SHERKIN COMMENT

Issue No. 49 Environmental Quarterly of Sherkin Island Marine Station *2010*

Centre pages:

Birds of the Irish Coastline

"Gannet with nesting material"
Photography by Richard Mills

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Editorial

Looking after the planet

By Matt Murphy

WHY is there a belief amongst many people that if the big issues are addressed the environment will be saved? This is the great fallacy of the environmental movement in general. Every so often we have nations gathering to strike a deal on how to "save the environment". Kyoto was to be the great step forward in tackling climate change, yet it failed amid a jungle of words. Copenhagen was then to be the definitive way forward - it also failed. Unfortunately the next, and subsequent meeting of world leaders will end in failure because to get consensus, agreements will be watered down. Of course, the PR spin will tell us progress will have been made, but to what extent?

The only way to make real progress and protect the environment for future generations is through educating the masses to become its guardians. Before the end of this century, without input from everyone, the world will have decimated much of its natural resources, including groundwater, oil, iron ore and the rainforest – to name but a few.

The real way to change people's attitude to the environment can best be achieved by educating the young, as it is they who will introduce their parents to conservation. Even more importantly, when they reach adulthood, they will bring sanity to governments, as their priority will be the protection of the environment. Many will say I am naive to think such awareness is achievable. One must remember what has already been achieved in Ireland to date, where each child is provided with a primary and secondary education. Thankfully in recent years more emphasis has been placed on educating children about the environment, and it has now been integrated into the curriculum. However, I feel that even more emphasis needs to be put on the environment in schools and that education on the environment should nearly be as important as teaching reading and writing. Can you imagine the consternation if governments decided there was no need to teach reading and writing to children? That instead they decided to save money in the belief children would learn to read and write as adults? Of course there would be hell to pay and the government of the day would be swept out of power. By not educating our children adequately on the environment, that is in effect what we have been doing. I believe even an extra hour a week on environmental care in primary and secondary schools would bring about more long-term change than dozens of environmental laws introduced by governments, many of which are just "paper talk".

One of the most essential educational tools missing in Ireland is a strong national non-governmental organisation, that deals with the environment. The two biggest are An Taisce and Birdwatch Ireland but each have only a few thousand members. The latter membership is solely for people with an interest in birds and although it is doing magnificent work, it is specialised. An Taisce should have a huge presence throughout every county in Ireland but unfortunately it doesn't. In fact it has little or no presence in many counties. The general public does not seem to understand its function in the planning system. They believe it objects to some developments because an individual may have a NIMBY gripe. An Taisce's activities with schools in recent years, including the Green and Blue Flag schemes, have done much to raise the organisation's profile in a positive way. However much more needs to be done for people to regard it as a positive, national organisation - for people to see that it has everyone's interest at heart. In this issue of Sherkin Comment I have asked Ms. Catherine McMullin the dedicated voluntary member from the Kerry branch to outline An Taisce's role in the planning system and the other projects they are organising, with schools and county councils around the country.

One cannot mention planning and education without remembering the massive flooding throughout the country last winter. Undoubtedly some of the flooding could not have been prevented as the continuous heavy rainfall was exceptional and such events are rare. However, could more have been done in the past to reduce the impact and can we do more in the future? I am not going to dwell on the Cork City flood, as the blame game has still not ended with regard to what should have been released at the Inniscarra Dam. Instead, looking at the Gort-Ardrahan area in Co. Galway, there were recommendations made in the Southern Water Global (1998) and Daly (1992) reports on the flooding in the area in 1990, 1991 and 1995 and yet new housing estates, such as the one in Ballinasloe, were located in areas prone to flooding. Why do we so often ignore recommendations such as these? Why does our innate 'common sense' not apply in these circumstances – perhaps once again it is because our knowledge and awareness of planning and environmental issues have not been developed by our educational system. After the recent flooding throughout the country, will local authorities ensure that houses are only located at levels sufficiently high above the recent floods so that the rise in water levels, predicted to occur due to climate change, will not affect new housing? On a more practical and local level, are farmers taking into account the highest past flood height on their land when storing their bailed silage? Should they construct a raised area above the level of the recent floods so that the fodder is not affected in the future? In view of the rare nature of floods such as those that occurred recently, are farmers recording, and even marking, the height of the recent flood so that this information is available for future generations living and farming in the area? We must learn and we must not forget!

Climate change or no climate change, is not the issue. What is vital is that we are good housekeepers of the planet we have inherited. We cannot continue to destroy so much of what is irreplaceable. If we continue to go on the way we are, future generations will have a planet devoid of so much. As the world population continues to increase, we will face vast starvation and wars between nations over water rights. Education is the only way forward. Of course, it will be a near-impossible mountain to climb but we must begin. Today's young must be given the ability to lead the way but first they must be guided through education.

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

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The ANTARCTIC PENINSULA

Photos: © Oscar Merne

Table icebergs in Bransfield Strait

By Oscar Merne

IN the last issue of *Sherkin Comment* (No. 48) I described the southward journey to the Antarctic Peninsula, from Tierra del Fuego across the Drake Passage in a hurricane. We left our departure port of Ushuaia at 18.00 hrs on 6th December (2008), and, after a rough crossing of the Drake Passage, we sighted the first Antarctic icebergs at 10.00 hrs on Tuesday 9th December. Soon after I spotted land at snow-covered Anvers Island, a large island on the west side of the Antarctic Peninsula. From then until we left Antarctica at 20.00 hrs on Saturday 13th December we spent our time cruising slowly in the sheltered waters between the islands and the peninsula, and we were lucky enough to make eleven successful landings on the islands and mainland. I heard afterwards that a ship which visited the area a few days earlier had managed just three landings, because many of the bays and channels were blocked by sea ice.

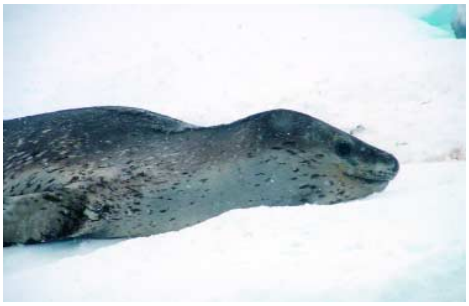
Our ship, the MV *Ioffe*, was equipped with ten large Zodiac RIBs, which were launched by crane from the stern of the ship, in an impressively efficient and quick operation by the crew. We too soon became adept at "layering up" very quickly, so as not to waste any time getting on board the Zodiacs for cruising among the icebergs and floes, or landing on the rocky shores. It was a late spring and there were still heavy falls of snow. We discovered that little progress could be made on land with us sinking thigh-deep in the snow at each step. However, the snow shoes were brought ashore and, after a quick crash-course in their use, we were able to plod along several kilometres with little difficulty, and even climb 200 m hills. This mobility allowed us not only to explore the magnificent landscapes of black mountains, immaculately white snow, glaciers, blizzards, blue skies, the midnight sun and icebergs, but also to visit a number of penguin colonies. In this part of the Antarctic Peninsula the common penguins are Gentoos, which were struggling to maintain open rocky nesting spaces in the unseasonably late snow. Adele Penguins were also common, while other birds we encountered were ghostly white Snow Petrels, Wilson's Storm-petrels (rather like our European Storm-petrels, but with yellow webs on their feet), Blue-eyed Cormorants, Snowy Sheathbills (scavenging disgustingly among the penguin droppings), South Polar Skuas, Kelp Gulls (rather like yellow-legged Great Black-backed Gulls) and Antarctic Terns (*very* like our Arctic Terns).

It was very early in the Antarctic summer for whales, but some of us had a brief view of a Minke Whale in one of the sheltered channels. However, we had very good views of seals, especially when cruising slowly in the Zodiacs, when we were able to drift quietly up to animals hauled out on ice floes. Weddell Seals were most numerous, followed by Crabeater Seals, and we also had excellent close views of several magnificent Leopard Seals. Their streamlined grey shapes, baleful eyes and many-toothed snouts reminded me of a giant Conger Eel.

We sailed through the Lemaire Channel, also known as "Iceberg Alley", which is one of the most spectacular landscapes in this part of Antarctica. With precipitous black mountains towering vertically 1,000 m from the mirror-calm sea, I was reminded of the Three Gorges on the Yangtse River in China – but a lot colder! In the evening some of us visited a former British Antarctic Survey base at Port Lockroy, which is now managed by the UK Antarctic Heritage Trust. It is an official Royal Mail office, from which you can send your postcards home, and has a surprisingly well-stocked shop selling souvenirs, weather wear, books on Antarctica, etc. An added bonus is that Gentoo Penguins have a breeding colony around and under the base huts, and occasionally inquisitive penguins waddle inside.

Gentoo Penguin coming ashore

From the Antarctic Peninsula we crossed the 180 km wide Bransfield Strait to Deception Island, which is a large active volcano lying off the south end of the South Shetland Islands. Much of the island is warmed by geothermal energy and large areas are snow-free. The caldera of the volcano is linked with the open sea by a narrow cut (Neptune's Bellows), and we were able to sail into the crater and drop anchor in sheltered waters. We went ashore in the Zodiacs, landing on a steaming, black sand beach, from where we spent several hours exploring the island. As on the north side of South Georgia, the rusting remains of an abandoned whaling station "adorned" a section of the shore inside the crater. It was a sad sight, especially when one thought of the thousands of great whale that had been rendered there, and whose oil filled the enormous storage tanks before being transported all around the world. It was also poignant to see a couple of simple wooden crosses marking the graves of whalers who had never returned home. The last eruption on Deception Island was in 1969 and Chilean and British Antarctic Survey research stations had to be evacuated and abandoned. Some of the more intrepid/foolhardy in our party dug a shallow hole in the black sand, waited a few minutes for it to fill with hot water, had a quick plunge in the freezing sea waters of the crater, followed by a warming dip in the hot pool. With chattering teeth and goose bumps they then evacuated to the MV *Ioffe* for hot drinks.



Leopard Seal on ice floe

Midnight sun near Anvers Island

South Polar Skua on Deception Island

Mountains in Lemaire Channel

Blue ice in Wilhelmina Bay

The island has a major colony of Chinstrap Penguins, but when we were there many of the birds had not yet started nesting. However, individuals and small groups were walking about within the crater, and a group of c.1,000 were clustered on the seaward side of the island. Several Weddell Seals were hauled out on the beach, a flock of Pintado Petrels was feeding actively on a swarm of copepods in the breakers, and several Brown/South Polar Skuas (one with rings on its legs) were loafing by a freshwater pool. I was somewhat surprised to find large carpets of moss growing in some areas, having seen only lichens in other exposed rocky parts of the Antarctic Peninsula.

We then moved on to Half Moon Island, a low-lying stony island in the middle of the South Shetlands. Here we spent several hours exploring half of the crescent-shaped island, concentrating on a large colony of Chinstrap Penguins. Among these was a pair of Macaroni Penguins, possibly the most southerly breeding pair in Antarctica. There was also a small colony of Antarctic Terns and a scattering of breeding Kelp Gulls and South Polar Skuas. On the pebble beaches five Weddell Seals were hauled out. Notable on Half Moon Island was the extensive areas of bright orange lichens on the rocky cliffs. This was our last landing in Antarctica and late in the evening of 13th December we set sail through the straits between the islands and out into the Drake Passage for the 64-hours voyage to Cape Horn.

The above is a brief outline of some of the things we did and saw. Just being there was, as our American friends might say, "truly awesome". If possible, I would go again, maybe on a longer trip, taking in the Falkland Islands (Las Malvinas) and South Georgia, as well as the Antarctic Peninsula.

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

Climate Change: What Now?

Christianshavns Canal, Copenhagen, Denmark.

By Alex Kirby

NINE WEEKS is a long time in climate change, although it may take decades or even centuries for the true impacts of human influence on the atmosphere to become entirely clear. At the beginning of December 2009, on the eve of the United Nations climate conference in Copenhagen, most scientists and politicians were confident that the facts were largely beyond dispute, and that the world was only days away from a radical agreement on how best to respond. By the end of January 2010 that apparently robust consensus was crumbling: the London *Times* published a prominent comment piece entitled "Global Warming: the Collapse of a Grand Narrative".

Collapse? Well, up to a point, Lord Copper. Several things came to light in those nine weeks, but it will take some time yet to judge whether they amount to the collapse of the science of climate change. The first revelation was that leaked emails written by scientists at the University of East Anglia showed they had decided to flout the Freedom of Information Act by withholding data requested by people critical of their arguments and conclusions. Then, and more damagingly, it emerged that the Intergovernmental Panel on Climate Change had published a wrong and unchecked allegation – that Himalayan glaciers were at risk of melting by 2035. The IPCC aims to be the gold standard of evidence that climate change is happening, that humans are at least partly responsible for causing it, and that it matters. It claims that every line of its voluminous reports is scrutinised minutely. Yet this glacier claim came originally from a scientist who says now it was "speculative", and the IPCC simply lifted it from a report by the campaign group WWF. It had not been subjected to peer review by other scientists, and the likely date for the Himalayan glaciers to be doomed appears to be 2350.

The IPCC now faces other accusations: that it knew before Copenhagen that the glacier claim was wrong, but failed to correct it; that it has also played fast-and-loose with the supposed links between climate change and damage to Amazonia; that it has suggested a very doubtful link with an increase in extreme weather. The jury may be out still on some of these charges, but there is near-unanimity that the Panel has shot itself in both feet, and possibly also in the head. Can the IPCC survive, and should it?

Something else happened in Copenhagen – or rather, failed to happen – which is probably even more worrying for those of us who maintain that the IPCC is flawed but that the science of climate change remains robust. The Copenhagen conference was intended to agree a new global treaty on tackling climate change, a treaty with teeth, targets and timetables. Its job wasn't really very complicated. What it had to do was work out an agreement which would commit the industrialised countries to rapid moves towards a low-carbon economy; commit the industrialising states to agree that they would soon have to do the same, even though poverty eradication remains their priority for now; agree to provide substantial amounts of money to help the developing world to slow its contribution to climate change, and to adapt to its effects; and provide a trusted way of sharing that money out.

Instead, in a last-minute deal, a few countries agreed a deal with no teeth – the non-binding Copenhagen Accord. The United Kingdom, which regards itself as a world leader in acting on climate change, was not a prime mover in the process. What made the fiasco still worse was the lacklustre speech by Barack Obama . There had been widespread expectation that he would attend the final stages of the conference only if he thought there was a chance of a meaningful result. Yet as he delivered his brief address there was an almost perceptible ebbing of hope among his hearers. One US journalist said his dilemma had been cruel: he was damned if he came to Copenhagen, damned if he stayed away. The harsh truth is probably that no leader had a popular mandate for action, because no country thinks the problem is grave enough to justify radical action and far-reaching changes in the way we live. Science is not going to tip the scales against boredom, apathy and deep scepticism.

But there is another part of the story. Many critics of the IPCC say it is unreliable because computer predictions of future climate are inherently untrustworthy. But what it reports relies only partly on predictions. Much of it is copper-bottomed science which has been properly peer-reviewed. Much of it consists not of predictions of what may happen, but of observations of what is happening. There may be a case for a drastic overhaul of the IPCC. But to write off everything it has reported would be to lose the baby as well as the bathwater.

Many people who doubt that climate change is anything to worry about tend to underestimate the speed at which it is happening. If it was something that made itself felt only gradually, and by a steady, even increase in temperatures and sea levels, the prospects of being able to adapt to it would be a lot stronger (though even then, if those of us who live in prosperous temperate countries could cope with a warming world, there is much less likelihood that the poor could do so – and virtually no prospect of the natural world adapting in time). It is not just the fact of warming that is daunting, but the pace of it. And that may well have several corollaries.

One is that the decisions we take within the next decade or so may have impacts far into the future. A power company planning how to maintain supplies as oil and gas become more expensive, for instance, may decide that the only option is to build a coal plant. That will probably be designed to work for 30 or 40 years. But by mid-century those of us in countries like Ireland and the UK should – according to the science – have reduced our greenhouse gas emissions by about 80% below their 1990 levels (at the moment they are rising by about 3% a year – and the forecasts say energy use is going to grow by about half by 2030.) So we have to take the right decisions *now*.

Another conclusion about climate change that seems hard to resist is this. It is just one part of the growing environmental crisis, but it is likely to intensify many of the other parts that threaten human society. World water supplies are coming under increasing strain (inevitably, in a world where human numbers are still increasing), and that means food is likely to become scarcer and more expensive. The world is rapidly losing many of the other species which make up the web of life, of which we are part and on which we depend. Climate change will not help us to find enough water or food, or to give biodiversity a sporting chance of survival.

Those who argue like this – that there is a gathering storm of different but interlocking environmental crises, with climate change set to intensify them all – are sometimes dismissed as naive, innocent, credulous people intent on terrifying ourselves and everyone else with shadows. Some of the hardest-headed and least gullible people I've met have been in the armed forces. So if they think there are problems ahead, I'll listen to them. They do. The London *Guardian* reported on 31 January:

> *The Pentagon will for the first time rank global warming as a destabilising force, adding fuel to conflict and putting US troops at risk around the world, in a major strategy review to be presented to Congress... The quadrennial defence review, prepared by the Pentagon to update Congress on its security vision, will direct military planners to keep track of the latest climate science, and to factor global warming into their long term strategic planning. "While climate change alone does not cause conflict, it may act as an accelerant of instability or conflict, placing a burden on civilian institutions and militaries around the world," said a draft of the review seen by the* Guardian.

The IPCC may not have all the answers, and the UNFCCC may need rejigging. But if climate change persuades the Pentagon, I'm heading for the hills.

Alex Kirby is a former BBC environment correspondent.

Photos courtesy of US EPA

The vast majority of existing diesel engines continue to be a significant source of air pollutants in the US.

Greening the Built Environment

The Second in a Series of Articles

By Walter Mugdan[1]

IN the previous edition of *Sherkin Comment* I wrote about the evolving "green construction" movement, which seeks ways to make our "built environment" more eco-friendly and sustainable. That first installment focused on the ways in which architects and engineers are working to reduce the "carbon footprint" – the total greenhouse gas (GHG) emissions associated with a building throughout its life. This second article focuses on ways in which traditional air pollutants associated with construction can be minimized.

Nearly all heavy construction equipment uses diesel engines – excavators, cranes, trucks, front-end loaders, construction site generators and more. In the U.S., the newest diesel engines are subject to recently-established, stringent emission control requirements but the vast majority of existing diesel engines continue to be a significant source of air pollutants. Chief among these are very small particulates known as PM 2.5 – particulate matter smaller than 2.5 microns in size; by comparison, a human hair is about 70 microns in diameter. These are the soot particles that make up the familiar black puff of smoke that is associated with diesel engines. PM 2.5 is particularly dangerous precisely because the particles are so small. Their tiny size allows them to be inhaled more deeply into the lungs, easily bypassing the body's natural defenses.

Because diesel engines are designed to be extremely durable, they tend to remain in service for a very long time – much longer than automobile engines. Consequently, the benefits of EPA's new emission control requirements will take decades to be fully realised. With a concentration of diesel equipment working all day long, any major construction site will be a significant source of air pollutants, creating legitimate concerns for neighbouring communities (not to mention the workers themselves).

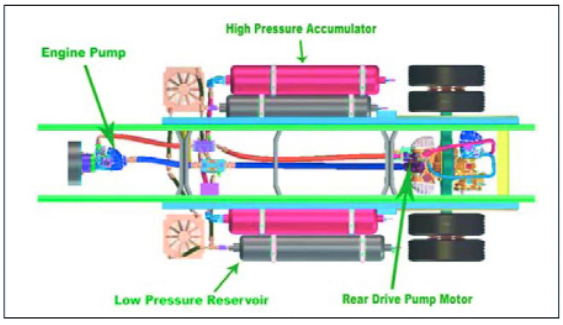
EPA promotes voluntary reductions of air pollution emissions from construction equipment through a variety of strategies, ranging from the easy and inexpensive to the somewhat more costly. First, and most obvious, operators should properly maintain their equipment. Second, operators and site managers can limit idling time. This should be equally obvious, and yet it is customary for diesel engines to be left running for extended time periods even when not required. Both of these strategies will also lower GHG emissions and save money by reducing fuel use and extending engine life.

BEFORE .... and .... AFTER RETROFIT. The emission control device is the cylindrical unit on top of the engine on the right.

Next, operators can choose to use cleaner fuels. Diesel fuel typically contains significant quantities of sulfur, which is emitted as fine particulates and sulfur oxides (another troublesome air pollutant, a precursor of acid rain). EPA has recently required ultra-low sulfur diesel fuel (ULSD) to be widely available in the U.S. for use in on-road vehicles, and in 2010 it will also be required for use in non-road engines. In the meantime, operators who are not yet legally required to use ULSD can easily do so for at most a few cents per gallon extra, which will yield a reduction of 5% to 9% in particulate emissions.

Biodiesel – diesel fuel made entirely from renewable, organic materials such as soybeans or even used cooking oils – can also be used, and burns significantly cleaner than conventional diesel. A typical 20% biodiesel blend (known as "B-20") yields reductions of up to 12% in particulate emissions. Use of biodiesel also results in reduced GHG emissions. The Destiny mall, an enormous shopping centre under construction in Syracuse, New York has required all diesel equipment on the job site to use B-100 (100% biodiesel), with over 100,000 gallons used to date.

UPS Truck with pilot Hydraulic Hybrid Technology.



Schematic Diagram of Diesel Hydraulic Technology.

Diesel Oxidising Catalyst (DOC)

Diesel Particulate Filter (DPF)

Biodiesel burns significantly cleaner than conventional diesel.

Finally, the best approach is to retrofit diesel engines with pollution control equipment. There are two major types of retrofit equipment – diesel oxidation catalysts (DOCs) and diesel particulate filters (DPFs). DOCs are relatively inexpensive, ranging from $500 to $2,000 depending on engine size and configuration; they will remove about 30% of particulate emissions. DPFs are somewhat more expensive, ranging from $3,000 to $10,000, but remove 90% or more of particulates. Costs of DOCs or DPFs for larger and unusual engines will be higher, but the cost will always be small by comparison with the cost of the piece of construction equipment on which it is being installed.

These strategies are voluntary, but any developer interested in "greening" a project can specify their use. For example, the reconstruction of downtown Manhattan after the devastation of September 11, 2001 involves a massive series of construction projects extending more than 15 years. The local community, which suffered the effects of pollution from the collapse of the World Trade centre (WTC), was deeply concerned about being exposed to large amounts of extra diesel emissions during such a long construction period. The various agencies involved – the Metropolitan Transportation Authority, the Port Authority and the developer who holds the lease on the WTC – all agreed to require of their construction contractors that any piece of diesel equipment larger than 50 horsepower would have to be retrofitted with DPFs. None of the contractors resisted the requirement; there was no noticeable effect on project costs; the equipment has run for years without difficulties; and residents and workers have been very pleased.

Just over the horizon is one of the most promising developments in diesel technology, the hydraulic hybrid. Invented and patented by EPA scientists but available to any and all manufacturers for free, it is expected to reduce diesel fuel use and associated emissions by 50% - 70% when fully developed. The technology has been in pilot use for over three years on a large United Parcel Service (UPS) truck. A further pilot application involves a pair of yard hostlers (trucks that move freight containers around port facilities). And UPS recently ordered several more hydraulic hybrids to continue its evaluation of this innovative technology.

Coming in the next installment in this series of articles: Reducing water consumption and pollution.

[1]*Any opinions expressed in this article are the author's own, and do not necessarily reflect the position of the U.S. Environmental Protection Agency*

Walter Mugdan, Director, Emergency & Remedial Response Division, U.S. Environmental Protection Agency, Region 2, New York City, USA. (January 2010)

Frills & Gills

Hexanchiform Sharks in Irish & North East Atlantic Waters

By Declan T. Quigley

FRILLED Sharks, Sixgill Sharks and Sevengill Sharks belong to a small order of primitive sharks (Hexanchiformes) represented by two families (Chlamydoselachidae & Hexanchidae), four genera and six species (Table 1), four of which have been recorded from the NE Atlantic and three from Irish waters. The Chlamysoselachidae includes two species of Frilled Shark while the Hexanchidae (Cow Sharks) includes two species of Sixgill Shark and two species of Sevengill Shark.

The Hexanchiformes are immediately distinguished by the presence of either 6 or seven gill slits whereas all other known sharks (c.500+ species), bar one (the unrelated Sixgill Sawshark *Pliotrema warreni* Regan, 1906), have 5 gill slits. All Hexanchiformes have a single anal fin and a single spineless dorsal fin set far back and originating over or behind the pelvic fins. These rare anatomical elasmobranch features, along with their unique dentition, have been observed in some of the oldest known fossil shark remains dating from the Devonian (c.410 million years ago, e.g. Frilled Sharks), Mesozoic (250 million years ago, e.g. Sevengill Sharks) and Jurassic (205 million years ago, e.g. Sixgill Sharks).

Frilled Sharks *(Chlamydoselachus anguineus & C. africana)*

Until recently, only one species of Frilled Shark (*C. anguineus*) was known. However, in 2009, a second species, *C. africana*, was described from southern Africa (Angola, Namibia and South Africa). Both species are elongated (maximum T.L. 196cm, *C. anguineus* & 117cm *C. africana*) and serpent-like in appearance and are unique amongst sharks in that the first gill slit completely encircles the head on the ventral surface whereas in all other sharks the left and right gill openings are clearly separated. The species also exhibits other unique anatomical features: the mouth is terminal (in most sharks it is under slung beneath the head), the lower jaw is only loosely attached to the cranium and there are numerous widely spaced needle-sharp tricuspid teeth on both jaws.

Photo Courtesy of Professor Koichi Matsuura

Frilled Shark *(Chlamydoselachus anguineus)*

Globally, *C. anguineus* is a wide-ranging ovoviviparous (6-12 pups per litter) mainly deep-water benthopelagic (50-1500m) species but appears to have a very patchy distribution. Specimens have been recorded, albeit rarely, from the following geographical regions: Western Indian Ocean (South Africa); Western Pacific (Japan to New Zealand); Eastern Pacific (southern California to northern Chile); Eastern Atlantic (northern Norway to northern Namibia). There are no known records from the Western Atlantic. Only a handful of specimens have been recorded from NW European waters to date. During August 2000, three specimens were taken off NW Ireland (55°N, 9°W) at a depth of 780m.

Sixgill Sharks *(Hexanchus griseus & H. nakamurai)*

The Bluntnose Sixgill Shark (*Hexanchus griseus*) is a large (482+cm T.L.) ovoviviparous (22-108 pups per litter) bathydemersal (0-2500m) species. Although adults generally inhabit deeper (>91m) continental and insular shelves and slopes, juveniles are often found close inshore. Although *H. griseus* is a widespread, highly migratory species, its circum-global distribution is rather patchy: Western Atlantic (North Carolina to Florida, northern Gulf of Mexico, Cuba, Nicaragua, Costa Rica, Venezuela; southern Brazil to northern Argentina); Eastern Atlantic (Iceland & Norway to Namibia, including the Mediterranean); Indian Ocean (South Africa, southern Mozambique, Madagascar, Aldabra & Comoros Islands); Western Pacific (Japan, Taiwan, Malaysia, Sumatra, Australia & New Zealand); Central Pacific (Hawaiian Islands & Palau); and Eastern Pacific (Aleutian Islands to Baja California, Mexico and Chile).

Photo courtesy of Dr Simon Berrow

Bluntnose Sixgill Shark *(Hexanchus griseus)*

H. griseus is the most frequently encountered member of the Hexanchidae in Irish and NW European waters. At least 265 specimens have been recorded from NW European waters since 1845, including about 110 from Irish waters. Although about 90% of the specimens were taken by commercial fishing vessels, the remainder were captured by anglers, including the recent Irish rod & line record (480kg, 390cm T.L., Loop Head, Co Clare, 16.06.2009 [IGFA World Record 588.76kg, Ascension Is., S. Atlantic, 21.11.2002]). Specimens were taken throughout the year but most (66.5%) were captured during winter and spring, with February alone accounting for almost 18% of the records. Over 90% of the specimens were immature (<300cm T.L.) suggesting that inshore waters are probably important nursery areas for juveniles and sub-adults (Figure 1).

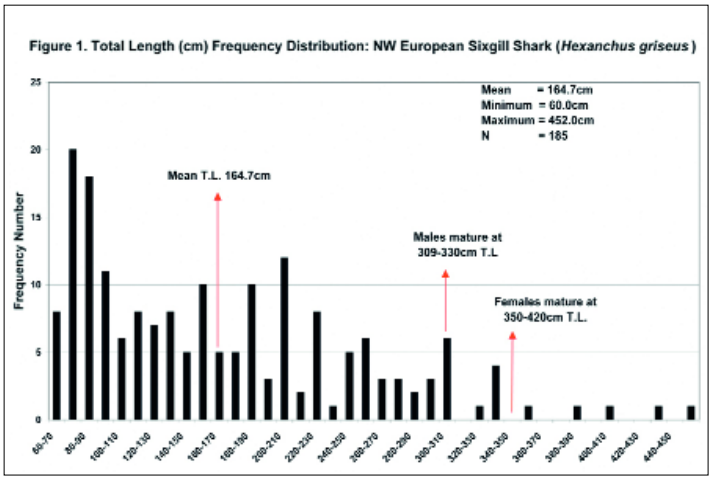


Figure 1. Total Length (cm) Frequency Distribution: NW European Sixgill Shark (*Hexanchus griseus*)

Until the early 1960s, only one species of Sixgill Shark (*H. griseus*) was known. However, in 1962, a second species, the Bigeye Sixgill Shark (*H. nakamuari*), was confirmed from Taiwanese waters. Since then, further specimens of *H. nakamurai* have been recorded, albeit rarely and diffusely, from warm temperate and tropical seas over a wide geographic area: western North Atlantic (Bahamas, Cuba, Nicaragua & Costa Rica); eastern Atlantic (Gibraltar, Mediterranean, Ivory Coast, Nigeria); Indian Ocean (southern Africa, Madagascar, Kenya & Aldabra Island, India); western Pacific (Taiwan, Philippines, Australia & New Caledonia). The species has not been recorded from NW European waters to date.

H. nakamurai inhabits continental and insular shelves and slopes at depths of 90-621m, usually near the bottom, but occasionally near the surface and inshore, particularly in tropical waters. *H. nakamuai* can be distinguished from *H. griseus* by the following characters: 5 rows of comb-like teeth in the lower jaw (compared with 6 rows in *H. griseus*), relatively narrow head and mouth and bigger eye. It is a relatively small (maximum T.L. 180cm) ovoviviparous species (up to 13 pups per litter).

Sevengill Sharks *(Heptranchias perlo & Notorynhus cepedianus)*

The Sharpnose Sevengill Shark (*Heptranchias perlo*) is a relatively small (maximum T.L. 139cm) ovoviviparous species (9-20 pups per litter), primarily inhabiting deep-water benthic and epibenthic continental and insular shelves and slopes at depths of 27-1000m, occasionally closer inshore.

H. perlo is wide-ranging, albeit patchily distributed in both tropical and temperate seas: Western Atlantic (North Carolina to Cuba and the northern Gulf of Mexico; and southern Brazil to Argentina); Eastern Atlantic (Scotland to Angola, including the Mediterranean); Indian Ocean (South Africa, Mozambique, Aldabra Island, and Quilon, India); Western Pacific (Japan, China, Indonesia, Australia & New Zealand); Eastern Pacific (northern Chile). There are no known records from the Northeast Pacific. The species is relatively rare in NW European waters (*c.*12 records north of Biscay) and only two specimens have been recorded from Irish waters to date: 06.02.1984, ICES Division VIIg3, S Ireland, 70cm T.L. & 16.10.2006, ICES Division VIIj (31EO), 52° 43'N, 9° 48'W, 108cm T.L.

The Broadnose Sevengill Shark (*Notorynchus cepedianus*) is a relatively large (maximum T.L. 290cm), long-lived (30-50 years), ovoviviparous species (aplacentally viviparous, producing 67-104 pups per litter in shallow inshore nursery areas), primarily inhabiting inshore waters at (<1-50m), with adults ranging into deeper offshore waters (>136m). It is wide-ranging, albeit patchily distributed in cool temperate waters: Western South Atlantic (southern Brazil to northern Argentina); Eastern South Atlantic and Indian Ocean (Namibia, South Africa to India); Western Pacific (southern Japan, Koreas, China, Australia & New Zealand); Eastern Pacific (British Columbia to Gulf of California, Mexico & Peru to central Chile). There are no known records from the North Atlantic.

H. perlo can be distinguished from *N. cepedianus* by the following characters: 5 rows of comb-like teeth in the lower jaw of *H. perlo* (compared with 6 rows in *N. cepedianus*), acutely pointed head, narrow mouth and large eyes. *N. cepedianus* is usually covered in many small dark spots which are absent in *H. perlo*.

It is possible that some Hexanchiformes species may be more common in Irish waters than the current paucity of records would suggest and it recommended that all specimens should be critically examined in order to verify identification to species level.

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

Table 1. Hexanchiform Sharks in Irish & North East Atlantic Waters

Common Name	Family	Scientific Name	Ireland	NE Atlantic	Mediterranean
Frilled Shark	Chlamydoselachidae	Chlamydoselachus anguineus Garman, 1884	√	√	
(South African) Frilled Shark	Chlamydoselachidae	Chlamydoselachus africana Ebert & Compagno, 2009			
Bluntnose Sixgill Shark	Hexanchidae	Hexanchus griseus (Bonnaterre, 1788)	√	√	√
Bigeye Sixgill Shark	Hexanchidae	Hexanchus nakamurai Teng, 1962		√	√
Sharpnose Sevengill Shark	Hexanchidae	Heptranchias perlo (Bonnaterre, 1788)	√	√	√
Broadnose Sevengill Shark	Hexanchidae	Notorynchus cepedianus (Peron, 1807)			

Photo courtesy of Dr Gordon Hoddeson

Sharpnose Sevengill Shark *(Heptranchias perlo)*

IRISH LIGHTS

Two Centuries of Service 1810 to 2010

By John Gore-Grimes

The S.S. Ierne standing of the Fastnet

ON the 22nd October 1707, an English Naval Fleet was returning from the siege of Toulon during the War of the Spanish Succession. The fleet comprised fifteen line of battleships, five of lesser rank and one yacht under the command of Admiral Sir Cloudesley Shovell. At mid-day the Admiral summoned all sailing masters from the various ships to come on board his vessel, the *Association*. He consulted with them as to the fleet's position. The common opinion was that they were not too far from Ushant, but one Captain dissented and placed the fleet close to the Scillys. Sir William Jumper, master of the *Lennox* estimated that a three hour sail would bring them in sight of the Scilly Isles. Unluckily for the Admiral, he adopted the prevailing opinion.

As darkness fell, a hard gale blew with hazy weather and rain and, unexpectedly, the roaring white breakers of the *Bishop* and *Clarks* were sighted off the weather bow. The *Association* (96 guns) was the first ship to sight the myriad rocks and islets which lie to the SW of the Scillys. Shortly after the ring of eight bells on the evening watch had died away in the strong winds, the vessel struck the rocks and sank almost immediately. The *Eagle* (50 guns) and the *Rumney* (70 guns) were cast away on the same rocks. The smaller *Firebrand* (a fire ship) under the command of Francis Percy struck the same rocks and sank with the loss of all hands. From the four vessels, a number in excess of 2,000 were lost. There was but one survivor, George Lawerence described in a contemporary account as follows:-

> *"Lawerence was Quarter Mr of ye Rumney a North countryman near Hull, a butcher by trade, a lusty fatman but much battered by ye rocks"*

The Admiral and his captains had failed to establish their longitude. The lights on the islands had been observed but, in the hazy conditions, it was too late for the four vessels which were wrecked. Some of the other 17 vessels had close encounters but with great skill they managed to ware ship and avoid disaster.

When the *Association* and her sister vessel sank on the pinnacle rocks of the Scillys (SW England), there were just 13 lighthouses in Ireland which, although in public ownership since 1704, were individually constructed, managed and operated by private contractors. The standards of reliability and therefore of availability of a light in the hours of darkness varied from place to place. The oldest lighthouse, which is also one of the oldest lighthouses in Europe, was operated, for a time, by most reliable private contractors. Hook Head lighthouse has been warning the mariners since the 5th Century when St. Dubhan set up a fire beacon on the headland. Dubhan and the Brothers were followed by their holy successors and they kept the Hook Head light shining for 600 years. New contractors arrived at Bannoa Bay, Co. Wexford, on the 1st May 1169 but the ambitions of these Normans extended well beyond an occupation as lighthouse keepers. Nevertheless, as they proceeded to gain political control they built what is the present lighthouse on the Hook Head. It is a masterly building the likes of which had not been seen in Ireland before. The tower was constructed of local limestone and burned lime mixed with ox's blood. Even to-day traces of the blood-lime mix can be seen coming through the paintwork.

In 1665 King Charles II approved the provision and operation of six lighthouses on the Irish coast which included the already built Hook Head and added Howth Head, the Old Head of Kinsale, Charlesfort (then Barry Oges Castle) and the Isle of Magee. In 1810 an Act of Parliament was passed which transferred the Irish lighthouses, then in existence, to the Corporation for preserving and improving Dublin Port. By 1815 all agreements with private contractors were terminated, and the Corporation transformed the Lighthouse Service in to a unified service. The lighthouse keepers became the employees of the Corporation. The Dublin Port Act 1867 ended the link between Dublin Port and the Irish Lighthouse Service. Since that date the provision and maintenance of all lighthouses in Ireland has been managed by the Commissioners of Irish Lights. To-day the statutory remit of the Lighthouse Service in Ireland is derived from Dail Eireann for the Republic of Ireland and from the House of Commons for Northern Ireland.

The power source for lighthouses has changed radically over 1,500 years. It started with wood and progressed to coal. Later various types of oil-burners were used. By directing a light beam through a lense the range was improved from six to eight miles (the range of a coal fire) to twenty miles or more from oil lamps directed through a revolving lense and emerging as parallel beams of light.

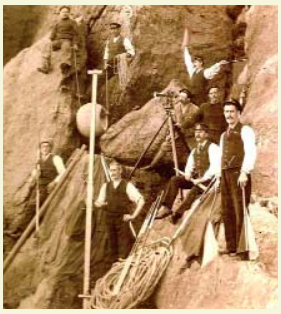
In the early 1890's, gas flashers were introduced which enabled flashing lights without revolving lense systems. Gas was made from coal or acetylene from carbide.

Electric lamps introduced another step forward which reduced the work of keepers considerably. Inevitably electricity also enabled the automation and de-manning of stations with the Baily lighthouse being the last CIL lighthouse to be automated in 1997. As technology improves, light emitting diodes are now being used which allow for an improvement in range and conspicuity of aids to navigation lights while increasing reliability and longevity. With no moving parts, the lifetime is in excess of ten years. Prior to the 1980's, the sextant was the primary instrument for navigating the oceans of the world. To-day the navigator relies on signals from satellites to give the precise position, and all the guess-work and the charm of being wrong has left the navigation table. Inevitably less reliance is placed on the warm and welcoming glow of a light flashing from a lighthouse dome. Because more precision is always required by the mariner, the General Lighthouse Authorities operate and have operated a system of Differential GPS since 1988 which offers an accuracy to within five metres or better. E-Navigation and AIS have found their way into the navigation system of all ships and these now represent the demands of the ships navigation system so that the mariner now knows the position of any other ship, or buoy in the area. E-Navigation attempts to link all these bridge systems in to a single integrated coherent system to reduce the workload of the bridge crew.

AIS has been developed as a transponder system to enable automatic ship to ship communications and ship to shore communications with a range of 30 to 50 nautical miles. AIS on buoys and lighthouses can provide automatic information to ships on the position and status of the light. Providing this information on the position and status of physical aids to navigation directly to the bridge via AIS enhances the use of these aids to navigation and helps integrate the electronic e-Navigation bridge display with the physical world outside the bridge window. As the Irish Lighthouse Service moves forward, it recognises a requirement for renewable energy. Starting with wind generators in the early 1980's the Lighthouse Service has now moved towards low maintenance solar power with no moving parts and the first solar lighthouse was installed on Rathlin O'Birne in 1989. Twenty-one of the forty-two offshore stations and two of the thirty-seven headland stations are now solar powered. All of our 142 navigational buoys are also solar powered.

As e-Navigation develops, the importance of lighthouses diminishes. Buoys marking channels and waterways will continue to be important in assisting navigation in confined waters. The slow but progressive rise in tidal levels may make the marking of new dangers an important part of the Irish Lighthouse Services work in the future. The Lighthouse Service will continue to move forward with the times and it will continue to honour its motto – "*In Salutem Onmium*" – (In the service of all).

Clockwise from left: **A survey team on Skelligs Rock in 1905; Coningbeg Buoy, which in 2007 replaced Coningbeg Lightship off the Saltee Islands, Co. Wexford; The Blackrock Sligo Lighthouse; J.J. Doherty, attendant at Tory Island in 1997; Howitzer Cannon Fog Signal Gun (Cannon guns entered the service in 1865 and were operated by retired admiralty gunners).**



John Gore-Grimes, Cavendish House, Smithfield, Dublin 7.

Kilmacurragh Arboretum

By Seamus O'Brien

LOCATED in east County Wicklow, Kilmacurragh Arboretum is the centrepiece of an 18th century estate that once covered almost 5,500 acres (2,226ha). Seat of the Acton family for three centuries, Kilmacurragh House was built by Thomas Acton II (1665-1750) in 1697 to the design of the noted Irish architect Sir William Robinson (1643-1712) who's most noted work is the Royal Hospital Kilmainham.

Kilmacurragh, formerly Kilmacurra, is the Anglicised Cill Mochurra meaning the church or cell of Saint Mochorog, an English saint of royal birth who established a monastery on the site of the present Chinese garden in the early 7th century. It was from stone salvaged from the ruins of a 13th century abbey that Thomas Acton II built Kilmacurragh House. This perfectly proportioned, five-bay Queen Anne style mansion was one of the first unfortified houses of its time in County Wicklow and is one of the few remaining (albeit in a ruinous state) early panelled houses in Ireland.

By 1712 the formal Dutch-style Landscape Park and outer Deer Park were completed and elements of this, such as great avenues, vistas and the ruins of a pond side summer house, survive in the present garden.

Thomas' eldest son, William Acton (1711-1799) married Jane Parsons of Birr Castle in 1736 and to celebrate the occasion they planted a two mile long Beech Avenue. A cobbled courtyard was built south of the house in 1762.

William and Jane were succeeded by their second son Thomas Acton III (1742-1817) who inherited the estate in 1779. His wife Sidney earned premia from the (Royal) Dublin Society for establishing oak plantations opposite the present estate gates. With this money she bought rare and exotic trees thus laying the foundations of Kilmacurragh's famous tree collection.

Lt. Col. William Acton (1789-1855) succeeded to Kilmacurragh following his father's death and during his time several rare trees were planted in the Arboretum, many of which were supplied by Edward Hodgins, who founded his famous nursery at nearby Dunganstown in 1780. A number of trees supplied to the estate by this nursery between 1820 and 1840 still exist and are among the largest specimens of their kind in cultivation.

It was in 1854, when Thomas Acton IV (1826-1908) inherited the estate, that the gardens at Kilmacurragh became internationally famous. Thomas and his sister Janet 1824-1906) greatly benefited from the advice and support of Dr. David Moore and his son Sir Frederick Moore, Curators of the National Botanic Gardens, Glasnevin in Dublin. David Moore soon realised that the mild, coastal climate and deep, rich soils at Kilmacurragh provided a more advantageous situation for growing plants from the Himalaya and the Southern Hemisphere and Glasnevin became a major supplier of plants for the next seven decades.

A Californian giant redwood on the Pond Vista.

Rhododendrons and Monkey Puzzles by the main estate gates.

A view of the Queen Anne House from the 7th century fish pond.

Photos: © OPW

national botanic gardens kilmacurragh

The late 19th century enjoyed a golden era of botanical exploration and through the Moore family the latest discoveries of these famous plant hunters reached Kilmacurragh, forming a remarkable collection of mostly wild-origin plants. It was through David Moore that Sir Joseph Hooker's collections from the Sikkim Himalaya (1849) reached here and formed the basis of what was to become Europe's most complete collection of Rhododendrons from Sikkim, Bhutan and Nepal. Many of these Rhododendrons have survived to the present day and have formed giant trees that give a dazzling floral display every spring.

Through the nurserymen, Messrs. Veitch of Chelsea, came the Chilean (1840s) and Californian (1850s) collections of William Lobb. The arboretum is particularly famous for its success with his Chilean introductions, partially his conifers which have always remained rare in European gardens.

Acton also received plants from the Royal Botanic Gardens, Kew including Rhododendrons collected by the French missionary and plant hunter Père Jean Marie Delavay who was actively exploring in western China during the 1880s and '90s.

Following his father's death in June 1879, Sir Frederick Moore continued the role of garden advisor at Kilmacurragh and by the time of Thomas Acton's death in August 1908 the arboretum contained the finest private collection of rare plants in Ireland.

Captain Charles Annesley Acton (1876-1915) succeeded his uncle to Kilmacurragh and both he and Sir Frederick Moore became close friends. Exciting new plants continued to be supplied from the nursery at Glasnevin including the Chinese collections of E. H. Wilson, George Forrest and Frank Kingdon Ward.

Alas, Kilmacurragh's heyday was short-lived. With the outbreak of the Great War the Acton brothers headed for the battlefields of Europe. On September 25th 1915, Charles, while trying to assist a fellow soldier, was mortally wounded by an explosion at Loos. His brother, who then inherited Kilmacurragh, was killed at Ypres just eight months later. Thus in just eight years Kilmacurragh had three consecutive owners inflicting death duties amounting to 120% of the value of the estate. By the 1920s the Acton family had left Kilmacurragh, by the late 1940s the house was vacated and the arboretum, once the finest in Ireland, was left to its own devices and slowly grew into a wilderness.

The National Botanic Gardens, Glasnevin had always retained an interest in Kilmacurragh because of the estate's historic ties and the arboretum's luck took a turn in 1996 when it was purchased by the Irish State to be used as an annexe by Glasnevin. Thus Kilmacurragh became a sister garden to Glasnevin and part of the National Botanic Gardens of Ireland.

Since 1996 the collection has been saved from near loss by removing a crippling tangle of cherry laurel, sycamore and *Rhododendron ponticum*. In 2006 a management plan was devised to take the arboretum into the 21st century. The arboretum is now being replanted using material raised at Glasnevin from various collaborative expeditions to many parts of the globe, most notably China and Chile. No doubt Thomas Acton would be pleased to know that his garden is now securely in the hands of the Office of Public Works and that Glasnevin continues to use the grounds as a safe haven for endangered plants.

Seamus O'Brien, Head Gardener, Kilmacurragh Arboretum, Kilbride, Co. Wicklow.

OPW

Captain Charles Acton planted many newly introduced plants supplied by Glasnevin.

A family gathering outside Kilmacurragh House in April 1932.

Kilmacurragh's Oak Avenue is the finest in Ireland.

The Role of *An Taisce*

By Catherine McMullin

RECENTLY, the oldest, and one of the largest, membership based environmental organisations in Ireland celebrated its 60th birthday. An Taisce, The National Trust for Ireland, was founded in 1948 with the following aim: '*The conservation of the physical heritage of the Irish nation subject to the common good*' An Taisce, translated, means 'Treasure' and the treasure to be protected is the Irish Environment, its landscape, air, water, wildlife, buildings, which all add up to Ireland's heritage.

One way to provide this protection is to hold property (usually donated) in trust for the Irish nation. At present, An Taisce holds and maintains 16 diverse properties, including Mongan Bog (Co. Offaly) Kanturk Castle (Co. Cork), Booterstown Marsh (Dublin), the Boyne Canal (Co. Meath), 6,500 acres of wild mountainside in Co. Donegal and 34 acres of the Burren, (Co. Clare).

An Taisce represents Ireland on the International National Trusts Organisation and, last September, hosted its International Conference in Dublin Castle. Delegates came from all over the world to speak on the challenges they faced, particularly in the light of climate change and sustainability.

Education obviously plays an important role in environmental protection and, in 1993, An Taisce set up its Educational Unit to initiated a variety of projects, including the National Spring Clean, Green Schools, Blue Flags for beaches, Clean Coast and initiatives in sustainable transport. Projects are carried out in partnership with local authorities or other organisations and have proven very successful.

An Taisce's first President, Robert Lloyd Praeger foresaw in 1948 that *'carelessness, ignorance, selfishness or ruthlessness could create a conflict between the pursuits of economic progress and the protection of Ireland's inherited riches.'* Unfortunately, that threat is with us to the present day. He realised that, apart from ancient monuments, there was no legal protection at that time for other aspects of our heritage. He noticed particularly the disfigurement of towns and countryside by injudicious development, including ribbon development along rural roads.

The introduction of the Planning and Development Act 1963 was a great step forward because, as well as regulating future development, it required planning authorities to identify landscapes, buildings etc. to be protected. The Act lists certain Prescribed Bodies, including An Taisce, to provide information to the planning authority in relation to certain planning matters.

As part of the planning process, a Development Plan is drawn up and reviewed every 6 years. The public are invited to make submissions and express opinions on how their area should develop (or not develop!) in the future. An Taisce finds this is a very good opportunity to request changes that give better environmental protection. Over the years, many of its suggestions have been incorporated into development plans and have helped protect the natural and built environment. Decisions on planning applications must be based on the policies and objectives laid down in the Development Plan.

Local authorities are obliged to consult An Taisce on planning applications in amenity areas or which affect protected structures or the natural environment. This is probably the most misunderstood part of An Taisce's functions. The organisation can assess and comment on proposed developments (as can any member of the public) but cannot make planning decisions, i.e. the right to grant or refuse permission is confined solely to the local authority and An Bord Pleanala.

An Taisce's right to appeal a planning decision is basically the same as any other objector. There is a misconception that objections are only permitted from neighbours, who may be directly affected by the development. In fact, anyone may object if a development would have an adverse impact on the 'common good', e.g. traffic hazard, pollution, intrusion in the landscape, etc. which are matters of concern to all.

Exaggerated claims have been made that An Taisce has stifled development by objecting to large number of planning applications. In the year 2004, Local Authorities dealt with 87,547 planning applications, of which 4,810 were appealed to An Bord Pleanala. 206 of the appeals were made by An Taisce and the rest were made either by the general public or applicants who had been refused planning permission In short, An Taisce appealed only 0.24% of Local Authority decisions, compared to 5.26% appealed by the general public. In many cases, An Taisce's appeal supported local communities to fight undesirable development in their area.

Building houses in rural areas has been a contentious issue in recent years. Up to about ten years ago, many sites in scenic coastal areas were sold for holiday homes, and the new buildings had a significant negative effect on the landscape. A survey by An Taisce has shown that, in some townlands, up to 80% of the houses are holiday homes. Aside from the visual impact, which is very damaging to the tourist industry, there are other issues raised by these rural houses, such as pollution from effluent treatment systems, traffic hazards, cost of providing services etc. It is now generally recognised by planning authorities that rural houses should be permitted for local people only, with a genuine need to live in the countryside.

In recent years, the need for sustainable development so as to prevent climate change has been recognised. Transport is a major producer of carbon dioxide and journeys can be reduced by planning settlements so that people can live close to work and the services they need. The proper planning of an area can lead to a better quality of life for everyone.

An Taisce's Central Office is in the Tailors' Hall in Dublin but most of the work is done by members around the country on a voluntary basis. There are local committees in most counties and membership is open to all. Further information may be obtained on the website, www.antaisce.org or by telephone 01-4541786

Catherine McMullin is a member of An Taisce in Killorglin, Co. Kerry.

North of Horsborough Island at the north end of the lagoon is one of the richest dive sites, "Eden". Here the coral slope is covered with sea fans and has big schools of fish.

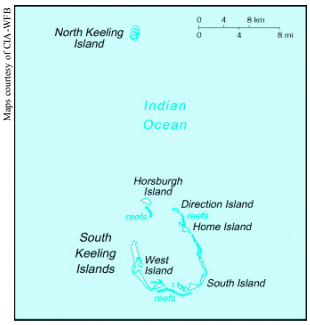
Photos: © Pete Atkinson

Cocos (Keeling) lagoon at uninhabited Direction Island at the north end of the atoll.

Cocos (Keeling) – Paradise Found

Coconut crabs, *Birgus latro*, are very rare in Cocos (Keeling). This one was photographed at nearby Christmas Island (900km away) where they are protected and common.

Maps courtesy of CIA-WFB



Cocos (Keeling) Islands are located in the Indian Ocean, halfway between Australia and Sri Lanka.

By Pete Atkinson

I MET a yacht in Cocos (Keeling) and the people aboard said that the best place on earth was uninhabited Chagos Archipelago in the Indian Ocean and the second best place was Direction Island in Cocos. You can only get to Chagos by boat, but Cocos has regular flights twice a week. But not many visitors take them; not much more than a dozen a week. Cocos (Keeling) is a small, forgotten atoll, halfway between Perth in Australia and Sri Lanka. By quirk of fate it belongs to Australia.

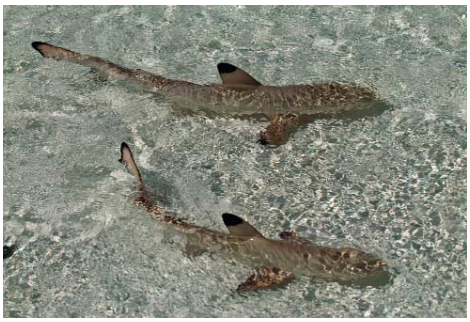
The largest island on the atoll rim, West Island has 120 Australians; on the windward side, Home Island has a few hundred Cocos Malays, originally brought in by John Clunies-Ross in the nineteenth century to work the copra (dried coconut flesh) plantations. Most are Muslims and they have a fascinating culture, a mix of Malay and Scottish. Although Queen Victoria gave the islands to John Clunies-Ross in 1886 in perpetuity, the Australian government managed to force his descendent, John Clunies-Ross to sell the island to Australia in 1978 for A$6,250,000.

Through yachtie friends we contacted the owners of the dive business on Cocos (Keeling). After much correspondence we agreed to look after their house, a duck, four cats and a pigeon for seven weeks. Meanwhile, they would visit Cairns and live in

Horn-eyed ghost crab, *Ocypode cerathopthalma* frequent all the sandy beaches and live in burrows in the sand.

Batfish, *Platax orbicularis*, school over the reef slope outside the lagoon at Cocos (Keeling).

Manta ray, *Manta birostris* at 40m outside the lagoon.



Black tip reef sharks, *Carcharhinus melanopterus* hunt in very shallow water along the edge of the lagoon.

our house for two weeks.

After a week on Christmas Island 975 km to the ENE, we arrived on a plane that looked like a child's toy at Cocos (Keeling). The atoll is about 9 km across and has 24 islands on the rim, of which only two are inhabited. The south end of the lagoon is shallow, but the north is deeper and has great diving. Apart from wrecks, old cannons, pieces of the old telegraph station, there's a resident dugong called Kat, manta rays and lots of sharks. What I love best, is crystal clear water, clean sand and small islands clustered with palms just like in cartoons. As so few visitors make the effort to get there, you can have an island to yourself any day of the week.

Direction Island at the north end of the lagoon is used for camping and day trips. The ferry calls in there twice a week. It has safe swimming in the beautiful lagoon, and the best snorkelling from the shore anywhere. "The Rip" is a deep gully of ocean water constantly pouring into the

Darin Limsuansub snorkelling near Prison Island in the clear ocean water coming over the reef.

Empty clam shells, *Tridacna maxima* which are supposed to be protected in Cocos (Keeling).

Photos: © Pete Atkinson

This is the usual amount of traffic on West Island, population 120. You might think that road signs such as this are unnecessary where there are so few cars.

lagoon. Depending on the tide this clear water is travelling from zero to four knots. (Which means that finning as fast as possible, you can easily go two knots backwards!) So you walk along the beach, leap into the gully, get swept along past sharks, coral, a huge barracuda, bump-head parrotfish and end up in the lagoon. Swimming cross-current takes you to shore where you can do it all over again. It's a blast!

West Island, where we lived, is 16km long. We had the use of a car, so we explored all we could. The beaches had horn-eyed ghost crabs, *Ocypode ceratophthalma*, higher were Coenobita hermit crabs. Black tip reef sharks hunted in the shallows in the evenings, their black dorsal fins cutting the surface. Land crabs, *Cardisoma carnifex*, lived all over and were the most common road-kill. Coconut crabs, *Birgus latro*, common on Christmas Island are very rare on Cocos, as are many seabirds, eaten to virtual extinction. Local guidelines claimed Tridacna clams were protected; however we found huge piles of newly opened shells in the southern part of the lagoon. Traditional practices are simply unsustainable with larger populations with better equipment like outboard motors.

In some ways Cocos (Keeling) felt like a microcosm of the world; what's the point of saying "Take only what you can eat" when we are creating too many people for the world to sustain? The island has trade-winds blowing much of the year, and endless source of power. There were four wind turbines, two erected, none working.

You might think that so far from the real world, you might escape the idiocies of bureaucracy. Some government department managed to erect many ugly and unnecessary signs telling people their taxes has paid for this slipway, or they were entering the cemetery, a beautiful, quiet spot at the north end of Home Island where many of the Clunies-Ross family are buried. I kept wishing the island belonged to the descendents of Clunies-Ross who still live there, or to Malaysia, or France... On Home Island where the Cocos Malays lived, most got around on ATVs, those four-wheel farm bikes. The few roads are good but Australian law dictates they must wear crash helmets, as you must on a bicycle. But they only wore them the days the policeman from West Island was on the island.

Trade-winds blew many days, 15-25 knots clattering through the palms. It rained some days. But we were there for the few perfect days when we could shoot pictures under ideal conditions. Nature, left to its self, is often perfect, and sits comfortably in harmony with the soul. To coexist peacefully with nature we need to deface it as little as possible and avoid state sponsored graffiti in the form of signs for everything.

Nowhere is perfect, but

Pete Atkinson

Cocos (Keeling) is beautiful, fascinating and has a couple of flights a week. So what are you waiting for?

Pete Atkinson blames Sherkin Island Marine Station director Matt Murphy for his idyllic lifestyle. Thirty years ago, during several visits to Sherkin to take underwater photos, Matt encouraged and inspired Pete enough that he bought an old yacht and sailed off to the Pacific, where he spent 20 years sailing, writing and shooting photos in beautiful locations. More recently, Pete married the Thai photographer Darin Limsuansub and they currently live in Cairns, Australia. You can see more of their work at www.peteatkinson.com and www.darinimages.com

Timber

By Daphne Pochin Mould

WE forget. So many new materials, so many ways of making things, so much that's novel and exciting. At the end of World War II, nylon stockings were an almost priceless gift. Go back a hundred years and such things were undreamed of. Back in time, into that most colourful, fashion conscious 18th century and fabrics were all of natural fibres: wool, hair, silk, flax, hemp, leather, furs and fleeces, ostrich plumes etc.. And timber – wood – was involved everywhere.

Step back in time, into the pages of Cork's first newspapers, the "Hibernian Chronicle" (from 1769) and its continuation the "Cork Mercantile Chronicle" (from 1800). It describes how every day a multitude of sailing ships came in and out of Cork Harbour, having sailed the world and carrying cargo from near and far. Cod fish and blubber came from Newfoundland, garden bulbs and flower roots from Holland, and from elsewhere, wines and rum, tobacco, tea and coffee, oranges and lemons, and timber – always timber. At that time, all the ships were made of wood and always had been since the first young fellow straddled a floating log and found he could guide it along a river. The best of wood, old and seasoned, is needed to build a big ship and many oaks are needed to make a battleship, as the old English song boasted: "Hearts of oak are our ships, Jolly tars are our men". By the 18th century, with the oceans crowded with the big mercantile and naval fleets of the European and American nations, timber was then like oil is today – likely to run out. Even one British admiral planted an acorn wherever he could, but eventually it was steam and iron ships that would save the day.

Then Cork was a city of coopers, maker of thousands of barrels. The narrow wooded laths, which make the side of a barrel, are called "staves" and were imported by the million.

Cork's great butter market, drew its supplies along the "Butter" roads of Munster. The mountain farms of Cork supplied Australian tables with butter that was rigidly graded, checked and exported in wooden casks. These were not any old casks, but ones checked by inspectors sworn in for the job. The specifications for the butter casks were:

"Whereas by several Laws in relation to Butter and Butter Casks, it enacted that no Person shall make, buy or sell any Butter Cask, or shall make up or pack Butter in any Cask for sale, unless each Cask shall be made of good seasoned Oak, Ash, Cycamore, Beech, Bird, Willow or Sally, whereof no part to be Big-timber and made tight to, hold pickle, with head and bottom equally dooled, and set to the cross with twelve good fresh sufficient Hoops on each Cask, well twigged with good fresh Osier Twigs, under the Penalty of five Shillings for each such offence."

May 6, 1784

Cork was the great slaughtering house of Munster, killing great numbers of cattle.

"Wanted by the Committee of Merchants, a few trusty Persons to remain at the different Avenues of this City, during the Slaughtering Season to ascertain the number of Cattle daily drove to market, by which their time of standing previous to killing will be known."

November 7, 1796.

Most of the meat was salted down in wooden barrels and exported. The naval Victualling Office in Cove [Cobh] advertised for the supply of:

Eighteen Thousand Pounds of Salted beef suet. The said Suet to be good, sound, sweet Suet of this Season's cure, to be packed in good, strong, substantial Tierces of Barrels full wood bound and trimmed, with six good and substantial iron hoops on each. Tierce and four on each Barrel – to be delivered to these stores in the space of two months.

November 9, 1812.

In the 18th century the oceans were crowded with fleets of mercantile and naval ships and timber was then like oil is today – likely to run out.

Salt beef was equally carefully packed and to last at least a year. Salt was the universal preservative of meat and fish. Cork had its own salt pans making it from sea water but also imported large quantities.

The city also imported mahogany for cabinet makers and the like, and timber of all kinds was needed for the gentry's carriages and farm carts. Tree felling went on fast enough, with the careful saving of the bark for the tanneries.

TO BE SOLD AT CASTLE OLIVER

FIR, ASH, OAK, ELM, BEECH AND BIRCH TIMBER of superior quality and on moderate terms. Purchasers of large quantities will meet good encouragement and Gross Timber delivered. N.B. A Man who understands the saving of Bark, and who can be well recommended wanted.

Application to Castle Oliver wood, or JOHN FITZGIBBON, Mallow Lane.

April 25 1719.

CORK WOOD TO BE SOLD BY AUCTION at Jennings and Bickerton's Stores, Coal Quay at 1 o'clock on Monday, 12th instant. About 13 tons of very fine Cork Wood. Just landed out of the HOPE from Oporto. Terms at sale and Earnest required.

March 1810.

(Presumably this cork made stoppers for the glass bottles into which the many barrels of fine French and Spanish wine would be decanted.)

AUCTION OF QUEBEC STAVES

John Cogan will sell at Auction on MONDAY NEXT, at the Custom House Quay,

8000 Puncheon Staves

1000 Ditto Hogshead

Terms at sale

January 27, 1815

DRAM TIMBER & DEALS

John and Joshua Carroll are Landing TWO CARGOES

They have oak, elm FIT FOR MILL AND SHIP BUILDING

July 15, 1805

The 18th century was the time of the great gardens on the great estates and of the eager introduction of new species. To Ireland came the lovely spreading Deodar cedar; the long, lanky Wellingtonia (a redwood), named for the military here of the day; the gaudy rhododendrons, very much the invader of the new land, suppressing all else; and the elegant fuchsia from South America, which has become more Irish than the Irish themselves.

Of the ancient, natural Irish woods only place names remind of what has been lost. Where are the oak forest of Derry and the yew woods of Youghal? Mankind indeed is very destructive of trees, often without a thought of replacement.

But in the 18th century there were large nurseries at Cork, and the

"nobility and gentry" as well as ordinary folk could get planting, both for landscaping and as a crop. Farmers enclosed more and more land, making fields hedged with "quick" (hawthorn, blackthorn) and also furze. Here for instance is GARRET AHERN, Nursery and Seedsman, Cats Lane, Cork who "aquaints the Nobility and Gentry, that he has for sale at his nurseries, a choice collection of the following articles, peach, nectarine, apricot, almond, plumbes, cherry, and pear trees, formed to the walls and standards; dwarf, cyder and table fruit, apple trees, English, French, Dutch and Irish fethere elms; oak, ash, beech, walnut, chesnut, hornbeam, quickbeam, sycamore, plananist, birch, alder, popular and lyme trees; European and America silver fir, black, white and red spruce ditto; Scotch, larch and Weymouth pine ditto; arbutus's in pots and baskets; crab and whitethorn quick, with upwards of three hundred different, kinds of flowering shrubs and evergreens. As he has a greater assortment of these than any in this province, and a vast array of other articles he apprehends he can sell upon the most reasonable terms. N.B. He has just imported from London and Holland, new garden seeds, flowers roots &'c.

February 12, 1770

And for information on how to grow all these things, James Garton had just published "The Practical Gardener, and Gentleman's Directory", which included the Physic Garden, and the management of vineyard, Pine apple, greenhouse and hot house. It cost 3s 3d and would have been a big volume.

The 6 inch to the mile First Edition Ordnance Survey maps show numerous, "Osieries", "sally gardens" where willow was grown for rods to make baskets and twigs for barrels (to make them water tight and to secure the joints). "Twig gardens" appear frequently in advertisements and seven town houses in Cork city had gardens and "orchards in full bearing". Field and garden mingled with the increasing number of new houses.

"Mr Dunscombe will this Year, sell the, FRUIT of his Orchard, at Carrigrohane and Mount Desert"

June 24 1784

The nurserymen sold farm seeds and the cowslip is included in some pasture mixtures. And some landowners were making very large plantations.

CHEAP PLANTING

MICHAEL Murphy

For Gentlemen who intend Planting Nurseries of their own, he has several millions one and two years seedling

Larch Fir	*Beech*
Spruce ditto	*Birch*
Scotch ditto	*Alder*
Silver ditto	*Sycamore*
Balm Gilhead do	*Apple and*
Oak	*Thorn, Quicks &c&c*

Having grown them on a very large scale this year, he can offer them considerably under former Prices. Printed catalogues of which may be had.

CONTRACT PLANTING

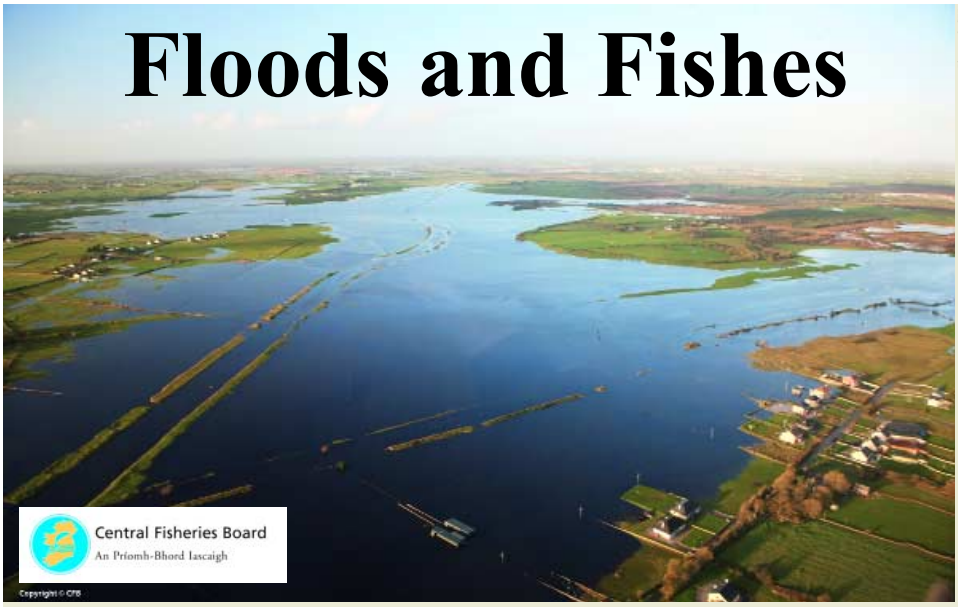
Being, often applied to by Gentlemen to plant by the Acre, induced him to establish a NURSERY in a very exposed situation by the Mile Stone on the road to Ballincollig, that the trees may bear removal to the most bleak situations – thus, with his very extensive Assortment of Forest Trees of every size and age, will enable him to execute orders on the very best terms.

N.B. The most careful Men employed in Planting and no money required until the whole is planted.

Cork. Castle – street. Sept 11, 1815

So new woodland was being established, even if most of it is now gone. Timber was the basis of life and trade. The wooden ships made settlement of new lands, trade and warfare possible. When people began to explore the great ocean of air above us, wood took them there. Even early aircraft were "rag and stick" framework of light strong wood, with a fabric covering.

Floods and Fishes



Photos: © CFB

The Clare and Abbert rivers confluence point west of Tuam.

By Dr Martin O'Grady

THE unprecedented floods in Ireland last autumn caused a great degree of hardship for families in many parts of Ireland. Many anglers, reflecting on the floods, are wondering how our freshwater fishes managed in these extreme circumstances.

In reviewing the impacts of floods on fishes it is worth remembering that our native fishes, Atlantic salmon and Brown trout, successfully colonized and have lived in Irish rivers since the last ice age, some 10,000 to 15,000 years ago. So, quite clearly, the fish have evolved to cope with even more extreme conditions.

It is worth examining the impacts of floods on fishes at several different levels. Firstly, in morphological terms, flood events were obviously crucial in the first place in forming the river basins that we have today. Over millennia major floods would have scoured out channels across the countryside forming the rivers we have today. So, clearly, flood events were crucial in creating suitable habitat for our fishes in the first instance.

As the old Paul Robson song says – "old man River, just keeps movin along" – this is indeed a truism. Floods play a crucial role in maintaining this continuum. How? While much flood water runs off as surface water to the sea a significant proportion of rainfall seeps down into groundwater reservoirs and/or is retained in the soil, particularly in peat land areas. It is the gradual release of these water supplies, subsequently, back into river channels which maintain summer water levels in our channels and ensure the survival of our fishes.

Minerals, particularly calcium, and nutrients, especially phosphorous and nitrogen, are the "ecological drivers" in our freshwater systems. Once there is a plentiful natural supply of these materials in rivers and lakes then a rich flora and fauna, including fish stocks, will be present. Recent research by the Fisheries Boards has shown that, in some stream catchments , up to 90% of the phosphorous load from the stream, over the course of a year, can be discharged downstream to a lake in as little as a five-day period. Surprise, surprise the five-day period in question coincides with the largest flood event of the year – clearly flood flows have a critical role in "driving" our aquatic ecosystems.

Floods are particularly valuable to salmonid fishes in terms of reproduction. How? Both salmon and trout lay their eggs in the loose gravel deposits in shallow riffle areas. The cobbles and gravels on river beds are not a permanent fixed feature of the river bed. While the downstream mobility of these materials is variable, depending on the gradient and hydrology of particular rivers, this phenomenon is evident in all catchments. Floods play a crucial role in eroding a certain amount of gravel and cobble from river banks, which deposit out in riffle areas, replacing material which has been washed downstream. Without this "top up" system many riffle areas would cease to function as salmonid spawning areas.

The movements and distribution of fish in rivers and lakes can be influenced significantly by flood events. In Irish lakes, following a major flood event, large numbers of trout will, temporarily, leave the lake moving into flooded callows to exploit new feeding opportunities. Once lake shore areas flood some of the earthworm population wriggle to the surface, drown, and provide a feast for the trout. The fish will of course consume any other unfortunate creatures such as slugs and snails that have the misfortune to be caught up in the "Tsunami". I have even observed Irish lake trout feeding on newts that did not "retreat" quickly enough in the rising flood waters.

Flood events in rivers significantly alter the distribution of trout. I first realised this, as a child, while fishing on the River Fergus during a big flood. At the time I could not access my usual haunts because of high water levels. I was largely confined to dangling my humble worm in backwaters (flooded cattle drinking areas).To my astonishment I caught large numbers of trout in places which I knew would be "bone dry" in low flow conditions. These trout had been feeding on earthworms and other grubs which had been "ripped" from the banks during the flood – an unexpected feast for the trout and the angler.

In very spaty, high gradient channels flood flows can physically damage and sometimes kill significant numbers of trout. I first realised this as a young biologist while carrying out a fish stock survey on the Shrah River – a stream which "tumbles down" the mountain in Lough Mask on its western shore. I took scale samples from 30 trout intending to age these fish when I returned to the laboratory. When I examined the scales I found that every scale from every fish were what biologists call "replacement scales"– if a trout or salmon looses a scale they grow a new or replacement scale. However the growth pattern recorded on the original scale is lost and the replacement scale cannot be used for age analysis. This discovery made me realise that fish living in torrential streams, like the Shrah River, are "battered and bruised" during flood flows. In contrast, it is unusual to find any replacement scales on trout living in lowland spring fed channels in the midlands.

Some years ago there was a very extreme localised thunderstorm in the Owenmore Catchment in County Mayo. Some minor tributaries were "blown out" by this event with thousand of tonnes of rubble, gravel and silt being dumped out on the flood plain. The following day thousands of young trout and salmon were found dead, scattered over the flood plain – an unexpected bonanza for the local seagull and grey crow populations! This was the only occasion in a long career as a biologist that I witnessed significant fish mortalities following a flood event. It is noteworthy that, today, despite this event, the Owenmore is still a high quality salmon fishery.

Floods must be regarded as a natural phenomenon – a part of the hydrological regime in this part of the world. They have helped to shape the landscape, feed our aquatic systems with minerals and nutrients, ensure the continuing availability of salmonid spawning areas and provide occasional "feasts for the fish. On balance they are both an intrinsic and valuable feature of our aquatic ecosystems.

Dr Martin O'Grady, Senior Research Officer, Central Fisheries Board, Swords Business Campus, Swords, Co. Dublin. www.cfb.ie

Gillaroo Trout.

Focus on Environmental Enforcement in Ireland 2006 – 2008

By Cormac MacGearailt

THE EPA recently published its *'Focus on Environmental Enforcement in Ireland'* report covering the years 2006 – 2008. This is the second such report from the EPA's Office of Environmental Enforcement. It assesses Ireland's enforcement of environmental standards and highlights the challenges we face as a country in complying fully with European air, water and waste legislation. It covers the environmental enforcement activities of local authorities and the EPA.

The report shows that the amount of environmental legislation has increased dramatically in recent years, and it is being matched by a significant level of enforcement activity. This level of regulation is a driver for improved enforcement and a cleaner environment. As a country we have less pollution entering the environment; and without this regulation we would not see many of the environmental outcomes highlighted in the report.

Examples of some of these positive environmental outcomes are as follows:

1. WASTE
All municipal waste is now landfilled in lined cells with gas and leachate collection. Odour complaints from waste transfer stations licensed by the EPA are down by 66%.

2. WATER
There was a reduction in the number of water monitoring stations seriously polluted by 10 – from 39 stations to 29 stations.

3. AIR
Air quality monitoring for Ireland indicates good compliance with current EU and national air quality standards.
Emissions from power stations have fallen in the period 2001-2007. Sulphur oxides (SOx), nitrous oxides (NOx), and heavy metals emissions have all dropped.

4. LARGE INDUSTRY
Complaints received in 2008 relating to large industrial activities were down by ~ 60% on 1998.

Figure 1.1: The national enforcement approach.

The EPA adopts and promotes an enforcement approach best represented by Figure 1.1. This strategic approach involves a combination of enforcement tools to manage compliance with environmental legislation and deliver outcomes for the environment.

Enforcement tools comprise supporting measures (below the surface) and visible measures such as sanctions and national reports (above the surface). The tools are selected and applied on a risk basis.

Supporting measures include activities such as audits and inspections, emissions monitoring, and complaint investigations. These are complemented by guidance documents, meeting with licensees, residents, NGOs and business groups, and network events.

Administrative sanctions are generally used to secure compliance as a result of audits and inspections, including warning letters, enforcement notices and directions. In 2008 the EPA issued in the region of 450 administrative sanctions and local authorities issued over 10,000 in the same period.

Criminal sanctions are pursued where serious non-compliance is detected or inaction persists. Criminal sanctions consist of summary prosecutions at the District Court, prosecution on indictment at the Circuit Court, and High Court injunctions. The EPA has prosecuted over 150 cases at District Court level since 2000 and submitted ten files to the Director of Public Prosecutions on indictment for more serious cases of environmental crime since 2000. The number of local authority criminal sanctions reported has also increased, with over 770 cases initiated in 2008.

The statistics in this report show that this approach is working. The Report highlights:

Enforcement Actions: The EPA and local authorities carried out over 130,000 inspections leading to 10,000 enforcement actions and 750 prosecutions in 2008.

Drinking Water: Following new legislation in 2007, the EPA issued 45 legally binding directions to local authorities to meet drinking water standards.

Water Quality: There has been a 20% decrease in emissions of polluting matter[1] to waters from the food and drink sector during 2004–2007.

Waste: There was an increased use of higher courts (Circuit and High Courts) in waste prosecutions e.g. securing High Court orders against unauthorised waste facilities or submitting files to the Director of Public Prosecutions.

Air and Noise: Local authorities issued 1,200 warning letters following noise and nuisance complaints and undertook 27 prosecutions in this area.

Industry: Following the introduction of IPPC licensing in 1995, total pollutant emissions from the pharmaceutical/chemical sector[2] to the year 2007 decreased by 59%.

The public play a significant part in highlighting risk and are a vital source of information for regulators. Almost 70,000 complaints came to local authorities last year across the spectrum of environmental issues. This shows the level of public awareness of environmental issues, and a willingness to take action on the environment.

The increase in legislation and enforcement activity also drives new approaches to the tasks of monitoring and enforcement. For example the EPA now uses risk-based approaches to enforcement. This means we align our resources to where they are needed most. Additionally, the EPA's drive for higher standards and better use of enforcement resources has resulted in Ireland becoming the first EU member state to have comprehensive inspection plans across all local authority areas.

A continued emphasis on risk assessment and the prioritisation of available resources will be required to deliver intermediate and long-term environmental outcomes for Ireland. This emphasis will necessitate sustained infrastructural investment along with collaborative approaches between regulators and the regulated community. This risk-based approach is all the more important now given the increasing complexity and volume of environmental legislation at a time of reduced or negative growth in the economy.

Finally, future EPA reports will assess the performance of environmental regulators in dealing with the enforcement challenges identified and discussed in this report. There is a need to close the infrastructural gap that exists between our current waste, wastewater and drinking water infrastructure, and the infrastructure required to meet environmental standards. Inextricably linked to this is the step change in expertise that is required at a local level to operate and manage these assets along with improving risk management and pollution prevention techniques.

The report is available on the EPA web site at www.epa.ie/NewsCentre/ReportsPublications/ or from the EPA's Publications' Office, McCumiskey House, Richview, Dublin 14 on 01-2680100.

[1] as measured by Biochemical Oxygen Demand)
[2] expressed as a single pollutant index

Cormac MacGearailt, Inspector, Office of Environmental Enforcement, EPA, Johnstown Castle Estate, Co. Wexford.

Birds of the Irish Coastline

By Jo Kerrigan

WE have a wonderfully rich and diverse birdlife along our deeply indented and varied Irish coastline, with something different to attract the keen photographer every day of the year. Whether winter or summer, rain or sun, it's an ever-changing perspective, and you simply never know what you will discover foraging among the seaweed, soaring over the cliffs, or building its nest on a safely inaccessible crag.

It's not just seabirds that frequent our shores: you will find many land-based species there too, taking advantage of feeding opportunities or simply making use of the updraught from cliffs to display their flying skills. Ravens and choughs are particularly adept at aerobatics, tumbling and swooping in sheer delight and calling raucously to each other. The south-west of Ireland is one of the last stronghold of the splendid chough with its vivid red bill and legs, as here it can still find unspoiled, uncrowded cliffs and headlands on which to forage and breed. Although normally nesting in inaccessible sea caves, choughs will often make their nest in an old abandoned house or barn, building high up in the rafters near a convenient exit hole, or even in a chimney.

The little rock pipit is a local, always to be found flitting from rock to rock, its inconspicuous brown colouring concealing it effectively from predators, while the cormorant, another year-round resident, dives for fish or stands motionless on rocks for long periods, drying its wings, and posing quite obligingly for the camera. The brent goose, in contrast, only comes here in winter, when exhausted migrating flocks welcome open fields near the shore where they can feed and rest from their long travels. Ducks too – teal, wigeon, mallard – gather in flocks in wintertime, before separating out in spring to start the season of nesting, laying eggs, and raising young again.

The water's edge is always a place to watch, be it a sandy beach or muddy estuary, since here the smaller waders run constantly up and down, dodging the wavelets and probing the mud as they search for food. Timing your visit to coincide with the incoming tide will ensure that they get closer and closer – a car makes a useful hide for observing them without disturbance. Sanderlings, ringed plovers and dunlin can be seen, while the turnstone, true to its name, is always searching through the pebbles and seaweed, probing with its bill for what it may find. Larger species like oystercatchers, lapwings, curlews and godwits are easier to spot.

And of course the cliffs offer myriad nesting sites for so many different species. Sometimes you wonder how eggs survive to hatch at all, when you see the narrow sloping ledges on which they are laid. Kittiwakes nest in colonies, each bird always unerringly returning to its own spot amid the confusion, while shags – very similar to cormorants in appearance – guillemots and razorbills offer pleasing contrasts in darker plumage to the soft white and grey of the kittiwake.

In spring and summer the slim and elegant terns leave their sea wanderings and come ashore to nest on sandy beaches and small rocky islets. The common, arctic, roseate, sandwich and little tern are all easily distinguishable from one another, but all share the common features of slim light bodies, long pointed wings, and an amazing grace in flying and diving for food. They are vulnerable while on land, always keeping a sharp eye out for predators like the ever-hungry herring gull or greater black-backed gull who will seize any opportunity to snatch an unguarded egg and make off with it.

Puffins, those enchanting, dumpy little birds who seem as brightly painted as a circus toy, choose inaccessible cliffs for their colonies, making burrows deep into the ground to raise their young. It's a fine sight to see a parent bird heading for home across the sea, its beak full of tiny fish for the fledglings in the nest. Gannets, in contrast, are splendidly huge birds, their vast black-tipped wings bearing them countless miles across the ocean throughout the year. When they nest, they choose steep crags away from the mainland, and gather together in enormous colonies where the noise (and, it must be admitted, the strong smell) make for a dramatic scene.

Wintertime can bring unexpected or unusual visitors to our Irish coastline too, and often wrapping up warmly and braving an icy blast can reward the photographer. Seawatching during a storm can reward you with the distinctive wing pattern of a Sabine's gull, the white wingtips of a glaucous gull, or even the snowy plumage of a rare Ivory gull. You simply never know what you will see, and that is half the pleasure of going out with camera and binoculars.

Our Irish coastline provides a rich source of information too, on bird feeding habits, migration patterns, mating and breeding. Often the photograph you take can throw light on some aspect of avian behaviour that has been puzzling researchers, or even suggest an entirely new possibility, hitherto unsuspected. That's where quick reactions and an ever-ready lens are invaluable. You simply never know when bird life is going to surprise you.

Centre pages by Richard Mills, who has been photographing birds and wildlife in Ireland and abroad for over forty years.

Sandwich Tern feeding young

Little Tern at nest.

Arctic Tern

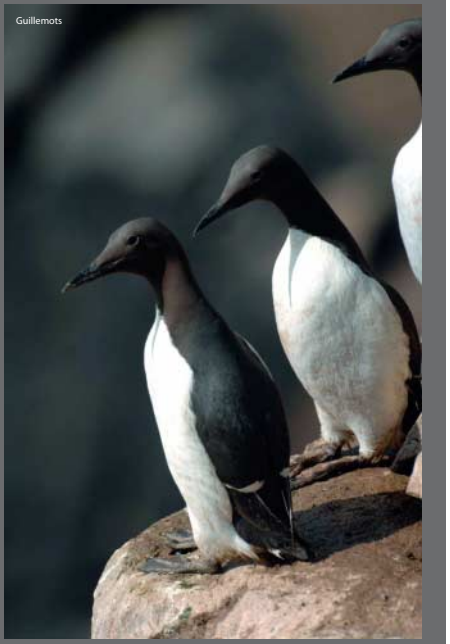
Roseate Tern

Common Tern

Photos © Richard Mills

Birds of the Irish Coastline

Photography by Richard Mills



The New EPA Code of Practice for On-Site Wastewater Treatment and Disposal Systems

By Margaret Keegan

THE 2006 census indicated that around 40% of the population of Ireland lived outside of the main cities and towns. Unlike other more urbanised European countries, around a third of the population of Ireland lives in the open countryside in individual dwellings not connected to a public sewer. The wastewater from such dwellings is treated at or near the dwelling by wastewater treatment systems often called on-site systems.

When on-site systems such as septic tanks fail to operate satisfactorily they threaten public health and water quality. When the wastewater is not absorbed by the soil it can form stagnant pools on the ground surface. In such failures, humans can come in contact with the wastewater and be exposed to pathogens. Inadequately treated wastewater may lead to contamination of our groundwaters and surface waters, which in many areas are used as sources of drinking water. It is essential therefore that these on-site systems are properly designed, operated and maintained.

The EPA recently published a code of practice in relation on-site systems for protection of our environment and specifically drinking water.

The EPA's code of practice sets out the following:

- An assessment methodology for the determination of site suitability for an on-site wastewater treatment systems and identification of the minimum environmental protection requirements.
- A methodology for the selection of a suitable on-site wastewater treatment system for sites in unsewered rural areas.
- Information on the design and installation of conventional septic tank systems; filter systems and mechanical aeration systems.
- Information on tertiary treatment systems.
- Maintenance requirements for the above systems.

It is important that homeowners have the correct on-site system for their home. If not, problems can arise in the future, such as contamination of water supplies, streams and/or ponding on the surface, which may lead to a potential health hazard. It is in the best interest of the homeowner and the environment to install an appropriate on-site wastewater treatment system. All new on-site systems should comply with the EPA *Code of Practice for Wastewater Treatment and Disposal Systems Serving Single Houses (2009)*.

Three important aspects relating to wastewater treatment for homeowners are:

Site Suitability Assessment

A site suitability assessment is an assessment of site conditions in relation to the suitability for wastewater treatment and disposal. All sites for proposed single houses in un-sewered rural areas will require a site suitability assessment. This needs to be undertaken by a competent person in accordance with the EPA Code of Practice (Consult with the local authority for information on competent persons). A full site suitability assessment report is required to be submitted as part of an application for planning permission and in many cases where a house extension is applied.

Selecting a Wastewater Treatment System

Site conditions, as determined by the site suitability assessment, govern the selection of the wastewater treatment system and are site specific. Some sites may not be suitable for wastewater disposal regardless of the type of system used. Unsuitable sites lead to pollution of surface and ground water and/or pose an unacceptable risk to public health. Any selected system should comply with the EPA Code of Practice, which incorporates the requirements of the European Standard EN 12566 Small Wastewater Treatment Systems for up to 50PT.

Installation and Maintenance of Wastewater Treatment Systems

The homeowner is legally responsible for the operation of their wastewater treatment system according to Section 70 of the Water Services Act, 2007 (S.I. No. 30 of 2007). Correct installation and maintenance are critical in ensuring correct operation of all wastewater treatment systems. The homeowner is advised to obtain relevant documentation from the installer/manufacturer in relation to installation and maintenance including ongoing costs. It is also essential that maintenance contracts be renewed. Certification by a competent person of installation may be required in planning conditions and should be checked with the local planning authority. All installation and maintenance documentation should be retained for future reference.

A copy of the Code of Practice: Wastewater Treatment and Disposal Systems serving Single Houses (paper edition €10) may be downloaded from the EPA's website at www.epa.ie or hard copies are available from our Publications Office, McCumiskey House, Richview, Dublin 14 on 01-2680100.

Revealing Cork's Rich Heritage of Wild Flowers

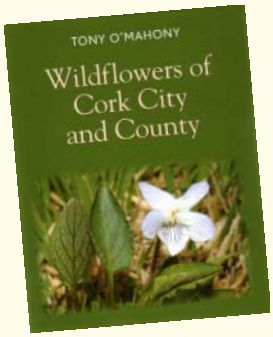
By John Akeroyd

IT is Ireland's largest county, but Cork has received too little botanical study over the years. Its impressive flora, especially in the mountains, peninsulas and islands, includes a substantial element of the Atlantic- and Mediterranean-type wild flowers for which Ireland is famous. County Cork covers wildflower-rich mountains, moorlands, bogs, lakes, rivers and wooded river-valleys, old hedgerows, and unspoiled coasts, peninsulas and islands. Even Cork City itself, despite the 'Celtic Tiger' years of urban and suburban expansion, remains a refuge for wild plants. Yet Co. Cork has never had a 'County Flora': the Revd Thomas Allin's *The Flowering Plants and Ferns of County Cork* (1883) is an indispensable source of plant records but is only a checklist – and it is rare, expensive and out-of-date!

Botanists and anybody interested in plants and nature should therefore welcome *Wildflowers of Cork City and County**. It is a treasure for both native and visitor to enjoy, and a credit to Cork City Council and Cork County Council who supported its publication. The author and publisher should be proud of what they have achieved, also Matt Murphy of Sherkin Island Marine Station, who initiated the idea and pressed hard for it to become reality.

Tony O'Mahony's fine book shows how wild flowers are important and why we must conserve them. Knowledgable and enthusiastic, he draws on four busy decades of field botany in his native Cork, and also documents three centuries of botanical study in the county. Each chapter profiles a habitat or group of plants such as orchids, ferns or aliens. Tony takes us around each habitat, pointing out key wild flowers and ferns, showing us in detail the places to look and what we might find. He repeatedly draws attention to little-known places that would repay investigation.

The text is lavishly illustrated with evocative photographs of plants and (superb aerial shots) spectacular scenery, which greatly enrich the botanical narrative. A checklist at the end includes some 1200 native, naturalized and



casually occurring species and subspecies of flowering plants, conifers and ferns recorded since 1745. An extensive bibliography brings together a miscellany of published scientific and other sources. There is also a glossary and general and botanical indices. The main text brings common and rare wildflowers and their habitats to life, looking at them throughout the year and providing plentiful detail on topics such as their uses for food or medicines. We follow Tony on easily accessible excursions such as the public amenity walks along the track beds of the old Carrigaline-Crosshaven railway and the Old Cork-Crosshaven railway at Blackrock; to wetlands and sand or shingle strands along the much-indented coast; on rougher moorland hikes to mountain lakes and crags; or along rivers and streams, sometimes in woodland such as near Dunmanway.

Tony's account of his home patch is particularly fascinating. Chapter 2 on Cork City, and Chapter 3 on Cork Harbour, show just how many fragments of natural and semi-natural habitats survive within the city and its suburbs, supporting some 570 plant taxa. These habitats include rocky places, always good for special plants, including the city's many old walls, Mount Desert Wood on a sandstone escarpment above the River Lee, and limestone outcrops such as Little Island in Cork Harbour, where Tony discovered tiny white-flowered Dense-flowered Orchid (*Neotinea maculata*), well south of its main distribution in the Burren. Stone walls especially are home to a classic Cork City plant and one more typical of the Mediterranean region, Little Robin (*Geranium purpureum*), which Tony refound in 1969 after it was thought lost for over a century. It occurs at one other place in Co. Cork, on Long Island in Roaringwater Bay, and in recent years Ian Green has relocated it in Waterford City.

Other chapters include accounts of the floral riches of the far south-west, the coasts and rivers, the still relatively unexplored mountains, and the famous Mediterranean-Atlantic plants. Chapter 15 presents a concise checklist of the conservation challenge for botanists and decision-makers. Notable rarities and botanical specialities are highlighted, such as Strawberry Tree (*Arbutus unedo*), Irish Spurge (*Euphorbia hyberna*), Spotted Rockrose (*Tuberaria guttata*) and Pale Dog-violet (*Viola lactea*). This last rare species of rocky heaths, featured on the cover of the book, has its Irish headquarters in West Cork, including Sherkin Island. Indeed, Tony frequently refers to the islands of Roaringwater Bay: a tribute to a rich flora and to more than thirty years of recording by young botanists from Sherkin Marine Station.

Tony takes us through the hills, rivers and coasts, over slopes, screes and rock outcrops, or just to hedgerows, roadsides and waste places, or around the edges of farmers' fields. He teaches, explains, illuminates, makes useful suggestions and encourages us to look further. This stimulating, inspiring book – always imbued with a strong conservation message – will not only inform the public about Cork's rich heritage of wildflowers and ferns, but also it is bound to lead to many new and exciting discoveries. It publication is a triumph and sets a new standard for books about our native wild flowers.

Wood-sorrel (*Oxalis acetosella*) is a common spring-flowering species in acidic woodlands in particular.

**Wildflowers of Cork City and County.* Tony O'Mahony. Pp. 456pp. The Collins Press, Cork. 2009. Hardback. £26.99, €29.99. ISBN 978-1-84889-020-6.*

Dr John Akeroyd has studied the Irish flora for 30 years. He edited The Wild Plants of Sherkin, Cape Clear and adjacent islands of West Cork *(1996) and is author of* A Beginner's Guide to Ireland's Wild Flowers *(2008).*

Images courtesy of Tony O'Mahony

The often gregarious Irish Spurge (*Euphorbia Hyberna*) is a magnificent adornment to the Irish flora. This beautiful plant is virtually confined to southwest Ireland, where it is of locally common occurrence on acidic hedgebanks and woodlands margins and flowers in April to May.

WHAT CAN BE LEARNED FROM RECENT FLOODING EVENTS?

By Brendan Devlin

DESPITE what might be thought from the media reports in November/December 2009, flooding occurs fairly frequently in Ireland affecting the lives of many people, in one way or another. Hydrologists classify a flood by its return period, or the statistical period within which a flood of a similar scale could recur. This does not mean that floods of a similar scale cannot recur in "back to back" years, they can do so and still satisfy the statistical data. Generally its floods with a return periods of 30 years and upwards that cause most disruption to people in Ireland, but infrequent flooding affecting towns and villages usually results in more sustained demands for remedial action by "the Authorities", and generates more controversy, than that coming from the more regular flooding of large tracts of agricultural land, which is often a frequent occurrence in many of the Irish river basins.

Ireland is saucer shaped with mountain areas around its maritime rim and with a relatively flat central plain so that most Irish rivers, rising on the inland side of the maritime mountains, must follow a roundabout route on slack gradients to reach the sea, giving them sluggish flows and a tendency to easily flood in wet weather conditions. There are more than 300 areas throughout Ireland known to be at serious risk of periodic flooding but the effect of this flooding varies widely and includes damage to houses, other property and roads; leads to road closures, isolation of houses, businesses and farms; causes disruption to services, waterlogging of lands and damage to habitats and can instill fear into individuals and communities.

Flooding can be caused by a number of factors but most frequently follows prolonged rainfall, or rainfall events of high intensity, which increases run-off of surface water into streams and rivers that eventually can no longer contain the increasing flow within their channels or normal flood plains. Once the ground is no longer able to absorb moisture from rainfall, by either being already waterlogged or when the intensity of falling rain is too high to allow absorption to take place, then the time within which flooding occurs can be significantly shorter than would otherwise be the case. Blockages in river channels and at bridges due to debris becoming lodged can also cause flood waters to over-spill from channels during severe flood events, which may then divert part of the flood flows away from their natural channel and onto different and unexpected directions. There is a saying that "water finds its own level" and while doing so it may have disastrous consequences for anything, or any persons, standing in its path.

Many of the recent flooding events followed from those factors being present, as is borne out by Met Eireann's statistics for 2009. That year was the wettest on record in some parts of the southwest, west and midlands, had an exceptionally wet summer for the third time in a row and heavy rainfall in July, August and November. 51.2 mm of rain, the year's highest single day's rainfall, was recorded at Cork Airport on November 19th. During the last week of November 2009 the River Shannon reached the highest levels recorded by the OPW since records began in the 1940s where some locations were 500 mm above those recorded in 1954, when very extensive flooding also occurred along the Shannon river basin. It is not surprising then that the scale of flooding experienced in many parts of Ireland in 2009 was well beyond what had happened in more recent years where previous flooding events had occurred.

Photo courtesy of Central Fisheries Board

Widespread flooding occurred around Ireland in the winter of 2009.

Historically most flood remedial works concentrated on river drainage to alleviate flooding of agricultural lands. The 1945 Arterial Drainage Act gave responsibility to the Office of Public Works (OPW) to design, construct and maintain drainage works on river systems where the extent of flood damaged land justified the cost of undertaking a drainage scheme by the economic return from the lands benefiting from the proposed drainage scheme. Those schemes involved a design extending from source to sea so the consequences of modifying the channels could be properly assessed. Prior to the 1945 Act individual drainage schemes could be promoted for specific sections of a river system, such schemes are known as "Drainage Districts (DDs)" and are still in existence in various Counties. However experience in the 1930s showed that, while the lands drained within a DD after completion of the drainage work were no longer being flooded, flooding was usually worsened on the lands downriver of the DD. In effect all the drainage work did in individual DDs was to move the flooding onto somewhere else and it was for that reason the 1945 Act was introduced so the entire, or arterial, river system was examined to produce an overall design.

This has relevance for calls for immediate drainage works to remedy specific flooding problems. Regulating flows in streams or rivers without fully assessing the hydrological consequences may only result in shifting the area of flooding to other localities. Equally, constructing structures on areas that normally function as a flood plain during times of rivers overspilling their banks can also be a cause of flooding being shifted elsewhere by being displaced from its normal storage area. Unfortunately there were several examples of flood plain displacement causing flooding problems for many people in the recent floods throughout Ireland. New Planning Guidelines requiring "Flood Risk Management" principles to be considered when building in flood plains are being introduced by the Minister for the Environment, Heritage and Local Government. These will require a detailed assessment to be undertaken on any future proposals in such locations and will reinforce the procedures now being required by many planning authorities for storm water management design to be based on sustainable urban design strategies (SuDS). However these new Guidelines, or the use of SuDS as a design tool, will not address the problems arising where developments have already been constructed on flood plains or in other inappropriate wetland locations. A significant number of residential developments were constructed throughout Ireland in locations where recent flooding events showed they should not have been built in the first place. How possible remedial actions for these problem locations might be addressed has yet to be considered but the problems in those areas cannot be ignored.

The design philosophy used in design and construction of the various Arterial Drainage Schemes undertaken from 1945 to the 1970s, and also in the DDs of the 1920/1930 period, assessed possible improvements to channel hydraulic capacity by "dredging" with only a cursory consideration being given to the environmental consequences. Many fishing interests suggest that rivers drained as part of Arterial Drainage Schemes took years to recover from the damage caused to fishing habitats and some say they never returned to their pre-drainage status, the River Moy being a case for such comments. With the need for Environmental Impact Assessments (EIA) since 1989 for all major infrastructural schemes, it is doubtful that some of the Arterial Drainage Schemes undertaken during the 1950/1970s period could have met the EIA criteria needed for approval to proceed, if they were to be considered now.

Recent flooding events lead to calls for remedial drainage works on rivers or in wetland areas in affected localities. However, the potential effects on aquatic environments and habitats as a result of any such drainage, as well as the downstream hydrological consequences have to be assessed before any drainage work could be initiated. Following the flooding in South Galway in the mid-1990s a possible drainage scheme to provide an outlet to the sea for turlough-based flooding there was considered but the environmental and financial costs of the options investigated did not identify a viable solution, despite the property damage being caused by that flooding. The most recent flooding in South Galway has prompted renewed calls for drainage to be undertaken there but the environmental impacts of that work would still have to be addressed. Flooding in the River Shannon basin has again led to calls for it to be drained, but the fact there is little fall available between Lough Ree and the Shannon Estuary makes meaningful drainage of the Shannon impractical.

Calls have also been made for an overall "authority" with responsibility to manage river systems so that flooding could be better controlled, it being suggested that there were too many bodies presently involved in responding to flood events with no clear lines of overall responsibility to "manage" flooding situations set down. It is true there are no "River Authorities" as such in Ireland and that there are a number of statutory authorities and agencies with inputs to river management activities, e.g. principally Local Authorities, Regional Fisheries Boards, OPW, ESB, Waterways Ireland, Coillte and EPA. However, it is debatable whether the setting up another authority or agency, as now being called for, would of itself lead to better management of flood events. There are issues of access and ownership to be addressed since lands adjoining and under most rivers are privately owned, and issues of fishing and water rights have also to be considered, if a new authority to manage and maintain Ireland's waterways is to be established. Despite the perceived fragmentation between the existing agencies, centralisation of decision-making can often result in actions being taken which do not reflect local knowledge or local inputs of what might be required on the ground. In recent years the setting up of a new authority or agency has become a frequent response to whatever crisis has developed, whereas if existing authorities or agencies were better tasked and resourced many of the perceived inadequacies could be addressed as effectively and at a lessor overall financial outlay on personnel and offices.

Responding to the widespread flooding in many urban and rural areas, particularly in Galway in the early 1990s the 1945 Arterial Drainage Act was amended in 1995 to allow the OPW undertake drainage schemes to alleviate localised flooding, as distinct from only drainage schemes for entire catchments as was their previous remit. Since the adoption of the 1995 amendment, the OPW have prepared Flood Protection Schemes for a number of towns where flooding of houses and commercial property has been a recurring feature, such as Clonmel, Mallow and Fermoy among other locations. Work on constructing flood protection schemes is progressing in these locations and the Government has committed to continue investment in further protection schemes that have already been identified. During the recent flooding on the River Blackwater, the protection barriers installed in Mallow proved very effective and the residents in Bridge Street, who usually were badly affected in previous flood events, were now kept "in the dry" for the first time ever in living memory. The success of the Mallow flood barriers shows that, over time, the OPW program can provide appropriate protection against flooding of properties in the urban areas where this recurs. However, since the preparatory planning for these

schemes is time consuming involving several stages of design and public consultation, as well as an EIS and property/access issues, there can be a 3 to 5 year period at a minimum from the time the OPW initiates a scheme before actual construction could be commenced. This suggests many of the urban areas affected by recent flooding may have to rely on some means of advance warning being provided while they await the provision of a flood protection scheme for their locality, assuming such a scheme can be planned for their locality.

In November 1980 the Bridge Street and Spa Walk areas of Mallow were inundated by a very rapid rise in the River Blackwater with depths of more than 2.5 metres being reached on the streets in the space of a few hours resulting in substantial losses to house and business owners. Fermoy was also badly flooded but had the benefit of Mallow's experience to allow for premises to be cleared in good time. While there was a history of flooding in those areas in Mallow, the scale of the 1980 flooding had not been experienced since 1946 and led to calls for preventative action to prevent a recurrence. Following from a meeting between the then Minister for the Environment and a local deputation and a subsequent inter-departmental meeting, Cork County Council were directed to prepare a local plan to co-ordinate the local agencies response in the event of future flooding along the Blackwater.

From previous flood events in the 1960s the Council's Engineering Staff had gathered considerable amounts of data on flood depths and associated rainfall durations and it was clear that preventative measures were impractical in the context of 1980s finances. Since arterial drainage works by the OPW on the River Blackwater were not seen as likely for many years, if ever, the Council's Engineers decided that the Plan would concentrate on providing flood warnings to facilitate self-help and mutual aid in the areas likely to be affected. From this the Blackwater Valley Flood Plan was developed by the Council's staff with assistance from the then SHB's Chief Ambulance Officer and technical staff from the OPW, Meteorological Service, Department of Forestry & Fisheries and the Fire Services section of the Department of the Environment. The Plan became operative by mid-1982 and relied initially on two flow monitoring stations on the Blackwater located 20 km and 35 km upstream of Mallow. These monitoring stations were linked to the telephone network and their status could be remotely interrogated and they could also give a warning message to a number of pre-defined phone numbers.

During 1982 to 1986 a number of daily and automatic rainguages were installed at strategic locations within the Blackwater catchment. From the rainfall records it was possible to devise a prediction methodology based on a combination of previous flood levels and rainfall duration. This enabled the Council's Engineers to predict with reasonable accuracy the likely timing and expected levels of flood events on the river Blackwater that might affect the Mallow and Fermoy areas. By the time of the October 1988 floods the Blackwater Flood Warning Plan as it had become known relied more on rainfall records than on the two monitoring stations, but local observation of the rising river levels was still an integral part of the prediction process. The early warning plan for the Mallow and Fermoy areas has been used for over 25 years to give sufficient time for residents in the affected areas to make necessary preparations to minimise flooding effects on their property. The OPW Flood Protection Scheme at Mallow has now overtaken the need for the Council's warning plan of the 1980s, and will do so for Fermoy in due course. The early warning system is also being automated, making use of improved technology not available to the Engineers in the 1980s.

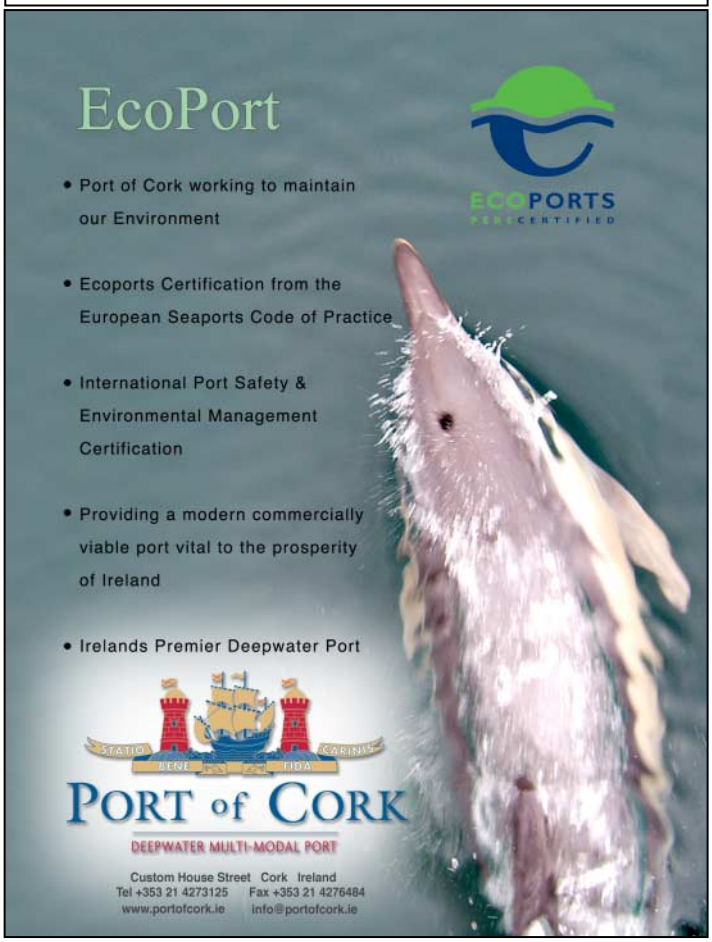
There are established procedures in place for many years to deal with "major emergencies" but flooding events typically take time to develop from minor to major proportions and procedures can often be overtaken by events. Rivers which regularly flood are major natural hazards, a fact that is often not realised by those living in their vicinity, or sometimes even by "the Authorities". Considerable investment has been made by the Office for Emergency Planning in inter-agency staff training and co-ordination in recent years and no doubt lessons can be learned by all involved from the flooding events of 2009 on how responses can be improved. While exercises in emergency planning can be undertaken on simulated major incidents, it is unfortunately true to say that nothing beats the real thing in finding out how real-life incidents can be dealt with more effectively.

The OPW has published a number of documents giving advice on flood protection for householders, business and farming interests and for planning authorities which are available on www.flooding.ie and many Local Authorities include similar advice on their websites. All this is useful and readily available information but may not be reaching those likely to be affected in flood events like those of November 2009. It is clear from media reports that some people were unaware of the risk of flooding affecting their property until the flood waters were on their doorsteps, and in some cases had come inside their houses. While we live in the information age, it should not be assumed that everyone will constantly be checking their computers and reading Local Authority websites for flooding updates. One of the more obvious lessons to be learned from recent flooding events is that a more structured advance warning procedure needs to be put in place for people living in areas known to be at risk. To be effective those procedures must include defined arrangements for their initiation and for liaison with the people likely to be affected.

As it is likely to prove impractical to provide flood protection facilities for all rural areas affected by recent flooding and it will also be some years before all areas with commitments for flood protection can be fully attended to, advance warning in flood-prone areas becomes all the more necessary so people get some opportunity to attempt to minimise the effects of flooding on their property. Providing for that opportunity was the rationale used in developing the Blackwater Flood Warning Plan in the early 1980s.

(Details of the Blackwater Flood Warning Plan's development are given in a Paper presented by the writer to a Seminar organised by An Foras Forbartha in June 1987 – Bridge Collapse, Causes, Consequences & Remedial Measures – ISBN 1 85053 091 2)

Brendan Devlin, former Cork County Engineer, Co. Cork, Ireland.



Merse (salt marsh), near Caerlaverock.

Birdlife on the Scottish *Solway Coast*

By Anthony Toole

THE coastline of Dumfries and Galloway follows a tortuous route from Gretna to Loch Ryan. The direct distance is less than 150 kilometres, but the meanderings to north and south more than double this. Around a backbone of low hills, the rivers Annan, Dee, Cree, Bladnock and the waters of Urr and Fleet, as well as numerous smaller streams, have filled the valleys with alluvium. Since the retreat of the Ice Age glaciers, eleven thousand years ago, tiny particles of sand and clay have been carried incessantly from the north, and deposited where the rivers meet the weaker sea currents. And the process continues, creating an ever-shifting sequence of mud flats that extends in some places as far as 5 kilometres from the land.

South-east of Dumfries, the sands of Powfoot face across the narrowest part of the Solway Firth toward the Cumbrian coast and the mountains of the Lake District. Buried in the mud are ragworms, snails, crabs, shrimps and shellfish that in turn provide food for large numbers of birds. Throughout the year, waders such as golden and ringed plover, lapwing, curlew, oystercatcher and dunlin can be seen here. These are often joined by shelduck, and in winter, scaup.

West of Powfoot, the boundary of the Caerlaverock National Nature Reserve stretches along the coast for 14 kilometres, past the estuaries of Lochar Water and the River Nith. It then moves south to Carsethorn, before turning back east along a line some 6 kilometres out into the waters of the Solway.

Close to the land, and covered by the high tides, are large areas of salt marsh, known in this region as merse. Here, the mud has been colonised and trapped by hardy plants like glasswort. The gradual build up of sand and silt allows the establishment of other salt-tolerant species that include thrift, sea aster and sea spurrey. Where the tideline has been pushed back, grasslands are able to develop behind the merse.

Caerlaverock was declared a National Nature Reserve in 1957. It is an internationally important wintering site for ten species of waterfowl that come here in their thousands. In addition to waders are whooper swans, pink-footed geese and pintail ducks. In 1957, fewer than 1000 barnacle geese wintered here. This number has now swelled to over twenty thousand that fly to the Solway coast from Arctic Norway's Svalbard archipelago, more than 3000 kilometres away.

In one small area of merse, about 3 kilometres long by half-a-kilometre wide, wildfowl shooting is allowed under controlled conditions. Adjacent to this is an area twice as large, which is reserved as a wildlife sanctuary, and from which visitors are excluded.

Cattle graze the salt marshes and grasslands during the summer. This is important, as it keeps the vegetation short and so aids the feeding of the geese.

The edge of the merse is the only place in Scotland where the rare natterjack toad is found. These amphibians hibernate in the sand during winter, breed in shallow pools in spring and live on beetles, worms, snails and spiders, which are plentiful during summer.

A short distance outside the reserve boundary is the Caerlaverock Wetlands Centre, which was founded in 1970 by the Waterfowl and Wetlands Trust. This covers 1400 acres and is a haven for ducks, waders, whooper swans and Svalbard barnacle geese. Birds of prey include peregrine, merlin, hen harrier and short-eared owl. In the well-equipped visitor centre, a CCTV link allows visitors to watch the progress of a family of barn owls. Pathways from there lead to a series of hides which combine birdwatching at close range with excellent views across the varying environments of farmland, pond, saltmarsh and meadow that make up the centre.

Moving west from the Nith estuary, further stretches of merse, mud and sand take one past Southerness to the more rocky headlands of Colvend and Balcary Point, where the cliffs provide nesting places for cormorants, shags, guillemots, kittiwakes, razorbills, fulmars and herring gulls.

Continuing westward, the coastline recedes again into Wigtown Bay, where, the alluvial deposits from the Cree and Bladnoch have built up another extensive region of mudflat, saltmarsh and freshwater wetland. Until the early 1970s, wildfowl shooting and fishing were carried out here without restriction. The concern of local wildfowlers and conservationists, over the deterioration in the wildlife led to the creation of what is now the largest Local Nature Reserve in Britain. Wildfowling and fishing are still allowed, but under strict control, to ensure the bay's long-term future and economic benefit to the local community.

Wigtown Bay is of international importance as a wintering site for pink-footed geese, and nationally important for pintail ducks and whooper swans. Rare fish, such as sparling and shad migrate through the bay toward their breeding grounds upriver. Waiting for them are the otters that hunt around the estuary. Behind Wigtown harbour, former fields have been turned into freshwater wetlands by the installation of sluices to control water flow. While cattle still graze here, the frequent shallow flooding encourages the feeding of waders and ducks.

A Visitors' Room in the County Buildings in the centre of Wigtown gives a comprehensive view over the bay. In spring, breeding ospreys can be watched with the aid of a CCTV link.

Continuing around the headland from Wigtown Bay is the larger Luce Bay, enclosed at its western limit by the Rhins of Galloway, a long, slim peninsula that reaches down to the Mull of Galloway, Scotland's most southerly tip. In complete contrast to the rest of the coastline, this is a region of high cliffs. In spring and early summer, upward of 2000 pairs of guillemots nest on tiny ledges, competing for space with hundreds of kittiwakes, shags, razorbills and fulmars. This is also the only part of the Galloway coast where puffins can be seen.

On the heathland above the cliffs, flowers such as sea pinks, vetches and sea campions attract many butterflies, while the nesting birds include wheatears, stonechats, twites and linnets. Dolphins, porpoises, seals and otters swim in the waters around the Mull of Galloway. Even the occasional minke whale has been recorded here.

About seven miles to the east, at the southern limit of Luce Bay, the Scare Rocks provide a sanctuary for grey seals, more guillemots and some 1000 pairs of gannets. Beyond are the deeper waters of the Irish Sea, with the Isle of Man to the south and the coast of Northern Ireland to the west, both clearly visible. On a particularly good day, even the Cumbrian coast and the hills of the Lake District may be picked out on the eastern horizon. And on these are whole new colonies of birds.

Anthony Toole, 65, Cheswick Drive, Gosforth, Newcastle upon Tyne, NE3 5DW, U.K.
E: anthonytoole@fsmail.net
W: http://myweb.tiscali.co.uk/anthonytoole

Whooper swans and other water fowl on a pond at Caerlaverock Wetlands Centre.

Whooper swans.

Wigtown Bay mud flats.

Pink-footed and greylag geese.

Salt marsh, Wigtown Bay.

Recycling of Waste Fishing Nets

THE introduction of man-made fibres to the marine sector in 1948 created a huge waste problem. Along with the various petroleum by-products, solvents and acids that has since become commonplace; disposal of fishing sector generated waste has reached enormous proportions. This waste material includes monofilament gillnet which when used irresponsibly or disposed of by means of discarding/dumping into the sea can cause irreparable damage to marine life and the surrounding environment. As an example, in the port of Dunmore East alone, the approximate cost in 2006, of disposal of fishing gear including landfill costs was in the region of €15,000. In addition, landfill operators were and still are increasingly reluctant to take this type of material due to the damage it causes to waste handling machinery.

In 2006, Bord Iascaigh Mhara (BIM), the Irish Sea Fisheries Board along with the Department of Communications, Marine & Natural Resources and PETLON UK Recycling Group initiated a state funded project (W.I.R.E.D.) based in Dunmore East whereby monofilament waste was collected, baled and eventually recycled into various products. PETLON UK had the ability to reconstitute this material into a range of useful materials for use in engineering compounds dependent on material quality. Despite a number of difficulties encountered, a total of 6,000kg of nylon waste was recovered from the industry and successfully recycled into PA35MY coloured grade nylon pellets.

In 2007, BIM decided to press forward and build on the expertise gained in the project and develop a more permanent and economical transfer centre. A dedicated baling centre was set up in Tramore, Co. Waterford and to date a total of 89,000kg of nylon waste material has been collected from the industry with approximately 30% of the volume already having gone through the recycling process in recycling plants in the UK and China. This represents a sizeable reduction in the amount of waste fishing gear being sent to landfill sites.

Photos courtesy of BIM

Removing nets from the pier.

A review of the operation suggests that it would be economically viable particularly if some small charge for transport costs were passed on that other waste materials associated with the fishing industry could also be recycled. The extension of the service offered is a very worthwhile initiative, removing as it has almost 100 metric tonnes of nylon waste material which otherwise would have gone to landfill or have been dumped at sea. There is also evidence of a change in attitude to waste disposal by the fishing industry when offered a route for recycling, which again is a positive outcome.

For more information on this project and the services provided by BIM, visit www.bim.ie

Loading the bales for transport to the UK.

Monofilament netting bales in storage at Tramore, awaiting delivery to recycling facilities.

Impact Modified Black Pellets (magnified) which can be moulded into products such as cable ties, nylon wheels, sockets etc...

Editor's Comments

It is important that BIM extend this collection of waste fishing nets to all fishing ports around our coast. If so, it could mean some fishing vessels from other countries, such as France and Spain, could also use this facility. There is some deliberate dumping of damaged gill nets off our shores, which leads to ghost fishing, whereby lost nets continue to fish and kill stocks unnecessarily. It is hoped the Irish fishing industry and the relevant local authorities will row in behind BIM's innovative project and develop it further.

PUBLICATIONS OF INTEREST

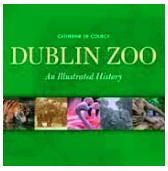
Dublin Zoo
An Illustrated History

By Catherine de Courcy,

The Collins Press
www.collinspress.com

ISBN: 9781848890084

Price: €20.00/2009



Dublin Zoo is a household name in Ireland. It attracts nearly one million visitors annually. This book traces its history, from its opening in September 1831 to the present day. In the early years the Zoo had just six mammals and seventy-two birds. The first elephant and rhinoceros arrived in 1835, with the first lions arriving in 1857 - a pair named Natal and Natalie. This began what became known as the "Irish Lion Industry", with the sales and swapping of many cubs, becoming an important factor in the solvency of Dublin Zoo in the 19th century. Throughout its history the zoo was constantly threatened by severe economic hardship yet the voluntary management council, visitors and staff somehow managed to keep it going.

In the chapter Radical Change 1980-2000, the author tells how this period was the most difficult in the Zoo's history. In the 1980s the Zoo had fallen so far behind modern zoo development it was in danger of closing and without funding could not modernise. These years of crisis shone a harsh spotlight on the operation of the Zoo, eventually lead to massive state aid of IR£15 million. This funding transformed the Zoo in all aspects, from housing for animals to facilities for visitors, all of which helped to bring the zoo into the 21st century. This book is a thoroughly fascinating historical account of this 180 year old institution.

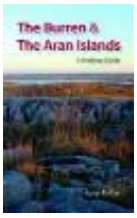
The Burren & The Aran Islands
A Walking Guide

By Tony Kirby

The Collins Press
www.collinspress.com

ISBN: 9781905172979

Price: €14.95/2009



The Burren and the Aran Islands are amongst the most distinctive landscapes in Europe. Limestone pavement abounds in these two regions. They make some of the finest walking routes in Ireland. The author describes some of the best trails these regions have to offer, assisting those that want to enjoy walking in these majestic landscapes. He outlines 15 walks, 11 in the Burren and 4 on the Aran Islands. The walks are divided into three grades to help the reader to select the walks best suited to his or her ability – casual, moderate and strenuous. Each walk has a map with the route, distance and time taken. Walks vary from two-hour strolls to the longer Burren Way, a six-hour walk from Lisdoonvarna to Ballyvaughan. There is wonderful "commentary" with detailed access information, including geology, flora and fauna, history, archaeology and folklore.

Nearly 50 years ago I spent a week of my honeymoon on Inis Oírr and always had a desire to visit the other two islands, Inis Meáin and Inis Mór. When I do, this walking guide will certainly be my companion.

The Iveragh Peninsula
A Cultural Atlas of the Ring of Kerry

Edited by John Crowley & John Sheehan

Cartographic Editor: Mike Murphy

Cork University Press
www.corkuniversitypress.ie

ISBN: 97801859184301

Price: €59.00 (hb)/2009

The Iveragh Peninsula often referred to as the "Ring of Kerry" is one of Ireland's most dramatic and beautiful landscapes. This cultural atlas comprises over fifty individual chapters and case studies from prehistoric times to the present day. The editors in their introduction tell us that "The mountains in many respects, are Iveragh's most distinctive features…. The remarkable mountain peaks, the valleys, the water filled corries, the ice-fretted crags and the narrow mountain gaps… are the legacy of a landscape sculpted by ice thousands of years ago." The book combines many different approaches to understanding the multi-layered landscapes of Iveragh. It uses a range of visual materials to assist in interpreting the story of the peninsula, wonderful photographs, paintings and archival material and as well as a series of historical and beautiful, newly commissioned, maps. The true colour landsat image of the Peninsula is stunning. The photographs are many and spectacular, especially the one at Puffin Sound, St. Finan's Bay with the purple and green banded siltstones of the Valentia Slate Formation. So all are the photographs of Skellig Michael. The masterpiece of Kenmare Lace --the Kenmare tabernacle veil is breathtaking. The industry prospered in the 19th and 20th century and went into decline around the time of World War I. This magnificent book is a wonderful achievement. It contributors include so many people: local historians, academics. One hopes at least that every school in the Iveragh Peninsula has this book in their library. The people of the Iveragh Peninsula are privileged to have such a book, highlighting the beauty and history of their area.

Newgrange

By Geraldine Stout & Matthew Stout

Cork University Press
www.corkuniversitypress.com

ISBN: 978-185918-431-8

Price: €19.95 (pb)/2008

Newgrange is the most visited archaeological site in Ireland. Every year around 250,000 people come to see this Neolithic passage tomb, which was constructed some time between 3370 BC and 2455 BC. Though Newgrange is Ireland's best known ancient site, there are many aspects of it that are not clearly understood and others that are just taken for granted. In the book, the authors present their own personal interpretation of an intricate story that is often hotly debated. It draws on the personal papers of Prof. MJ O'Kelly, the Cork Archaeologist who led the archaeological investigations in 1961, as well as incorporating the results of more recent and as yet unpublished excavations. The reconstructed quartz wall we see today is based on the professional interpretation of Prof. O'Kelly and one is left in no doubt that his views prevailed. The authors give a fascinated account of this period and also the counter view of some to those of the Professor. The authors give their understanding of various aspects of the monument, including how the three ton kerbstones for Newgrange were quarried at Clogher Head and transported by boat some thirty kilometres by water. The super carving on the many stones at Newgrange are beautifully illustrated in many photographs. It also contain a superb photograph of the winter solstice sunlight reaching the burial chamber, illuminating the innermost recess and its iconic triple spiral. One thing is certain, the book would inspire you to visit the site, if you haven't done so already.

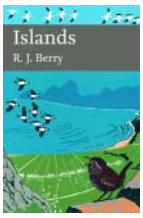
Islands
A Survey of British Natural History

By R.J.Berry

HarperCollins Publishers
www.collins.co.uk

ISBN: 978-0-00-726738-5 (PB)

Price: £30.00stg/2009



I feel in love with an island over 57 years ago, after a week's holiday, and 14 years later came to live on Sherkin Island with my late wife Eileen and our then 5 children. Two more are island born. Since those early days I have been fascinated by the history of Ireland's offshore islands and saddened and annoyed to see them being depopulated and neglected over the years. This book has been a joy to read. It is a wonderful journey through many of the islands around Britain and Ireland. The first chapter discusses various definitions of what is on the island. The author give a guesstimate of about 5,000 islands, some just isolated rocks. The main ones are listed in tables with area, height and population – Lewis and Harris is the largest with 220,020 ha.

The chapter "The Inhabitants of the British and Irish Islands: Distribution" shows how important the flora and fauna is on an island. Britain's bird islands are especially notable – some are home to 80% of the world's Manx Shearwaters, 60% of the world's Gannets, and 60% of its Great Skuas. Various other records of wildlife are highlight. [As an aside, the islands of Roaringwater Bay (including Sherkin and all the other islands) now have over 640 species – the richest 10 km sq in Ireland.] The later chapters take one on a wonderful journey to the islands around Britain, such as Orkney, Mull, Bardsey, the Isles of Scilly and the Farne Islands, and onwards to the islands of Ireland. We get short but wonderful glimpses of the islands.

The island romantics, of which there are many, dream of wanting to visit many islands, but there never seems to be enough time. Well, the book should give a push to realising part of that dream.

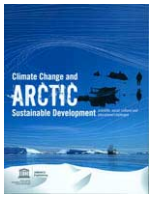
Climate Change and Arctic Sustainable Development
Scientific, Social, Cultural and Educational Challenges

Edited by Peter Bates

Unesco Publishing
www.unesco.org

ISBN: 978-92-3-104139-6

Price: €22.00/2009



This book on the Arctic has 35 papers in eight sections: "Ice Oceans and Atmosphere" documents recent trends with respect to climate change; "Biodiversity and Ecosystem Services" turns to the biological and ecosystem impacts of Arctic climate change, with a focus on monitoring and response strategies. "Community – Level Impacts and Adaptation" highlights the direct effects of climate change on local and indigenous communities; "Health and Well-being" focuses on key health issues for Arctic communities; "Economic Development and Social Transformations" examines how society as a whole will respond to a dramatic reduction in sea ice cover. "Education" places the crucial need for assessable and culturally appropriate education to generate sustainable development in the Arctic; "Ethics, Responsibility and Sustainability" asks where the weight of responsibility should be for climate change impacts and response. "Monitoring Systems" examines who monitors and manages the rapidly evolving environmental and biological and socio-cultural landscapes of the Arctic. The 35 papers each address the above issues in a short concise way and are easy to understand, especially for the lay person. Anyone interested in the Arctic and climate change should read this book.

The Three Secrets of Green Business
Unlocking Competitive Advantage in a Low Carbon Economy

By Gareth Kane

Earthscan
www.earthscan.co.uk

ISBN: 978-1-84407-874-5

Price: £16.99stg/2010

This book provides one with the three secrets of a Green Business:

1. understand the business case: be proactive, grasp the opportunity, but don't forget you are a business, not a charity;
2. follow the ecological model of sustainability, or where you can't, be eco-efficient by a factor 10;
3. take huge leaps and small steps.

The author has tried to structure this book to give one the knowledge and tools needed to create a genuinely green business. The section "Small Steps" should be a bible for any business, whether it wants to be green or not. The bottom line is that the tips will help save money and of course the environment will gain. The most telling words in this practical book must be quoted:

"It is no exaggeration to say that our natural world is in crisis. Climate change has dominated the debate in recent years, but there are plenty of other pressing environmental concerns: the hole in the ozone layer, acid rain, accumulation of toxins in the food chain, loss of biodiversity, loss of topsoil, pollution of seas, lakes and rivers and the unsustainable exploitation of renewable, but depletable, resources such as forests, fish stocks and fresh water.

The facts are staggering. If the population of the whole world were to live like citizens of the UK, we would need three planets to support that lifestyle. If we all lived like the average US citizen, we'd need five. We only have one. It is only the poverty in which the majority of humankind lives that stops the planet giving up the ghost right now. But with the economics of India and China booming, it is imperative that something is done to make human life on Earth sustainable."

This book has down-to-earth information and guidance on nearly every page. The author does not preach. It is a book that should be in every school library and is a must for businesses.

Water in a Changing World
The United Nations World Water Development Report 3

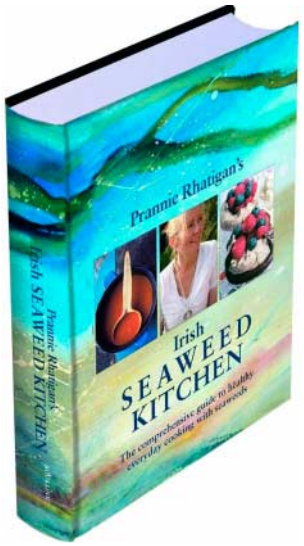
Unesco/Earthscan
www.unesco.org
www.earthscan.co.uk

Price: €45.00/2009

This report comes in two volumes "Water in a Changing World" and "Facing the Challenges - Case Studies". The Secretary General of the UN Ban Ki-moon in his foreword states "It is well known that water is life: what this report shows is that water also means livelihoods. It is a route out of poverty for individuals and communities. Managing water is essential if the world is to achieve sustainable development."

Volume 1 has four parts: They are: *Understanding what drives the pressures on water; Using Water; State of the Resources;* and *Responses and Choices*. These issues are discussed in depth in sixteen chapters, with the key messages highlighted. There is no doubt that unless the water crises worldwide are resolved they will lead to political insecurity and conflict at various levels. The report points out that the various crises in climate change, energy and food supplies and prices, as well as troubled financial markets are linked to each other and to water resources.

The case study volume compliments and compounds the analyses provided in the report by taking a critical look at the state of water resources in 23 countries. These two volumes are most important guidelines for the whole freshwater crises debate.



Irish Seaweed Kitchen

Reviewed by Matt Murphy

IN my early years on Sherkin we collected seaweed from the beach to fertilise our land. Believe it or not we also experimented with feeding it to pigs – they loved it. However, in my 40 years on the island we never used seaweed in the kitchen. This wonderful book, with its many recipes shows what we have missed. The author is a medical doctor who has been harvesting and cooking seaweed, and gardening organically, since childhood. She begins the book with a quick guide to the health benefits and culinary uses of seaweed and then goes on to show how to prepare the various species. In the first chapter Stock and Soups, she gives a basic sea and land vegetable stock which can be used for any recipe requiring vegetable stock in the book. The chapter also features delicious-sounding recipes, from "nettle soup with Alaria seaweed", to "roasted red pepper and red lentil soup" to "herb and vegetable broth with Duileasc and cheese".

The chapter on Starters and Light Lunches, includes "Memories of Sleabhac", the author's wonderful childhood memories of harvesting this seaweed. Sleabhac is described as the perfect boost to the system and a great way to help the body fight off infection during the winter months. In the chapter Salad and Vegetables, the recipes "beetroot and sea lettuce salad" and "popeye's gratin" highlight Sea Lettuce (Ulva lactuca), 100g of which can provide up to 35% of vitamin B12 for adults. What about a basic seaweed smoothie, with Alaria, banana, pineapple and honey to give a great green boost in one glass. Other chapters show that seaweed can be used in many other fascinating recipes including breads, cakes, desserts and puddings.

If you are unfamiliar with the names of the various seaweeds you can eat, the final chapter "edible seaweeds" has wonderful photographs of the various species, as well as details about where and when you can find them. The author also provides nutritional charts/range of values of each seaweed. Being a medical doctor, the author gives sound advice that the book is not intended to substitute any treatment or advice given by your medical practitioner. She also states that if you are on thyroid medication to consult your practitioner before consuming seaweed.

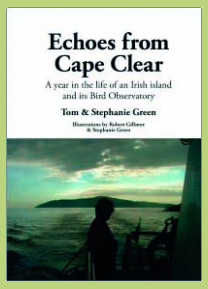

Photo courtesy of www.prannie.com

For all those who have always wanted to try cooking with seaweed, this recipe book will take the trepidation out of it. It's a beautiful publication and would make a wonderful gift for anyone interested in cooking with these natural ingredients.

Irish Seaweed Kitchen by Prannie Rhatigan. Published by Booklink (2009) and available online at www.prannie.com ISBN: 978-1-906886-22-6. Price: €35.00.

Echoes from Cape Clear

A year in the life of an Irish island and its Bird Observatory



Tom & Stephanie Green

Wren Publishing, 4 Heath Road, Sheringham, Norfolk, NR26 8JH, UK.

www.echoesfromcapeclear.com
tqgreen@homecall.co.uk

ISBN: 978-0-9542545-4-4

Price: €25.00 (inc. p&p)/2009

This book is a wonderful adventure story. It begins in 1961 when sixteen-year-old Tom Green from England and his two friends volunteered for a two-week stay at the newly established Bird Observatory on Cape Clear Island, southwest Ireland - 7 miles from Baltimore Village and 4 miles from the famous Fastnet Rock. In Chapter 2 he describes his 11-hour journey to Ireland by boat from Fishguard, being too cold to sleep, getting sea sick, travelling on the bus to Skibbereen and the various fellow travellers including two live chickens in a cardboard box.

Eventually they arrived on the island, staying in the Observatory's rented house, sleeping in ex-army camp beds with ex-army blankets. Cooking on a paraffin primus stove, mostly heating up tins of beef and veg or cooking eggs. As they were there to records the bird varieties they struck "gold" with recording Ireland's first corded Bonelli Warbler.

Over the next seven years Tom returned often to the island. He gives wonderful accounts of the work that needed to be undertaken to the now permanent observatory, which had been purchased near the North Harbour. Back home in England, Tim became a teacher and during the Easter holidays in 1967 brought a group to the island to refurbish the house. He brought his then girlfriend, Stephanie (a nurse), who was to be his soul mate and heroine. When they went to the island in late July 1968 for a 12-month stay, he was the first resident warden. Stephanie was expecting their first baby and the obstetric consultant where she was a nurse in Oxford insisted she return in October to have the baby. Somehow I doubt if he would have left her go to Cape Clear if he realised the boat journeys and the work she would undertake at the observatory – to me she was the bravest of women.

Clare was born on 9th November in Oxford and was taken to Cape Clear 5 weeks later to a house without electricity and the only running water flowed intermittently from an open spring on the hillside into an old wooden cider barrel beside the house.

I have just given a "taste" of the 12 months of many adventures this young couple spent on the island. It took courage, determination and above all a love for each other to leave city life in England and take up the challenges of living on an island, especially over the long winter period. Event today, many people that live permanent on island around Ireland's coast can find these long dark winter days difficult. It is a book for everyone, and yes to all those bird-watchers that have been to or want to visit the Cape Clear Observatory, there is much about birds also! A wonderful story of adventure.

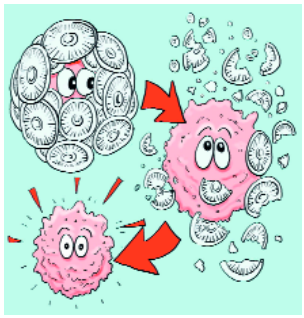
JUNIOR PAGES

What is Ocean Acidification?

The sea is a complex chemical soup containing proteins, salts and minerals – all held in balance or "buffered" between being too acid and too alkaline by naturally occurring chemical reactions. These buffering reactions allow the sea to absorb carbon dioxide from the atmosphere and the tiny plants living in the oceans to break it down into sugars to feed their own bodies and into oxygen. In fact, the sea is the largest converter of carbon dioxide to oxygen on this planet – many times more powerful than all the plants in the rain forests of South America put together.

When too much carbon dioxide (CO_2) dissolves in water (H_2O) it converts the carbonate (CO_3^{2-}) that animals and tiny marine plants use to make their shells to bicarbonate (HCO_3^-) reducing its availability for shell-building. It also releases hydrogen ions (H^+) flooding the buffering system and increasing the acidity of the seas. This is what is known as 'ocean acidification'.

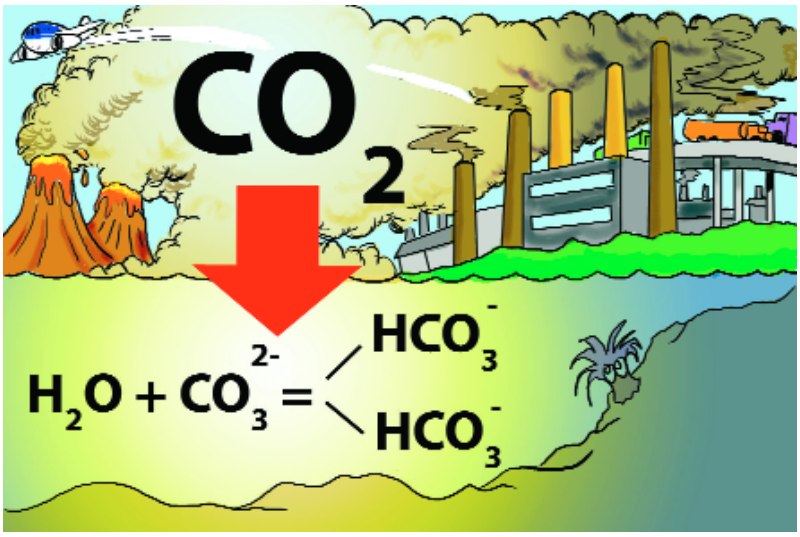
In October 2008 a meeting of distinguished marine scientists meeting in Monaco signed "The Monaco Declaration" expressing their concern about ocean acidification. One of their concerns was that ocean acidification could slow down or even stop the process whereby marine animals build their shells. The shells of marine animals are mostly made from calcium carbonate, the same material found in chalk and limestone rocks.



Calcium carbonate dissolves in acid. So if the seas become too acidic, then animals (such as the tiny single-celled coccolithophore algae *pictured on the left* or the wide range of corals, crabs, oysters, clams and shellfish of all kinds *pictured on the bottom right*) will find it much harder to build shells and protect themselves.

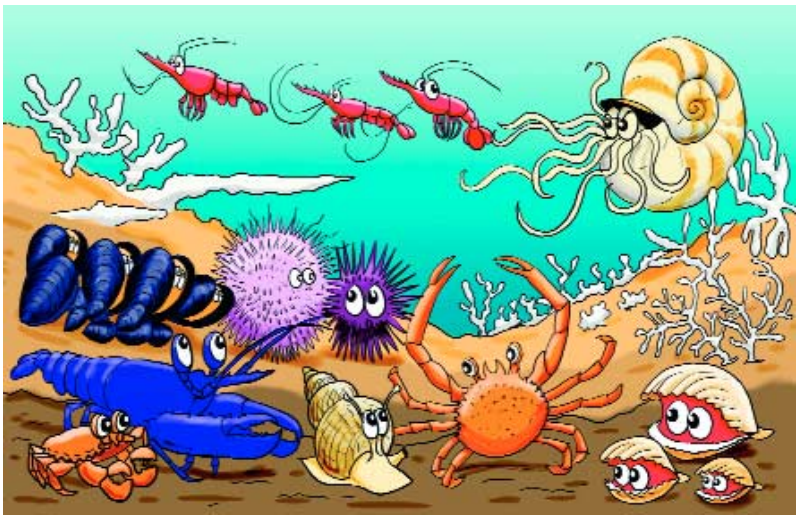
USEFUL LINKS

www.ocean-acidification.net/
http://bioacid.ifm-geomar.de
http://en.wikipedia.org/wiki/Ocean_acidification



Captain Cockle's Log

Log onto www.captaincockle.com



As yet, the oceans of the world are still alkaline, but scientists have noticed minute changes that show the seas are becoming more acidic. The Monaco scientists believe that this is due to the increased amount of carbon dioxide in the atmosphere produced by human activities such as the burning of fossil fuels such as gas, coal and petrol, although volcanoes – both above and below the sea – produce huge amounts of carbon dioxide as well.

To guard against ocean acidification, the human race needs to reduce the amount of carbon dioxide it releases into the atmosphere. You can play your part in this by using less plastic and recycling that which you throw away, by reducing the amount of petrol you use by cycling to work or using public transport, and by switching to 'clean' types of electricity generation such as wind, wave and tidal power.

Photos: © BirdWatch Ireland

By Niall Hatch

ONCE again BirdWatch Ireland is holding its National Dawn Chorus Day and this year it is on Sunday 16th May. This is the day when birdwatchers of all ages will set their alarm clocks a little earlier than usual and go out to listen to a morning of beautiful birdsong. In fact some birdwatchers will be out listening at 4 o'clock in the morning!!

But what is the dawn chorus anyway? Birds sing throughout the day, so why not just listen to them then instead of getting up so early?

You can certainly do that, but the most amazing thing about the period just before dawn is the sheer number of birds that are singing and the high volume of their songs. People who have never before experienced a full dawn chorus in a woodland park or even a well-wooded garden are often astonished by how many birds seem to be involved. You might think that you have a lot of birds in your garden or local park, but until you hear the dawn chorus you honestly have no idea how many are there. So why are the birds so busy at this seemingly unsociable hour, and why does the chorus stop once the sun has risen? Well, the most important thing to every bird is to make sure it has enough food to eat. Very early in the morning, before the sun is out, the insects and other creepy-crawlies that they like to eat are not up and about yet, and it is too dark for the birds to go looking for food anyway. They need to advertise themselves and their territories on a daily basis, so it is thought that they just get most of it over and done with at a period when it won't use up valuable feeding time. They can then use the rest of the day for foraging, perhaps with a bit of singing thrown in every now and again for good measure, just to remind everyone who's boss.


Chaffinch

Of course, that isn't the only day on which you can experience the marvel of the dawn chorus; the birds will be in full voice throughout late spring and early summer, and the best time to hear them is in the twilight period just before the sun comes up. We call this natural phenomenon a chorus because, to our ears, all the different species of birds singing their different songs at the same time sounds like a beautiful choir. As in a choir, it seems to us that each bird has its own part to play and its own melody to contribute, and it perfectly represents the harmony and balance of nature and the joys of spring.


Blackbird

The birds themselves, however, don't see it this way at all. The male birds (and in most species it is the male who does the singing) are singing to advertise that they are defending a certain patch of territory from other birds and to attract a mate by showing that they are fit and healthy and able to provide well for chicks. In fact, as far as we can tell they are completely oblivious to the sounds of the other birds around them, and what we perceive as beautiful singing is really just them shouting at the top of their voices: "Hey, look at me. This tree belongs to me, and the rest of you males better keep away. By the way, ladies, aren't I in good condition? Look at all the nice territory I own. Wouldn't I make a great dad?"

We are learning new things about the dawn chorus all the time. For example, it has long been noticed that some species of birds, such as Robins, Song Thrushes and Blackbirds, start to sing much earlier in the morning than others. In fact, it might take up to an hour and a half for birds like Blue Tits and Chaffinches to join in the chorus, but until recently no-one knew why this was the case. A couple of years ago, however, scientists realised that it was the species of birds that had the biggest eyes that start to sing the earliest, and their research indicates that this is the case with songbirds all over the world. Bigger eyes mean better eyesight in the low pre-dawn light, meaning that birds with big eyes can be on the lookout for predators and other dangers when they are loudly giving their location away to any creature that is in earshot. The birds with small eyes have to wait longer until they can see well enough to know it is safe for them to sing. Makes sense when you think about it like that, doesn't it?

Certain very common species, such as Wrens and Dunnocks, are often overlooked in parks and gardens, as their very secretive habits make them difficult to see. These birds have very distinctive songs, however, and when they participate in the dawn chorus it gives us a chance to locate them and check just how many of them there are. It is also often the case that the bird species with the dullest, drabbest plumages have the most complicated and musical songs. Brightly coloured and conspicuous birds, such as Great Tits and Blue Tits, can demonstrate how fit and healthy they are by showing off the condition of their feathers, so their songs are often quite simple and basic, serving just to identify their territory. The dull, shy birds, such as the Wren, can't do this, so they convey all this information in their complex and vigorous songs, and that is why they sound so pleasant to us humans. Perhaps the most famous songbird of all is the Nightingale, a bird that is only a very rare accidental visitor to Ireland but that is widespread in parts of Britain and continental Europe. To look at it is nothing special, just a small plain brown bird that likes to hide in thick bushes, but when it opens its beak to sing it produces a song so exquisite that it has inspired poets and authors for centuries. The most celebrated songster amongst Irish birds is probably the Blackcap, a drab member of the warbler family that, because of its beautiful song, has sometimes been called the 'Irish Nightingale'.

If you or your families would be interested in hearing the dawn chorus for yourselves, with experts on hand to tell you all about the birds that you are hearing, then why not take part in one of the free dawn chorus events (open to members and non-members alike) that are being run by BirdWatch Ireland branches across the country on 16th May? To find out details of an event near you just visit the BirdWatch Ireland website at www.birdwatchireland.ie, give them a call at 01-2819878 or email them at info@birdwatchireland.ie

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.

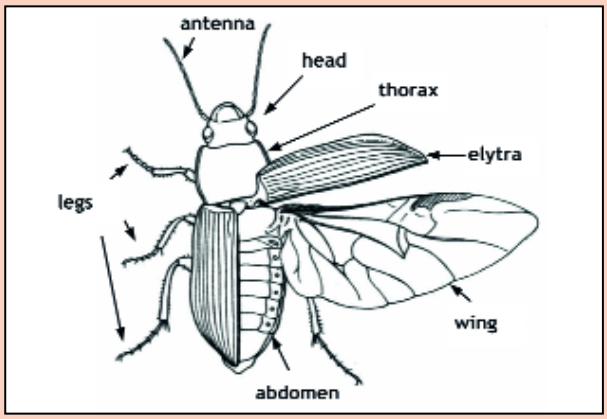
- Visit the Working with Birds web site to learn about watching and feeding birds

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

BEETLES



By Stuart Munro

Beetles are EVERYWHERE, they are to be found all over the world; from the tropical rainforests to the deserts and even in the cold arctic regions. They live in trees, on the ground (hiding under logs and stones or in the bushes), some live in the nests of bees/wasps/ants and birds, or burrow into wood and some even live in the water of ponds and rivers (but not in the sea).

Beetles have a hard outer shell, called an EXOSKELETON, they do not have bones inside them like we do. This limits the maximum size they can grow to; but there are still some very large beetles in the world. As with most insects, beetles have 3 main body sections; head, thorax and abdomen. Most beetles have 2 pairs of wings and can fly, however their wings are usually not visible because they are protected under the hard case which covers their abdomen; this covering is called the elytra and is actually made from the first pair of wings which have become hardened in beetles, these elytra then protect the more delicate flight wings from damage as they run around on the ground – sometimes the elytra are fused together in some ground beetles which are then unable to fly.

A World of Beetles

There is thought to be between 330,000 and 500,000 (or more) species of beetle in the world. New species are being discovered all the time. Try a little detective work to reveal the identity of just some of these beetles. Answers below.

a. 21 14 26 10 19 19 8 1 19

b. 15 8 11 2 10 19 19 8 1 19

c. 15 19 22 19 23 – 15 7 14 8 1 11 21 18 10 16 26 21

d. 2 26 14 25 23 21 10 19 19 8 1 19

e. 10 25 26 18 16 23 2 10 19 19 8 1 19

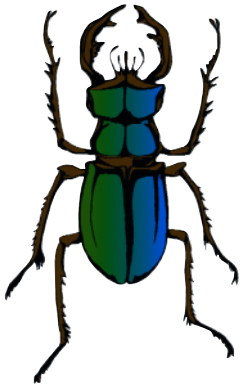
f. 26 14 15 19 17 20 11 12 19 26

g. 15 14 1 21 16 19 26 10 19 19 8 1 19

h. 24 11 8 19 26 10 19 19 8 1 19

I. 22 16 23 19 24 19 19 22 16 1

j. 2 26 19 19 23 8 16 2 19 26 10 19 19 8 1 19



A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
11	10	17	21	19	12	2	20	16	13	4	1	6	23	14	7	3	26	15	8	25	22	24	9	18	5

ANSWERS

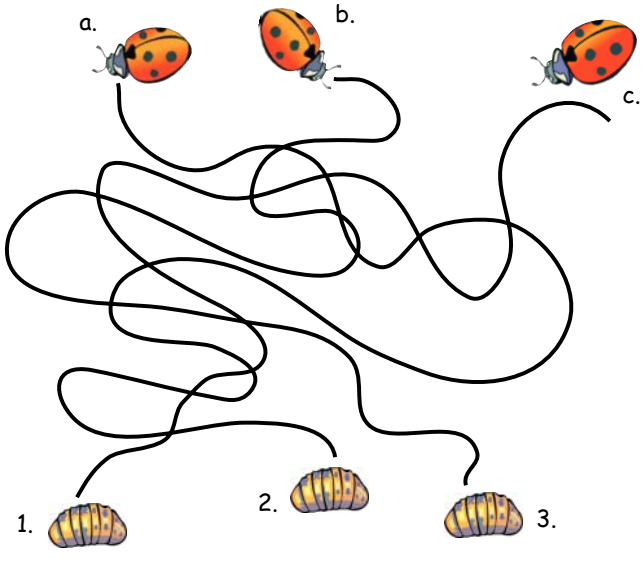
BEETLE BABIES: a=2; b=3; c=1.

A WORLD OF BEETLES: a. Dor Beetle; b. Stag Beetle; c. Seven-spot Ladybird; d. Ground Beetle; e. Burying Beetle; f. Rose Chafer; g. Soldier Beetle; h. Water Beetle; i. Vine Weevil; j. Green Tiger Beetle.

IN OTHER WORDS: cite; clip; clop; clot; coil; colt; cool; coop; coot; cope; core; cost; crop; else; epic; isle; leer; lest; lice; lips; lisp; list; loop; loot; lope; lore; lose; lost; peel; peer; pelt; pert; pest; pile; plot; poet; pole; polo; pool; poor; pore; port; pose; post; reel; rest; rice; riot; ripe; rise; rite; role; root; rope; rose; rote; sect; seep; silo; silt; sire; site; slip; slit; sloe; slop; slot; soil; sole; solo; soot; sore; sort; spit; spot; step; stet; stir; stop; teet; test; tier; tile; tilt; tire; tits; toil; tool; toot; tore; tort; tote; tree; trio; trip; trot.

Beetle Babies

The young beetles (called a LARVA), look nothing like the adult beetles and are usually not seen by us, preferring to hide under stones or burrow into the ground or dead wood where they will change first into a PUPA (quite like butterflies) and then hatch out into the fully formed adult (called an IMAGO). These larvae often look like caterpillars, and quite often eat different foods than they will as adults. Can you help the Ladybirds find their larvae? Answers below.



IN OTHER WORDS...

A Coleopterist studies beetles. How many four-letter words can you make from the word:

coleopterist

We can find 96 four-letter words. Can you find more? Why not make it even harder and find as many five-letter words as you can?

(See our list of four-letter words in the box on the left.)

Photos: © Lifetime Lab

Lifetime Lab entrance at Old Cork Waterworks.

Lifetime Lab in Cork City

By Mervyn Horgan

THE award winning Lifetime Lab is located in Cork City's Old waterworks along the scenic banks of the River Lee. Following a massive conservation project the campus was transformed into an interactive visitor centre and offers a fun and enjoyable way to learn about environmental issues and Cork's Industrial Heritage.

As you journey through the Victorian architecture exploring the machinery used in the age of steam, the history of the old water works is revealed. With Sustainable development being one of the pillars of Lifetime Lab, great care was placed during the restoration in re-using as much of the original buildings as possible, almost 80% of the materials were reclaimed and the results are evident as one explores. Keep an eye out for the miniature steam engines and images of the working conditions of the old employees.

Lifetime Lab will entertain, inform and captivate. Children investigating the interactive exhibits transform into environmental detectives, the mission is to solve clues themed around water, waste and energy and to discover how daily choices impact our world. Visitors are then encouraged to make an environmental pledge which will be on permanent display in the coffee dock.

After the hard detective work, a laneway leads visitors from the courtyard passing along the way a giant chessboard, up to the scientific themed playground and sensory garden, which provides splendid views across the river.

The main education focus of Lifetime Lab is the primary school workshop programme to promote the uptake of science, maths and engineering, over 140 schools participate each year and they will even send a bus to collect a class from the school. As well as being an accredited Discover Primary Science centre Lifetime Lab has linked up with An Taisce, Sustainable Energy Ireland and Engineers Ireland to offers briefing and training events throughout the year as well as numerous open days linked with national events such as Heritage Week, click on www.lifetimelab.ie for regular updates and events.

Due to the high demand for workshops and events, a school tour has been developed where children take on the role of water scientists and go through the stages of water treatment and conservation, identifying how much water we use everyday and also what happens when it runs out.

Besides providing information on renewable energy and energy conservation, the centre offers itself as a working example, with geothermal under floor heating, a hydro-powered electricity supply to provide green electricity from nearby River Lee, solar panels running the outdoor lighting and a windmill now installed to generate electricity to pump water as a demo model. In fact 80% of the required energy is provided form renewable resources available on site. By operating under Best practice guidelines the electricity consumption has been reduced by a further 36%,similar progress has been made in waste to landfill and water consumption.

Lifetime Lab is suitable for all interests and offers a wide range of activities catering for all ages, perfect for a family visit or any corporate event including family fun days, meetings or product launches and boasts a 1000sq ft. marquee for BBQ's and outdoor events. Keep a special eye out for our new science clubs and science camps which will operate throughout 2010.

At the exhibition "How to Save Energy at Home"

Admission to Lifetime Lab is as follows - Family €7, Adult €3, Child/Student/OAP €2 or yearly pass for €30. *Summer opening - Monday - Friday 9.00-17.00 with Saturday and Sunday 11.00-17.00*
For further information, please contact Lifetime Lab at: Tel -021-4941500 E-mail lifetimelab@corkcity.ie Web-www.lifetimelab.ie

Mervyn Horgan,
Lifetime Lab, Lee Road, Cork.
Tel: 021-4941500
Fax: 021-4941519 Email: lifetimelab@corkcity.ie

Old Triple Expansion Steam Engines at Lifetime Lab.

The playground at the Lifetime Lab.

Children finding out about energy at the Lifetime Lab.

THE AWARDS

November 2009	Cork Better Building Award 2009 - Conservation & Heritage
February 2009	Lifetime Lab receives ISO 14001 accreditation (Environmental Management System)
December 2008	Finalist National Green Awards 2008
November 2008	Cork Better Building Award 2008 - Tourism Building
October 2008	Lifetime Lab receives Vodafone Innovating Government Award
September 2008	Lifetime Lab short listed through NTR main private sector sponsor for Chambers Ireland President Award
April 2008	Lifetime Lab receives Public Service Excellence Award from An Taoiseach Bertie Ahern TD for schools science programme
June 2007	Lifetime Lab chosen as one of five exemplars of on site best practice for the European Shining Example programme.
May 2007	Lifetime Lab receives Double Gold from Cork Chamber Green Failte programme for onsite best practice covering themes such as water, waste and energy.
November 2006	Lifetime Lab short listed for REPAK Recycling Award
October 2006.	Lifetime Lab received the prestigious IVCA Clarion Award at the BAFTA headquarters in London for its positive contribution to the modern society through the development of a unique concept of a permanent interactive educational exhibition.
June 2006.	Lifetime Lab received the special award for "Best conservation/Restoration Project" from the Royal Institute of Architects in Ireland (R.I.A.I.)
November 2005.	Architects Jack Coughlan Associates and Contractors, John F. Supple Ltd. receive award in the Heritage Category of the Opus Architecture and Construction Awards for the conservation and adaptation of the complex.

25 Years of Gaisce – The President's Awards

By John Murphy

GAISCE had a humble enough target in its first year back in 1985. Back then 300 hundred was the target number of participants in the first year. That was surpassed and the numbers grew to 670 participants in 1988. In 1992 the number of participants exceeded 4,000 and today there are over 16,000 participants per year. A youth Award like Gaisce exists in 129 countries worldwide. Gaisce is recognised as one of the leading awards in the world now.

Gaisce is of course the Award of the President of Ireland. It is also known as the national challenge award for young people between 15 and 25 years of age. To earn an award participants must complete a challenge in each of four different areas of activity. They are community involvement, a personal skill, physical recreation and an adventure journey.

The idea of starting an Award like Gaisce was doing the rounds in the corridors of power for many years. In 1985, the then Minister George Birmingham (now a well known barrister) sought the assistance of an esteemed group of individuals to start the award. The group was chaired by Sir Anthony O'Reilly who was then President of Heinz. The other members included rugby legend Ray McLoughlin, Alex Spain accountant, Niall Greene (then CEO of the Youth Employment Agency), the late John Meagher and Fergus O'Ferrall (special Adviser to the Minister). Their first task was to employ John Murphy a native of west Cork as CEO. There were just two other staff in those early years – John T Murphy (not to be confused with the other John) who was in charge of Development, Training and PR and Mary Lyons who ran the office.

The late President Patrick Hillery was the first Patron of the Award. Dublin, Cork, Galway, Kilkenny and Monaghan were the initial pilot areas and President Hillery presented awards in each area. He was very happy with the development of the award as was evident in his address in Galway in 1989. "Since its inception the success of the scheme has been phenomenal" he stated.

Mary Robinson of course succeeded Paddy Hillery as Patron of the Award and she was patron during some years of rapid growth of the Award. Next we have our current Patron Mary McAleese. President McAleese spearheaded many new initiatives in the Award, most important of which was finding a formula to make the Award available in Northern Ireland, side by side with the Duke of Edinburgh's Award.

Photo: © Shane O Neill, Jason Clarke Photography

President Mary McAleese presents Gold Awards in Dublin Castle in 2003 to the Special Olympics Group from Kanturk, Co Cork.

There were many others who played an important role in its development. The late Charles Haughey was credited with coming up with the title Gaisce which is a very special word – it means 'a great achievement' or a proud moment'. The Gaisce offices are based in Dublin Castle.

Central to the success of the Award is the army of voluntary leaders known as President's Award Leaders or PALs who agree the challenge with the participants and monitor their progress. The Award is also indebted to a large group of Irish leaders and personalities who gave of their time freely presenting Awards and helping in many other ways. Gay Byrne was one of the early Award presenters and he was followed by many other well known names like Darina Allen, Adi Roche, the Saw Doctors, PJ Culligan Garda Commissioner and of course Jack Charlton. Over the years there has been almost 300,000 participants.

During the first twenty five years participants have pushed themselves to the limit and climbed some of the most challenging peaks of the world. Those achievements however are matched by equally tough challenges serving the community. It is this balance of activity that makes the Award an unselfish "rounding" experience for participants. This year as Gaisce celebrates its Silver Jubilee you can look out for lots of initiatives like a Gaisce stamp from An Post, Commemorative coins from the Central Bank and a Family Race Day in Leopardstown on Sunday May 30th.

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

Photos: © Gaisce - The Presidents Award

Majella Killeen of Mervue in Galway receiving the very first Gaisce Gold Award from President Dr. Patrick J. Hillery in 1989. Executive Director John Murphy from Aughadown, West Cork in the background.

President Mary Robinson presents a Gaisce Award to a worthy recipient.

John Murphy with Award participants at an Army Survival Training with The Defence Forces.

Nature's Web

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Produced by Sherkin Island Marine Station

All in a Day's Work

John Ball – Fisherman

PROFILE

John Ball is a fisherman and fishes out of Turk Head near Skibbereen in West Cork.

Photographs courtesy of John Ball

A Day in the Life of John Ball

What do you fish for?
I fish for shrimp, crab, lobster, pollock and mackerel – mostly with pots and fishing lures.

When is your busiest time of year?
My busiest time of the year is during the shrimp season, which is from August until late December. January to April are very quiet so there is very little fishing.

Do you work alone or is part of a team?
I fish on my own with a 21ft fibreglass boat and most of the time I fish around the islands – Sherkin, Cape Clear, the Skeams, as well as south of Baltimore Harbour. It depends on where the fish are.

Have you always wanted to be a fisherman?
I have always been interested in fishing and the sea and could never see myself being far away from it. Before going out on my own I fished on trawlers and other fishing boats for a good few years. This gave me a lot of experience.

What is a typical day like?
An average day's fishing during the shrimp season could start at 5.30am and end at 5.30pm. Sometimes the day can be shorter or longer depending how things go (weather etc.). Every day is different. Fishing for shrimp involves hauling, baiting and re-shooting 20 pot trains of gear. These trains, or lines, have a buoy attached and are anchored at each end so as to keep them from moving and tangling. After hauling and re-shooting each train, the catch is sorted and the small and undersized go back into the sea alive. The shrimp that are big enough to keep go into tank pots until the end of the day, after which time they are collected alive by a refrigerated truck and sold to market.

Is your catch collected for market each day?
Shrimp are collected mostly every day, depending on the quantity. Crab are collected once or twice a week and are usually loaded onto trucks with big tanks of sea water to keep them alive for market in France or Spain.

Do you always fish in the same area?
Shrimp pots and crab pots are set back in the same area if the fishing is good, but at times you have to find a different area. This often takes up a good part of the day. Wind, weather and tides have a big effect on all fish and where they move to on the fishing grounds.

What's the worst thing about your job?
The worst thing about my job must be the bad weather. It can make it very difficult to fish, so I can lose a lot of fishing time during the winter months. Gales and stormy weather can often cause a lot of damage to the pots and can badly tangle them up.

What is the best thing about your job?
The best about my job is that it changes every day. I like all the seasons and the different fish that come along with these changing seasons. I am fascinated by the creatures and sights that I see. Some of the unusual fish I have come across have been sunfish, trigger fish and flying fish. Most of all, I enjoy being my own boss!

Top left: A small mechanical pulley hauling in the train of pots.
Right: Lobsters and crabs waiting to be sold to market.
Bottom: A stack of pots in the boat, waiting to be shot into the sea.

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www.naturesweb.ie Spring 2010

18 issues of ***Nature's Web*** – each with 16 pages – are now available online. The Summer issue will soon be uploaded. Why not check it out?

The Cost of Environmental Protection

By Michael Ludwig

ENVIRONMENTAL MOVEMENT is a term often used for any social or political faction directed towards the preservation, restoration, or enhancement of the natural environment

I had an unforgettable discussion with a speaker at one of Matt Murphy's Sherkin Island Environmental Conferences about a decade ago. The discussion focused on the importance of environmental protection. My counterpart said that Americans had the luxury of environmental protection because they had the money to afford it. I have thought about that statement regularly. It is wrong. Luxury has nothing to do with it but money has everything to do with it.

In the United States, Rachel Carson's book *Silent Spring*, published in 1962, is often considered the start of our environmental movement. The book describes the "costs" of continuing to use pesticides that last long after they had been applied and they effected animals that are not the target of the use. Americans concluded that the environment deserved protection from these materials and got laws passed to start the process. The changes in the law cost money but the public felt their environment was worth the price. That opinion remains valid today. In both thinking and spending Americans continue to believe and fund environmental protection or improvement as their goals. Funding environmental protection has never meant more than it does in the age of excessive use of natural resources and global climate change. However, those situations are not as clear as the one Ms. Carson wrote about. These uncertainties are causing many people and governments to hesitate. But, passing laws and spending money to make changes are what governments are supposed to do.

It doesn't matter if you are the King or the help, if you are not living in a healthy environment chances are that you and others around you are going to pay dearly for problematic conditions. The earth needs environmental protection if it is going to continue to provide us with a place to live. Does that mean that humanity can live in peace with our environment and the species sharing the earth? We continue to over harvest the ocean's seafood species even as some species are relocating in response to changes in their environment. Seafood is still one of the cheapest sources of nutrition

Our environment is quite literally a single boat swirling through space. And, our "boat" has limited space (dry land covers less than thirty percent of the earth's surface). The boat passengers have embarked on a science project known as global climate change. Regardless of what the actual human input to the experiment is, the current read of the evidence indicates that the climate is changing faster than we have ever experienced and it is unlikely to return to the "good old days" anytime soon. And, sea level seems to be rising faster than expected. Does it matter who is causing the problem or only that society can make changes, is capable of doing so, and the results may lessen the results of the experiment? I'd like to think that just as petroleum changed the world, so too can the next great energy sources. We can't do that efficiently if popular opinion and funding are focused on protecting the past.

Now, just when we need to focus on making changes, the world gets pulled into a financial crisis and economic needs exceed supplies. But wait a minute, if the old ways are causing part of the problem is it wise to keep using them or is it time to discover and develop new ways to provide energy, food production, housing, clothing and a new lifestyle? The idea of change is catching on in some areas but apparently, even though sticking with the past may limit your future, there is a reluctance to change. The Obama Administration recognizes that the way forward is through change and has implemented funding to help use the environment in a more sustainable way. Unfortunately, with limited available funds and a majority of the population worried about unemployment, health care and war, the "luxury" of protecting the environment is not high on most lists of importance. The climate change discussions in Copenhagen in December revealed that situation. We often hear that change means uncertainty and differences that can be disruptive. Look at Chesapeake Bay (USA). It is being degraded by too much fertilizer. They have known this for more than twenty years but the people charged with "saving" the Bay have been unable to correct the problem. Maybe it is time that we recognize that saving these environments is likely to be difficult and costly but it could save us in the process. Is that a worthy investment?

Michael Ludwig, OCC 35 Corporate Drive, Trumbull, CT USA 068811.