Ltd; Pfizer Ireland Pharmaceuticals; Sherkin Comment.

Gaisce – the President's Awards

Images courtesy of An Gaisce

By John T. Murphy

WHAT an amazingly busy year it was for Gaisce – The President's Award. It was President McAleese's final year as President of Ireland and patron of Gaisce. Events ranged from a Gold Award ceremony, to the visit of HRH the Duke of Edinburgh, to the annual Defence Forces Adventure Training event, to FAI soccer Gaisce Awards, to Silver Award ceremonies to the ending of the three year term of the Council of Gaisce. All of these events are captured here as a special montage of Gaisce's incredible year. Look out for Gaisce's new website over the coming weeks at www.gaisce.ie.

CAPTIONS (*clockwise from top*):

- President McAleese bidding farewell to Gaisce staff at their headquarters in Ratra House, Phoenix Park. L/R Barney Callaghan, Hugh MacConville, Majella Killeen, Marion Irwin-Gowran, Ann Moore, President McAleese, Margaret Murtagh, Stephen Peers, Michael Collins and John T. Murphy.
- Barney Callaghan, Chief Executive of Gaisce, Orla Hughes, Natasha Smyth and Claire Turner from Coláiste Bríde, Carnew Co Wicklow, having been presented with their Silver Awards by radio presenter Ray Darcy of Today FM.
- Patrick Clarke, Stephen Cull, Rachel Rosney, Lyndsey Rankin, Mary Kenny and Miriam O'Gorman having received their Gold Gaisce Awards at Dublin Castle.
- Gaisce Bronze Awardees from St. Ita's Soccer Club Donabate at the AVIVA stadium with FAI officials and Gaisce staff.
- Gold Awardee and world Frisbee champion, Sandra Murphy from Enniscorthy, Co. Wexford.
- Collette Farrell from Rathmines assisting soldiers from the 2nd Field Artillery Regiment, McKee Barracks with a 25 gun salute.
- Gaisce participants under abseiling instruction at Dalkey Quarries overlooking Dublin Bay on the Defence Forces Training event (why don't you apply now to be selected for this incredible 4-day event next summer?) .
- Gaisce Board: Dr Laurence Crowley, outgoing Chairman of Gaisce receiving a gift of thanks as the Council of Gaisce finishes its term of office at Ratra House. L/R Ann Dunne, Barney Callaghan, Niamh Clarke MacMahon, Pat Larkin, Brian Collinge, John McCormick, Gerry Costigan, Laurence Crowley, Séan Rogers, Catherine Sweeney, Philip Jones, and John Hurley.
- HRH The Duke of Edinburgh, Prince Philip in conversation with Gaisce participants from St Dominic's College Cabra at a reception in Farmleigh House.
- Danielle Boyle, Cork, receiving her Gold Gaisce Award from President McAleese in Dublin Castle.

If you are interested in entering for a Gaisce Award please contact: Gaisce – The President's Award, Ratra House, North Road, Phoenix Park, Dublin 8. Tel: 01-6171999 / 01-670 7063. Email: mail@gaisce.ie Website: www.gaisce.ie

Cork County Council
Environmental Awareness Unit

The Story of Litter

- Enjoy your rest here, you are our guest.
- We ask our guests to be environmentally responsible people.
- Please enjoy this rest place and avoid littering.

CHEWING GUM

Discarded chewing gum is becoming an ever increasing problem

It is unhygienic and un-sightly. Not only is it difficult to remove, it's also very expensive.

Discarded gum can be dangerous for wild animals and pets. It gets caught in feathers and fur and when swallowed can lead to suffocation.

SO CHEW IT AND BIN IT

How long does litter last?

Facts & Figures

While out enjoying our recreational areas, have you ever come across some litter and wondered how long it will be there if no one picks it up?

Litter and dumping are a serious concern that can be avoided if everyone learns about the problem and what can be done to eliminate it.

Cigarette butt
1-5 years
Cigarette butts last a long time, often thrown from a vehicle which means the cigarette butts pollutes our country lanes and recreational rest stops.

Leftovers 6 months or more.
Throwing banana peels, apple cores, or your sandwich from the car is littering. Don't let anyone tell you that if it's biodegradable it's not litter.
Compost this organic waste so it can be reused.

Aluminium Can
200 years
An aluminum can left in the ditch could be found in the same spot by our Great great great great great ..... grandchildren.
Aluminium is a valuable metal – recycle

Disposable diaper
450 years
Need we say more ...

Plastic bottle
450 years may be around forever
In a recent study of litter clean-ups, plastics accounted for 60% of the litter collected.
Please take it with you and recycle

Plastic shopping bag
'000 of years
Bring reusable bags with you to the shops. Children are starting to think plastic bags grow in our hedgerows.

Styrofoam
May be around forever
Use reusable travel mugs.

Time it Takes...

6 weeks	2 months	1-5 years	25 - 40 years	200 years	450 years	1 million years
News papers, Paper towel, Orange, Banana	Apple core	Cigarette butts	Shoes & Fabrics	Aluminium wrap, Tin & Aluminium cans	Plastics, Disposable Nappies	Glass Bottles

BE RESPONSIBLE, BIN IT.

Litter is an offence under the Litter Act ranging from on the spot fines to imprisonment .

Nature's Web

Download a free and exciting newsletter for children, featuring interesting and informative news on nature and the environment.

Produced by Sherkin Island Marine Station

Visit www.naturesweb.ie

The RNLI is the charity that saves lives at sea

Visit the RNLI website at www.rnli.co.uk to read amazing stories of courage around the Irish and UK coastlines. In Ireland, read about:

- Galway lifeboat rescues man from sinking boat.
- Baltimore RNLI in major rescue operation off the Cork coast after Fastnet yacht capsizes.
- Wicklow RNLI lifeboat launched to assist beam trawler involved in Irish Sea collision.
- One week, two calls out and a little bit of science for Sligo Bay lifeboat crew.
- Portrush RNLI rescue four from upturned dive boat.
- Crosshaven RNLI save dog from drowning.
- Three Calls in 18 hours for Crosshaven RNLI.
- And much more....!


Photo: Robbie Murphy
Baltimore Lifeboats on manoeuvres.

There are over 230 RNLI lifeboat stations around Ireland and the UK. Find your nearest station by navigating the map on the website, and learn about each station and their most recent call-outs.

Sustaining the Past

By Mike Ludwig

(**Sustaining [adj]:** To supply with necessities or nourishment; provide for)

WHILE giving a paper on the environmental consequences of the new Panama Canal Locks, I missed the East Coast's first significant earthquake in almost a century and the passage of Hurricane/ Tropical Storm Irene. Then, Matt Murphy and I spoke about what we know and how we know and use it. These varied threads led me to this depressing article. What do we know about sustaining our environment and how do we use it? I have been explaining environmental impacts associated with human activity for most of my career. Global Climate Change and its impacts are components of those discussions. Carbon dioxide and freshwater availability are changing my earth. Many species are leaving their traditional habitats and others are adapting to new conditions. And, I see that humans are not particularly interested unless they are experiencing the consequences of the changes first hand.

The earth's human population was assumed to be willing to sustain themselves by fighting against common threats on our march toward a better life (a common theme in "alien invasion" movies). Apparently the consequences of global climate change have not been clearly defined as such a societal event. As a result, sadly, we are not moving toward a better future but rather one that is deteriorating around us. And, we are discovering the inaccuracy of the belief that we, as a species, wish to act decisively and coherently to deal with undesirable change. It is not that we lack the capacity to address the challenge but rather it appears that the perceived seriousness of the future lifestyle is unimaginable, unacceptable, and therefore unworthy of action. Part of this thinking can be laid to the political and economic conditions and assertions that, global climate change is not happening, is not a big deal and/or unfortunately, the tools currently available are not suited for addressing it. But without some action to slow or stop the changes now, the evidence supported, likelihood is that the climate we take for granted will not be the future norm.

"Are the changes the fault of sunspot cycles, a slight wobble of the earth, or the gases being discharged from your car's tailpipe? Who cares? It is the change that will influence subsequent generations and it appears unlikely to make life easier."

Do you remember how our forefathers lived without the modern "basics" of life? Most of the technology evolution changes they saw came about quickly, in less than a generation. My wife's grandmother lived to be almost 103. She flew on a seat attached to the wing of a Wright Brothers "Flyer" and within the shell of a British Airways "Concord." That is "change." Many changes are regularly racing into public awareness and general use but the slow ones do not draw much attention. Climate change is creeping rather than racing. But, even the rapid changes have consequences. For instance, change often needs energy to sustain it. Why is that important? Energy use is one of the causes of climate change. The US uses more energy than any other country; about twice as much as the European Union and four times as much as China. In 2008, every person living in the US used the energy in about seven gallons of gasoline, every day.

The climate we are creeping towards is not likely to make our lives easier or be one we have ever experienced. Almost everyone is aware of Global Climate Change. Accepting what is driving it is of little importance to most people. Are the changes the fault of sunspot cycles, a slight wobble of the earth, or the gases being discharged from your car's tailpipe? Who cares? It is the change that will influence subsequent generations and it appears unlikely to make life easier. Sea level rise, rainfall amount changes, persistent droughts, and more severe weather events are occurring. But, as the tides wash a little higher, and some storms get more or less severe, the earth's surface is being altered and not for a couple of generations but potentially for centuries. And, yet the majority of us do not seem interested let alone willing to slow our consumption of energy. Why?

The most frequently given excuses among the "no action needed" set is that the changes will happen in the future and we'll have technologies to save the day by then. This is the belief that things will become difficult on some Wednesday a hundred years from now so why worry? In what has to be the best statement ever made we hear "I don't worry about that stuff, God would never let me suffer." Why argue with that logic? Because doing nothing is not a good option.

Weather is changing and becoming more unusual. In the last decade we have lived through heat and cold waves in Western and Eastern Europe, protracted drought across a wider band of latitudes than usual and torrential rainfalls that washed out the infrastructure of civilization around the world. If for no other reason than the waste of tax dollars, when do we accept that we know things are not getting better?

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