SHERKIN COMMENT

Issue No. 61 Environmental Quarterly of Sherkin Island Marine Station *2016*

Wild Violet Species of Ireland

See page 7

Photograph: Common Dog-violet by Robbie Murphy

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Editorial

The Plague of Marine Debris

By Matt Murphy

BORD IASCAIGH MHARA (BIM) recently established the "BIM Fishing for Litter" programme in three ports - Castletownbere, Co Cork, Union Hall, Co. Cork and Clogherhead, Co. Louth. The idea is to encourage fishermen to collect their litter out at sea, both on board and litter that is caught in nets or drifting at sea. The response has been extremely positive and local representatives including the respective Harbour Masters, fishermen, community groups and Cork County Council have become very involved.

Marine debris is a world wide problem. Fishing for Litter Scotland has been to the forefront since 2005. Since that time 800 tonnes has been removed from Scotland's seas and landed at participating ports. At present 212 boats and 15 harbours, right around the entire coastline of Scotland are participating in the scheme. 800 tonnes is the equivalent of bring more than 47 million empty drink cans ashore. The litter originates from a number of source, much from the general public.

Worldwide around 8 million tonnes of plastic enters the ocean every year. At least one million seabirds and one hundred thousand marine mammals, such as whales, turtles, dolphins die each year due to plastic pollution. They are eating the plastic and dying from choking intestinal blockage and starvation.

In the US plastic pollution causes at least 13 billion US dollars in damage every year to industries that include fishing, shipping and tourism. The reality is that 80% of marine debris originates on land most of that is plastic. The US West Coast states spend an average of $1500 per ton to clean up their beaches.

Yet every day ships throughout the world discard 5.5 million pieces of rubbish into the oceans. The problem is getting worse with just minimum attempts to reduce or even contain the problem.

In *Sherkin Comment* No. 60, Michael Ludwig wrote a very interesting and alarming article "The Pollution Story Continues". He discusses how microplastics less than 5 mm in size, that normal waste processing systems are incapable of being captured or removed from discharge streams. He explains "there are two types of microplastics: primary microplastic which are manufactured as human use materials and products and secondary microplastics which are microscopic plastic fragments results from the deterioration of larger plastic items." He points out that "the desire may be to harvest them, but substantial removable of microscopic debris from the environment is not feasible....The problem has become so pervasive that we are seeing some of the smaller particles embedded in the edible portions of the seafood we eat."

People must realise that the marine debris that enters the sea can have a "long life" or take years to breakdown:

- Fine fishing net: at least 500 years
- Plastic bottles 450 years
- Aluminium cans 80 years
- Foam cups and tin cans 50 years
- Cigarette butts 1-5 years
- Orange and banana peel up to 2 years
- Papers 2-4 weeks.

In 2014 a team of 17 NOAA Fisheries biologists in the USA undertook a 33-day mission to remove marine debris from Papahanaumokuakeea Marine National Monument in Hawaii. A World Heritage Site and one of the largest marine conservation areas in the world. In total, they removed approximately 57 tons of derelict fishing nets and plastic litter from the monument's tiny islands and atolls, sensitive coral reefs and shallow waters. In the short period the divers were in the area, the nets they pulled from the coral weighted hundreds of pounds. The divers rescued three turtles tangled in different nets.

NOAA has led this mission every year since 2006, removing a total of 904 tons of marine debris. Interesting the divers recovered two 30 foot boats at Pearl and Hermes Atoll which are suspected to have come from Japan as a result of the 2011 Tsunami.

One must remember that the recovered marine debris is from a small area, underwater. No collection was undertaken of how much plastic washes up on the uninhabited islands such as buoys, bottles, toys, flip-flops, crates and other trash.

Nearer home the environmental charity Keep Northern Ireland Beautiful carried out a 3-year study on 14 reference beaches, including Lough Foyle and Carlingford Lough. They found that the 2015 results were the worst yet. 5000 pieces of litter line every kilometre of beach. These included 1500 items of plastic, 425 drinks bottles and 180 cotton buds.

Marine debris comes ashore everyday on Irish beaches. On just three small beaches on Sherkin there are always some items being washed up on the strandline – piece of fishing nets, ropes and net cords, large and small pieces of plastic. Thankfully local volunteers help to collect this debris. If you go for a walk on your local beach why not slip a shopping bag into a pocket and when your walk is done fill the bag with marine debris and take it home for disposal. Your good deed may be the cause of saving the life of some marine animal. Indeed why not organise a small family get together for an hour at an nearby beach for a marine debris clean up. So often one hears "it the County Council's job". Well it is not because they would need an army of people to keep our beaches clean and the cost would be prohibitive. One can remove plastic from a beach today and the next day strong winds arrive and bring with it more debris. there is no end to the problem. The way to contain it is by not creating the problem, so we must reduce, reuse and recycle.

Though marine debris can be a plague in our seas and beaches, the sea does throw up many fascinating items. Recently I received an excellent book "Essential Guide to Beachcombing on the Strandline" (reviewed on page 24), which highlights many of these items. Coming across such treasures while exploring the shoreline can open a tiny window on to the world that live beyond the waves – a world that we need to respect.

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

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THE NORTHERN PINTAIL

An Elegant Duck

By Oscar Merne

PINTAILS are not the most colourful of ducks – Shelducks, Mallard, Teal, Wigeon, Shovelers, Eiders and Red-breasted Mergansers are much more attractive in that respect – but they are very elegant with their long necks and extraordinarily long central tail feathers in the adult males.

The adult male (drake) Pintail, in full breeding plumage is basically a bird of chocolate brown, white, grey and black, with a rich creamy triangular mark on each side of the ventral area. This latter character is similar to that on a drake teal. However, while these colours are somewhat dull, they do form a very distinctive pattern. By contrast, and as with many female ducks that have to protect themselves with cryptic plumage as they sit for a month or so incubating their large clutches in ground nests, the female Pintails are rather plain brown streaky birds.

The Northern Pintail (there are also southerly species of pintails) are Holarctic in their global distribution, breeding in mid-latitudes in Alaska, the Canadian mainland, USA (north and central), Iceland, Eurasia east to Kamchatka, Japan and the Philippines.

In winter few go south of the Equator, though large numbers occur in wetlands south of the Sahara Desert, and some move up the Nile Valley to the Rift Valley lakes of East Africa. In the Americas, Pintails winter in large numbers in the southern USA, Central America, and as far as northern Columbia and Venezuela. Some very large concentrations – up to several hundreds of thousands – are recorded in southern USA and Mexico.

Wetlands International has estimated the global population of Northern Pintails at c.5 million birds, about half of which are in the Americas and the remainder in Eurasia.

Of the 46 species of *Anas* "dabbling ducks", which include the Northern Pintail, only Mallard and Teal are more numerous (c.20 and 7 million respectively). To put this in perspective, there are the same numbers of people living on this little island of ours as there are Pintails on the planet, while we have three times as many cattle and sheep here.

In the Old World, it is estimated that c.60,000 are wintering in NW Europe; c.750,000 in the Mediterranean, Black Sea and West Africa; c.700,000 in East Africa; c.650,000 in south Asia; 200,000-300,000 in East Asia.

In winter, the Irish Wetland Bird Survey has estimated that only c.1,126 and 1,509 (mean and maximum) Pintail occur here nowadays. We do not have good census data going back before the 1970s, but at that time up to 1,150 Pintails occurred regularly on the Wexford Slobs alone, and the national estimate was between 3,000 and 7,000 birds. Clearly there has been a significant decrease here, for reasons unknown. Not all birds occurring in Ireland in the autumn and early winter stay through to the following spring, for of 86 Pintails ringed on the Wexford North Slob between 1973 and 2003 two were reported subsequently in Italy and on the Azores Islands in mid-Atlantic.

The main wintering sites in Ireland now are at the Little Brosna Callows (a wonderful flood plain adjunct to the Shannon Callows on the Offaly/Tipperary border), Dundalk Bay (Co. Louth), Tacumshin Lake (Co. Wexford), North Bull Island (Dublin City), the Wexford Slobs (Co. Wexford) and Lough Foyle (Cos. Derry/Donegal) – all of which regularly hold over 100 birds. The first site averages 446 Pintails, with an exceptional peak of 783 being recorded. Probably the best site where you can see and enjoy Pintails close-up is the North Bull Island, where the birds usually feed on the mudflats and saltmarshes beside the very accessible causeway from the mainland to the island.

Images courtesy of Cian Merne

The Pintail is a very rare and irregular breeding species in Ireland.

The Pintail is a very rare and irregular breeding species in Ireland, first proved nesting here in 1917. Since then it has been recorded breeding in six counties, mainly in the northern half of the country, but only in tiny numbers (1-5 pairs).

Oscar Merne retired from Ireland's National Parks & Wildlife Service in January 2004. Before he died in January 2013, Oscar wrote a number of articles for Sherkin Comment *to be published in future issues.*

A male Pintail.

The male (background) has a more distinctive colour-pattern than the female (foreground).

North Bull Island, in Dublin Bay, is probably the best site in Ireland to see and enjoy Pintails close-up.

Herring Hogs, Orcs, Pillicks and Turleyhides

A look at vernacular and scientific names of cetaceans

Image courtesy of Robbie Murphy

Bottlenose Dolphin – *Tursiops truncatus* – Deilf bholgshrónach

By Padraic de Bhaldraithe

WHILE we expect the vernacular names of animals to be different in different languages, we may be less open to the idea that within a language there may be a variety of names for the same species. In addition, a single name may be ascribed to more than one type of animal or plant. In order to avoid confusion and to have an international standard for naming flora and fauna, the system of Latin binomial nomenclature, first proposed by the Swedish scientist Carl Linnaeus, is used.

The word cetacean is derived from the Greek ketos (*cetus* in Latin) and referred originally to a large fish or shark or whale or sea monster. Two suborders of cetacean exist – the *Mysteceti* (baleen whales) and the *Odontoceti* (toothed whales). While the origin of *Mysteceti* is debated by etymologists, the basis for *Odontoceti* is simpler – meaning toothed whale. The word baleen (the plates of bristles in the whale's mouth) has the same origin as the word for whale in the romance languages – e.g. *baleine* (French), *balene* (Italian), *ballenas* (Spanish) – all from the Latin *balaena*.

The derivation of the English word whale is different – it arrived from the Proto-Germanic language via Old English. The word *míol* is a very general term for an animal in the Irish language and is included in the names for a variety of fauna from a midge to a whale. *Míol mór* is the commonly used modern Irish word for a whale, but the words *blaoch* and *bléidhmhíol*, are also found in dictionaries.

The right whale was so named because they were the right whales for the old whalers to hunt (easy to hunt and floated when harpooned) and was not an anatomical description of any kind. There is only one species in Irish waters to which this name refers – *Eubalaena glacialis*. *Eu* in Greek means good or right and glacialis means 'of the ice', referring to their habitat. The Irish names for the different species of whales are of relatively recent origin. In the Whale Fisheries Act of 1937 the right whale is referred to as *míol mór ceart*, in H & H[1] it is referred to as *fiormhíol mór na Bioscáine* and the official standard name is *ceartmhíol mór*[2]. A variety of names for the right whale occurs in other languages; the French call it *la baleine des Basques* amongst other names – the Basques were renowned for hunting this whale.

The fin, blue, sei, minke and humpback whale belong to a group of whales called rorquals. The word rorqual derives from the Norwegian word *røyrkval*, meaning "furrow whale", the furrows being the longitudinal folds of skin under the lower jaw[3]. The humpback whale, *Megaptera novaeangliae*, got its name from its habit of arching its back before diving. *Mega* (huge) and *pteron* (wing) refer to its long pectoral fins and *nova* (new) and *anglia* (England) refer to the east coast of the USA where it was common. The Irish *dronnach* means hunchbacked, hence its name *míol mór dronnach*. The fin whale *Balaenoptera physalus* got its name from *balaena* and *pteron* (wing – the dorsal fin) and *physalus* derives from the Greek for bellows, referring to the blow of the whale. The Irish name is *droimeiteach*, from *droim* (back) and *eite* (fin). The blue whale's scientific name is *Balaenoptera musculus*, but the meaning of *musculus* is unclear. It is *míol mór gorm* in Irish. Another member of the genus *Balaenoptera* is the sei whale *Balaenoptera borealis*, the species name meaning northern. Sei is the Norwegian name for pollack and other names for this whale include coalfish whale, pollack whale, and Rudolph's rorqual. The black pollack or coalfish (*Pollachius virens*) is also called a saithe in English and this name came from Norwegian. The Irish name is *droimeiteach na saián*, a *saián* being a young coalfish. The minke whale is the smallest of the rorquals and is quite common on the Irish coast. Its name is believed to have come from the surname of a Norwegian whaler called Meincke. Its Latin name is *Balaenoptera acutorostrata*, the species name referring to its sharp snout and in Irish is called *an droimeiteach beag* (small dorsal-finned).

Amongst the toothed whales, the sperm whale is easily identified and well known as the whale Moby Dick in Melville's famous novel. The genus name *Physeter* has the same origin as the fin whale species *physalus* and refers to the blow, and *macro* (from the Greek for large) and *cephalus* (from the Greek for head) are descriptive of this animal. The Irish name *caisealóid* derives from the French *cachalot*, which is also an alternative English name for the sperm whale.

The standard modern Irish name for a dolphin is *deilf*, based on the Latin *delphinus*. However, there must have been a number of vernacular names for this mammal as it was commonly observed by coastal dwellers. It may have been included in a general name for dolphins and porpoises and called a *muc mhara* (a sea pig or hog), which is more specifically used for the harbour porpoise. In English, the word herring hog was ascribed to various types of cetacean, including the porpoise, the bottlenose whale, several small to medium sized cetaceans and even the fin whale. In the Annals of Ulster (under the year A.D.827) the *muca mara* are mentioned as follows; (translated from Irish): "A great slaughter of sea-hogs on the coast of Ard-Cianachta (Ferrard Barony, Co. Louth), by foreigners" [Norsemen, probably][4]. Another name used in the Strangford Lough area for the porpoise was 'pillick'. This word may have derived from the Irish *pilleog*. It appears in a treatise by a writer and poet called Aodh Mac Domhnaill who was associated with the north-eastern part of Ireland in the 19th century. His work includes the names of fish, herbs, insects, birds and other members of the flora and fauna in Irish. He talked of the *pilleog* in the same context as the *muca mara* and *míolta móra* and his belief that they were all man's friends as they drove smaller fish ashore for the benefit of the fisherman. Perhaps the *pilleog* was the dolphin. The word *pèileag*, obviously related to *pilleog*, is used in Scottish Gaelic for a porpoise.[5]

There is, however, a native Irish name in Connemara for the dolphin – neither well known nor widespread today – *scabhairneach* (pronounced something like 'scour niuch'). In H & H the name *dorad* appears as an alternative name for the common dolphin, but I suspect that this is an error transmitted from another source. The word *dorád* in FGB is glossed as a dorado, the dolphin-fish *Coryphaena* sp. – someone got fish and mammal mixed up.

As regards the species of dolphin, the beak is a feature used in identification. This beak is described as a *soc* (snout, beak) in the standard Irish names. The striped dolphin is also known as the euphrosyne dolphin, a name based on one of the Graces of Greek mythology, and a word meaning mirth or merriment. Perhaps it was based on the playful nature of these animals as they bow ride vessels and leap clear of the water. Its Latin name is *Stenella coeruleoalba*, [from Greek *steno* (narrow) and Latin *caerulo* (blue) and *albus* (white)]. The use of the word hog interchangeably for porpoise and dolphin is not surprising, as the bottlenose dolphin's Latin name *Tursiops* is based on *tursio* which means porpoise. The white-beaked dolphin is *Lagenorhyncus albirostris* – from *lagenos* (flask), *rhyncus* (snout), *albus* (white) and *rostrum* (snout). In Irish it is called *deilf shocbhán*.

The pilot whale (*Globicephala melas* – round-headed black) is a common visitor to our coast and is still driven ashore in the Faroe Islands. It is also called the caaing whale and the blackfish. The origin of caaing is thought to be a verb denoting calling or driving (whales into shallow water)[6]. Another name for a type of cetacean is turleyhide. A history of Dublin describes how 'a prodigious number of large sea fish called Turleyhides' went ashore at the mouth of the River Dodder in the year 1331, and how the Lord Justice, his servants and many Dublin citizens killed over 200 and distributed them among the poor starving citizens[7,8]. The most likely species to strand in such great numbers is the pilot whale, but descriptions of the size of the turleyhide (30–40 feet) would rule them out. The name grampus is ascribed to "any of various dolphins or toothed whales such as the orca". The orca is better known as the killer whale (*Orcinus orca*) and like the pilot whale is a member of the dolphin family. The origin of orca is Latin meaning large sea mammal, and *orc* in both Irish and English refers to a fabled sea monster and in Irish also a cetacean. In Irish the killer whale is called a *cráin dhubh* (black sow) or *grampar*. Grampus is also an alternative English name for Risso's dolphin as well as being the genus. A number of small whales around the Irish coast are named after various people – True's beaked whale, Gervais' beaked whale, Cuvier's beaked whale, Sowerby's beaked whale and Risso's dolphin. Our smallest cetacean is the porpoise *Phocoena phocoena*. The Latin name has the same origin as the word for a seal in romance languages – *phoque, foca, focă* and the English name porpoise comes from the French *pourpois*, which is from Latin *porcopiscus*, a compound of *porcus* (pig) and *piscus* (fish).

1 Hayden, T. and Harrington, R. (2000) *Exploring Irish Mammals.* Town House and Country House Ltd., Dublin. [An excellent book, but of the 24 Irish names of cetaceans given, 11 are grammatically incorrect]
2 www.tearma.ie
3 http://iberianature.com/britainnature/miscellaneous/etymology-of-mammal-names-in-english/
4 http://www.forgottenbooks.com/readbook_text/Annals_of_Ulster_Otherwise_Wise_Annals_of_a_a_Chronicle_1887_v1_1000707633/329
5 Faclan Nàdair, Dualchas Nàdair na h-Alba
6 http://www.merriam-webster.com/dictionary/caaing%20whale
7 Warburton, J., Whitelaw, J. And Walsh, R. (1818) *History of the City of Dublin.* Cadell and Davies, London.
8 Fairley, James (1981), *Whales and Whaling.* Blackstaff Press, Belfast.

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'that intercourse with the wild things of the woods and the wastes':

The role of nature study in Pearse's vision for education

By Brian Crowley

IN 1910 Patrick Pearse moved St. Enda's, his experimental Irish-speaking school, from Cullenswood House in the red-brick suburb of Rathmines, to The Hermitage in Rathfarnham. The Hermitage was a Georgian granite villa set in fifty acres of dramatic parkland at the foot of the Dublin Mountains. It was a much bigger and more impressive house than Cullenswood, with extensive grounds and inspiring historical associations with one of Pearse's greatest heroes, Robert Emmet. However the main reason which Pearse cited for leaving Cullenswood House was that it was *'too much in the Suburban Groove. The city was too near; the hills too far ... [it] gave no scope for that outdoor life, that intercourse with the wild things of the woods and the wastes (the only thing in Ireland that know what Freedom is), that daily adventure face to face with elemental Life and Force, with its moral discipline, with its physical hardening, which ought to play so large a part in the education of a boy.'*

From the foundation of the school, Pearse identified nature study and physical science as an *'essential part of the work at St. Enda's'*. Just as he encouraged his pupils to learn Irish by making it the everyday language of the school, he felt that the rudiments of zoology, botany and geology should be taught through direct contact with the natural world and not *'dry-as-dust teaching'*. He wanted his pupils to develop *'a real interest and love for beautiful living things'*. In the school prospectus he described how the boys were first introduced to the natural world in the school garden where they were taught *'Practical Gardening and Elementary Agriculture'* by Mícheál Mac Ruadhrí, a native Irish-speaking gardener and prize-winning story teller. Any boy who wished it was allotted a plot of ground which he was *'at liberty to plan out and cultivate according to his own taste'*. While Pearse emphasised the school's modern teaching facilities, which included both Biological and Physico-Chemical laboratories, he also stressed that the boys would learn about the natural world on *'frequently-organised outings to suitable spots within an easy radius of the School'*.

Pearse also arranged several lectures on botany and natural sciences for his pupils by eminent guest speakers. In December 1909 the botanist Helen Laird lectured the boys on plant life, and in particular on seeds and their ability to travel and colonise new territories. She brought a number of seed specimens for the boys to observe which she donated to the school museum. This museum contained *'zoological, botanical, and geological specimens, together with some illustrations of industrial processes and a few objects of historical and antiquarian interest'* and was cared for by a curator elected from amongst the student body. Many of these specimens came from the pupils themselves and the school magazine recorded donations by the boys of seashells, butterflies, dragon flies and saw-flies. All the specimens in the museum had to have met a natural end as the boys were under a solemn *'geasa'*, or obligation, not to kill *'wild things'*.

In the school garden – a gardening class at work at St. Enda's.

The lake at St. Enda's College, Rathfarmhan, Dublin.

The botanist Professor David Houston, who taught in Royal College of Science, also addressed the boys. He was a neighbour of the school in Rathfarnham and brought his own students on field trips to the woods in the school grounds. When he lectured the boys in the winter of 1910 he promised to return and bring them on a botanical expedition to the neighbouring mountains. In thanking him for his lecture Pearse accepted Houston's invitation to arrange a nature ramble and said that his *'heart throbbed at the thought of coming of spring and that tramp through the hills with Professor Houston'*.

While the historic appearance of St. Enda's Park has been maintained, the area outside its walls has been utterly transformed since Pearse's time. The *'Suburban Groove'*, which Pearse tried to escape from in 1910, now completely surrounds the park. However, it remains a haven for wildlife of all kinds and continues to play a role in educating schoolchildren about the natural world. A nature study centre, located in a building which once housed Pearse's classrooms, introduces school groups and other visitors to the rich variety of flora and fauna which inhabit the park. It draws inspiration from Pearse's words of over a century ago which continue to ring true today: *'If our boys observe their fellow-citizens of the grass and woods and water as wisely and as lovingly as they should, I think they will learn much'*

Images of Patrick Pearse in the museum.

Images courtesy of Pearse Museum

Brian Crowley, Curator, Pearse Museum, St. Enda's Park, Grange Road, Rathfarnham, Dublin 16.

St.Enda's, the school formerly run by Patrick Pearse, is now a museum set in beautiful grounds. Managed by the Office of Public Works, attractions include a permanent exhibition on the life and times of Patrick Pearse, a gallery of Willie Pearse's sculpture, a nature study room with attractive displays and the house rooms which are furnished as they were in Pearse's day. Access for visitors with disabilities. St. Enda's Park is found on Grange Road, Rathfarnham, Dublin 16.

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Email: brian.crowley@opw.ie
Website: http://pearsemuseum.ie/

Opening Hours
The Park and Museum are open all year: The Museum closes over the Christmas period and the park is closed on Christmas Day.

Pearse Museum Hours:

Nov - Jan:	Mon - Sun 09.30 - 16.00
Feb	Mon - Sun 09.30 - 17.00
Mar - Oct:	Mon - Sun 09.30 - 17.30

Sundays & Bank Holidays - opens 10.00am

St. Enda's Park opening hours:

Nov – Jan	9.00am - 4.30pm
February	9.00am - 5.30pm
March	9.00am - 6.00pm
April	9.00am - 8.00pm
May – Aug	9.00am - 9.00pm
September	9.00am - 8.00pm
October	9.00am - 6.00pm

Weekends/ Bank Holidays - Park opens 10am

COP21: the Paris Climate Summit

By Alex Kirby

WHATEVER COP21, the Paris climate summit, proves to have achieved, it avoided by a country mile the disaster of its 2009 predecessor in Copenhagen. In the closing days of Paris a journalist asked a seasoned negotiator how the two events compared. "By this stage in Copenhagen people had stopped talking to each other", came the reply. "Here it's all sweetness and light."

Paris saw a huge improvement in the mood music, and that must be worthwhile. There's more chance of agreement on tackling climate change when people are listening to each other, not glowering. But you don't have to be a cynic to wonder whether at least part of the price of that amiability was a significant lowering of expectations. It's so much easier to agree when you've already shelved your disagreements.

Agreement, in any case, is not the same as action, but a prelude to it. Paris cleared the air and gave everyone a fresh chance to do what the scientists say is essential and more urgent every day: cutting emissions of carbon dioxide and other greenhouse gases and moving very rapidly to a low- or no-carbon economy.

The cause of the 20-year wrangle over how to tackle climate change is simple to describe, but appallingly difficult to resolve: how do you devise a scheme that will allow developing countries like China and India to continue to lift people out of poverty while ending their reliance on the fossil fuels which enabled the leading economies to grow rich? There are high hopes that renewable energy and new technology will let the developing world leapfrog over much of the pollution of the Industrial Revolution. Paris was an attempt to end the wrangling.

What it did, in essence, was to agree:

- to peak greenhouse gas emissions as soon as possible and achieve a balance between sources and sinks of greenhouse gases in the second half of this century;
- to keep global temperature increase "well below" 2°C and to pursue efforts to limit it to 1.5°C;
- to review each country's progress in cutting emissions every five years, after an initial assessment in 2018;
- to provide $100 billion annually by 2020 in climate finance for developing countries, with more to come in the future.

So far, so good. But only parts of the agreement will be legally binding. The national pledges by countries to cut emissions – the INDCs, or Intended Nationally Determined Contributions – are voluntary, and will remain so even when they soon shed "Intended".

The agreement acknowledges that there is a "significant gap" between the INDCs and what is actually required to keep the world safe. Among its serious flaws is its failure to tackle the ever-growing emissions from shipping and aircraft. Shipping could be improved with technology, but for aviation there is currently no reduction strategy or alternative fuel.

Some hail Paris as historic. Others say the fact that it achieved an agreement at all is its main achievement, and one which bodes well for other elusive global treaties. Many business leaders see it as a clear signal to stop investing in polluting fossil fuels. Critics shrug and dismiss it as something that has not so far prevented the emission of one molecule of greenhouse gas.

I'm not a cynic, just a sceptic. I am certainly sceptical about humanity's sense of urgency. Many people said Paris had ratcheted up the world's determination to act. That's probably true. But something else is ratcheting up too: the changes in the biosphere, the natural world, where the ravages of climate change are becoming daily clearer and more intense.

My guess is that we shall not know what Paris managed to do for another 10 or 15 years, because it will take that long to see how far emissions are falling – and how fast – and what progress the world is making in phasing out coal, oil and gas, and other sources of carbon emissions such as much intensive agriculture. And however we answer those imponderables, we shall have to weigh the answers against what is happening to the climate in the big wide world.

If you want a judgement sooner than that, there are plenty on offer. CIFOR, the Centre for International Forestry Research, for example, was judicious in a piece by Stephen Leonard in its publication Forests News, entitled *Paris Agreement: Not perfect but the best we could get:*

"As a result of this outcome in Paris, we have not 'fixed' the problem of climate change, and we are far from saving ourselves from the impacts. This Agreement is the best we could get and we need to make the most of it now, and we need to do it with a sense of urgency and in a way that is socially and environmentally sensitive. It would be safe to say that this battle was won, and it was a turning point, but unfortunately, the war is far from over and climate change continues to be the greatest challenge of our time."

There was a more enthusiastic response from a climate scientist who has worked with the UN's Intergovernmental Panel on Climate Change, Adil Najam, of Boston University, US. He was in Paris as part of Pakistan's delegation, and told Wisconsin Public Radio:

"I think the new direction is one that has less to do with government regulation and government responsibility, and more to do with innovation, with investment, and encouragement of new technology. The old world was where business essentially said climate change is not real, and were a resisting force. The new world is kind of where there is at least a part of business, sometimes a significant part of business, which is saying we could benefit from this change."

Someone who takes a far more sombre view of the outcome of COP21 is the London *Guardian's* George Monbiot. This is how he began a piece published on the day the Paris Agreement was reached:

"By comparison to what it could have been, it's a miracle. By comparison to what it should have been, it's a disaster."

He continued:

"Two decades of procrastination,

caused by lobbying – overt, covert and often downright sinister – by the fossil fuel lobby, coupled with the reluctance of governments to explain to their electorates that short-term thinking has long-term costs, ensure that the window of opportunity is now three-quarters shut. The talks in Paris are the best there have ever been. And that is a terrible indictment."

If you can't wait till 2030 to know what Paris does for the world, just remember Voltaire's words: "Men argue. Nature acts."

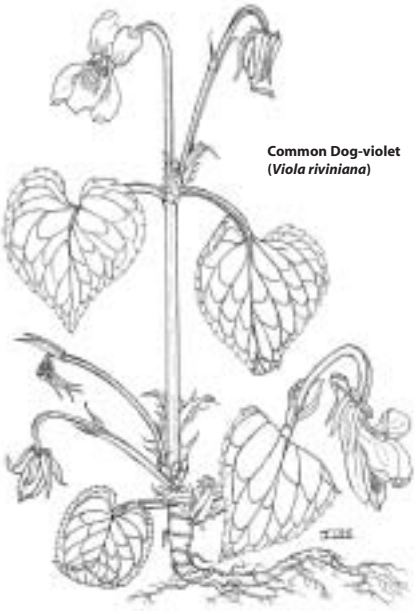
Alex Kirby is a founder editor of the Climate News Network (www.climatenewsnetwork.net).

By Tony O'Mahony

The Wild Violet Species of Ireland

FOR the nature-lover, the season of spring is an exhilarating time of year, as the hedgerows and hedge-banks of Ireland are once again bedecked with a scintillating floral display. Present here in local abundance is the beautiful Common Dog-violet (*Viola riviniana*) – one of only eight true violet species native to the Irish flora, and the most frequently encountered member of this genus in Ireland. All of our violet species produce two types of flower, namely: showy, delicate, intricately-structured spring flowers (within the violet-blue colour range) which offer both pollen and nectar to a range of visiting insects; and tiny, inconspicuous, closed flowers that appear from July onwards, are self-pollinated, and produce the main crop of seed-capsules for the plant. When mature, the seed-capsules stand erect on their stalks (pedicels), and split into three, gaping, boat-shaped valves that forcefully eject their seeds by applying lateral pressure to them. In common with many woodland plant species, the seeds of violets bear an apical, detachable, sweet-tasting appendage (an *elaiosome*) that is a favourite food of ants, who inadvertently disperse the violet seeds in the course of their foraging expeditions.

Common Dog-violet is by far the most frequently encountered violet species in Ireland, and occupies a diverse range of habitats, such as deciduous woodlands, damp pastures, rocky heathlands, mountainous terrain, calcareous grasslands, sand-dunes and hedgebanks. Moreover, while all of our violet species display some variation in appearance in response to environmental conditions, Common Dog-violet exhibits a bewildering array of morphological guises and, consequently, is a veritable 'floral chameleon'! For example, adjacent populations of this ubiquitous species often differ markedly in flower colour (pale-blue/bluish-purple/ violet) and in petal-shape, giving the erroneous impression that one is looking at two or more different violet species, rather than in actuality just a *single* extremely variable species. In stark contrast, our other seven violet species are of far more local occurrence, and exhibit much more restricted morphological, ecological and geographical ranges. Early Wood-violet (*Viola reichenbachiana*) is mainly confined to lime-rich (calcareous) woodlands and hedgebanks, where it frequently cohabits with the visually similar Common Dog-violet – a situation that results in considerable identification difficulties for botanists throughout Europe.



Common Dog-violet (*Viola riviniana*)

Top: Early Dog-violet (*Viola reichenbachiana*).
Bottom: Pale Dog-violet / Milk Violet (*Viola lactea*).

Images courtesy of Tony O'Mahony

Two further violet species favour calcareous or base-rich habitats. The nationally rare Hairy Violet (*V. hirta*) is a plant of limestone grasslands, and restricted to two widely separated regions of Ireland: the western counties of Limerick, and Clare, and the eastern counties of Wexford, Dublin and Kildare. The well-loved Sweet Violet (*V. odorata*) is most frequently encountered in base-rich woodlands and hedgebanks, and is our only scented violet species. However, the status of Sweet Violet in Ireland (i.e. whether native or naturalised) remains a bone of contention, and seems unresolvable. The blurring of its true status is in no small measure due to the fact that it was a very popular medicinal herb in cottage-gardens in past times, and frequently seed-projected from there, into nearby, semi-natural habitats. Consequently, many seemingly 'wild' populations are in actuality derived from garden-sourced seed, the initial founder-colonies subsequently expanding in area by means of vegetative runners (stolons), and distributing their seeds further afield, to create new populations.

In contrast to the above violet species of predominantly dry, well-drained habitats, two further species dwell in *marshy* sites. Of these, the locally common, usually lilac-flowered Marsh Violet (*V. palustris*) is, as its name implies, confined to wetland habitats such as marshes, bogs, and rill-margins in acidic habitats. However, in order to see the nationally rare Fen Violet (*V. persicifolia*), one must travel to the spectacular karst Carboniferous Limestone terrain on, or near, the western coast of Ireland. Here, Fen Violet has its home in the *turloughs* (i.e. saucer-shaped limestone basins that hold lakelets for at least part of each year, and which support a distinctive flora), these turloughs (and their Fen Violet companion) being distributed from the Burren region of County Clare, northwards to County Fermanagh. In this special habitat, the creeping stems (rhizomes) of Fen Violet form expansive colonies that flaunt their beautiful china-blue flowers in abundance for a brief period each year – a memorable floral spectacle.

Of the remaining two Irish violet species, the Heath Dog-violet (*V. canina*) is now of local/very local occurrence, and occupies a range of distinctive, highly contrasting, ecological habitats, namely: calcareous coastal sand-dunes, and inland lake-margins on both acidic and base-rich soils; it also occurs occasionally in montane habitats. The last of our suite of eight native violet species, is Pale Dog-violet/Milky Violet (*Viola lactea*) (see photograph) a European *endemic*, confined to the Atlantic fringe of western Europe, where it occurs in Ireland, Britain, France, Spain and Portugal. As a consequence, it is a legally protected species in the Irish Republic, where it is of rare occurrence on dry coastal/subcoastal heathlands in West Cork, Clare, West Galway, Waterford and Wexford. One of its English names, alludes to its milky-blue flowers.

As a group, Ireland's native violet species are a beautiful asset, and form part of the kaleidoscope of floral colour that is available to everyone, on visits to the countryside. Yet, accurate identification of *individual* species requires a high level of botanical skill, bearing in mind that the flowers of many violets are disconcertingly similar in appearance. This identification problem is further compounded by the fact that, excepting the Marsh Violet, the remaining seven species have the potential to interbreed, producing a range of hybrid offspring that generally are highly pollen- and seed-sterile.

Tony O'Mahony, 6 Glenthorn Way, Dublin Hill, Cork.

Cork City Council Landfill

Gas Electricity Generation at Tramore Valley Park

Images courtesy of Cork City Council

From top left, clockwise: **An aerial view of Tramore Valley Park, Cork City; Final capping works in progress at the landfill; James Goulding Senior Engineer Cork City Council, James McFadden Engineer Cork City Council , Ross McConnell Vayu Energy, Renewable Manager and Michael O' Brien, Senior Engineer Cork City Council (now retired). The electricity generation plant.**

By Michael O'Brien

Background

CORK CORPORATION and later Cork City Council operated a 70-hectare landfill site at Kinsale Road, Cork. Approximately three million tonnes of waste had been deposited on the site over the years, until its closure in 2009.

The site was granted an EPA licence in the late 1990s and this licence required the Council to manage the facility in accordance with many environmental conditions and also to remediate the site to the satisfaction of the Agency. These remediation works were completed over a period of 10 years and cost approximately €40 million. These works included:

- Collection/treatment and safe disposal of leachate and methane gas.
- Collection and safe disposal of surface water collected on site.

Landfill Gas Infrastructure and Electricity Generation

Methane gas collection is through a complex series of underground pipes and it discharges into the atmosphere following combustion at a very high temperature in a totally enclosed flare – alternatively can be used to power an electricity generator. The quantity and potency of gas has declined over the past 10 years due to the age of the waste and the capping of the site.

Prior to 2013 the landfill gas was used to generate electricity by a third party and exported to the ESB grid. For various reasons this was discontinued and the Council reverted to exclusively flaring the gas until November 2015.

The Landfill gas electricity project is now working satisfactorily and is generating 0.5 megawatt electricity. The original capacity was 1.8 megawatt.

The reduction is due to the age of the waste on site. The older the waste the less gas available for electricity generation. It is estimated that the power generated will supply the equivalent of 500 domestic houses from the grid and that the project will supply 3.5 million units of electricity to these consumers. The electricity generated on site is sold to an electricity supplier VAYU, who was chosen following a tendering process. The company chosen to maintain and operate the generation is Irish Biotech Services Limited. The income from the sale of the electricity to VAYU and an ongoing REFIT (Renewable Energy Feed in Tariff) subsidy from the Dept of Communications, Energy and Natural Resources will more than cover the capital and ongoing costs until 2020.

City Council's Energy Obligations

Cork City Council, through its operations and activities as a Local Authority, consumes large quantities of energy – approximately 30 million units of electricity, natural gas and diesel etc. The Council, like all public bodies, is required to reduce its energy consumption by 30% by 2020 i.e. by 9 million units of energy in 2020. The amount of landfill gas electricity being generated can be offset against this. In other words the Council will now have to reduce its energy consumption by 5.5 million units per annum instead of 9.0 million units per annum. Thus the project will contribute 35% of the required savings.

Conclusions

To conclude the project is fulfilling an EPA landfill gas requirement, generating a renewable energy which reduces the balance of payments deficit, assisting the Council in meeting its 2020 obligations and at the same time is cost neutral. In addition one person is employed in the project.

The Site into the Future

Another requirement for the granting of the licence was a submission from the Council of plans for the future use of the site following its remediation. The EPA accepted the proposal that the site would be converted by the Council into a multi-use amenity space for the benefit of the public. In recent years a long-term vision for the site was announced. Now known as Tramore Valley Park, the aims are to build a new exciting public space on the key themes of family leisure, adventure, attractions, culture, energy and environment. The main elements provide for an adventure play area, walking, running trails and mountain bike trails. Within the park large geo-dome structures are proposed which will provide flexible multi-use indoor facilities, such as educational programmes and events.

Some parts of the masterplan have now been constructed on the ground:

- multi-use events area on the city side of the site, to host various events such as circuses, family fun events etc..
- a grass pitch and dressing rooms.
- BMX track designed and built to international standards.
- 2,500m peripheral roadway suitable to host 5K events or longer.

These are available to the public at the moment on a limited basis and it is hoped these will be fully available later in 2016. A public civic amenity site / recycling / waste electrical centre was constructed many years ago and will remain into the future. More plans for the park will be realised over the medium term.

Compiled by Michael O'Brien, Senior Engineer with Cork City Council, who recently retired after 42 years service with Local Authorities in Cork.

Changing Ocean Conditions Affect Quality of Prey for Atlantic Salmon, Other Species

RESEARCHERS have found that changes in ocean conditions in the Northwest Atlantic during the past 40 years have altered the food web, changing the quantity and quality of important prey species. These food-web changes are thought to have influenced the survival and abundance of Atlantic salmon and many other ecologically, commercially, and culturally important species.

"Salmon are a good barometer of what is happening in the marine ecosystem," said Mark Renkawitz, a salmon researcher at NOAA's Northeast Fisheries Science Center (NEFSC) and lead author of a study on salmon foraging and the changing food web in the Northwest Atlantic published in Marine Ecology Progress Series. "They are like a canary in the coal mine. Dams and decreasing marine survival rates have been the primary drivers of the declines for many populations. In taking a closer look at the marine part of a salmon's life, we found that changes in salmon diet may be a big factor."

Atlantic salmon have a broad range, extending from the US and Portugal in the south to Canada and Russia in the north. After a freshwater phase, juveniles migrate to sea for a year or more, with North American and European salmon stocks congregating at common marine feeding areas like the waters off West Greenland during summer and fall. There, salmon feed on abundant and energy-rich prey such as capelin, a small forage fish. This diet promotes rapid growth and maturation, allowing salmon to undertake long migrations back to their natal rivers to spawn.

Changes in ocean conditions have significantly changed the quality of capelin, the primary prey for both North American and European origin Atlantic salmon feeding at West Greenland. Since the early 1970s, the North American portion of the stock complex at West Greenland has declined approximately 54 percent, and similar declines have been documented for the European stock complexes.

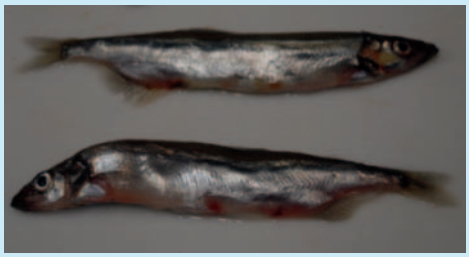
During the early 1990s ecosystem conditions changed across the Northwest Atlantic, including the waters off West Greenland. Shelf waters freshened and stratified, altering the annual seasonal distribution and abundance of phytoplankton and zooplankton. This 'regime shift', as scientists call it, affected organisms from the bottom to the top of the food web. Changes in what small planktonic organisms ate cascaded up through the food web, affecting the quality of food available to larger forage species like capelin and ultimately many other marine mammal, sea bird and larger fish species that depend on them as prey.

To understand these food web changes, researchers examined historical stomach content data, collected before the regime shift in the 1990s, and contemporary data from the contents of approximately 1,500 salmon stomach samples collected between 2006 and 2011. Both the historical and contemporary samples were collected during the commercial fishery that occurs annually off the West Greenland coast.

Results showed Atlantic salmon ate prey that varied in both type and size. Capelin and macro-zooplankton (*Themisto* sp) were the most common components of the salmon diet, followed by boreal atlantic armhook squid, sandlance and other miscellaneous fishes. Renkawitz noted that there was a distinct absence of armhook squid in the historical data and that today salmon are eating fewer capelin and more macro-zooplankton. Research suggests that Northwest Atlantic capelin are distributed differently and are physically smaller, in addition to being less nutritious prey than they were 40 years ago.

"The reduced energy density of capelin, by almost 34 percent, is likely influencing survival and productivity of eventual Atlantic salmon spawners," Renkawitz said. "Salmon may be experiencing an energy deficit and they may not be accumulating the energy reserves they need to survive, mature and migrate long distances back to their natal rivers to spawn. This may be one reason why we have seen large decreases in marine survival for this species across large portions of its native range over the past 40 years."

Tim Sheehan displays an Atlantic salmon in 2006. Credit: NOAA Fisheries



Capelin are a small, slender forage fish in the smelt family. Credit: NOAA Fisheries/Shelley Dawicki

Other studies have suggested that changes in capelin energy density and dynamics may also be partially responsible for the documented declines in the breeding success of various seabird species, growth and reproductive potential of northern Atlantic cod, and the decreasing condition of harp seals, which has also been implicated in the declining condition of polar bears.

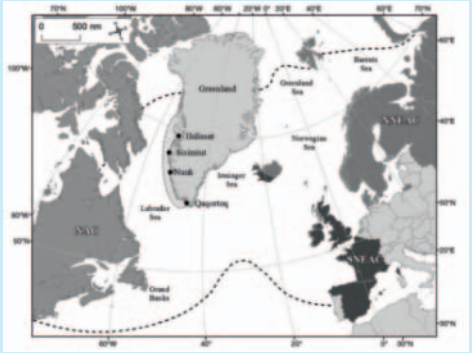
All of these species rely either directly or indirectly on capelin as their primary energy source. Capelin, and similar forage fishes like Atlantic herring, provide an essential ecological function by transferring energy from lower trophic levels to higher trophic levels, like Atlantic salmon.

"Atlantic salmon are a great indicator of large-scale changes in the North Atlantic because they integrate components of the ecosystem over a wide geographic range and their populations are closely monitored through international stock assessment efforts," said Tim Sheehan, a salmon researcher at the NEFSC and study co-author. "Identifying and understanding the mechanisms that cause changes in the food web may have implications for managing and rebuilding protected populations of Atlantic salmon. Results such as these can also help inform the dynamics of other commercial and recreational fisheries globally and will hopefully result in better management towards long-term sustainable use."

The research team on this study comprised scientists from NOAA's Northeast Fisheries Science Center in Woods Hole, Mass.; the University of Waterloo in Ontario, Canada; and the Greenland Institute of Natural Resources in Nuuk, Greenland.

For further information contact: Shelley Dawicki, Science Writer, shelley.dawicki@noaa.gov Northeast Fisheries Science Center Research, Communications Branch, 166 Water Street, Woods Hole MA 02543, USA.

The Northeast Fisheries Science Center is the research arm of NOAA Fisheries in the region. The Center plans, develops, and manages a multidisciplinary program of basic and applied research to: (1) better understand living marine resources of the Northeast Continental Shelf Ecosystem from the Gulf of Maine to Cape Hatteras, and the habitat quality essential for their existence and continued productivity; and (2) describe and provide to management, industry, and the public, options for the conservation and utilization of living marine resources, and for the restoration and maintenance of marine environmental quality.



Dashed lines indicate approximate marine distribution of the three Atlantic salmon stock complexes. Dots indicate collection locations for salmon fishery and stomach samples; diagonal lines indicate area of historical collections. Credit: NOAA Fisheries/Justin Stevens

Cork County Council Environmental Awareness Strategy 2016–2020

By Dr Mary Stack
Senior Scientist

Key Objectives in the Strategy

1. Climate Change
2. Sustainable Living
3. Anti-Litter Awareness
4. Water Conservation
5. Protection of Our Freshwater & Coastal Environments
6. Protect Our Biodiversity
7. Research
8. General Education and Awareness

THE EU's environment policy is termed The 7th Environment Action Programme (EAP) and is valid until 2020. It aims that as EU citizens we live well within the planet's ecological limits and that our prosperity and healthy environment stem from an innovative, circular economy where nothing is wasted. It aspires to being a society where natural resources are managed sustainably and biodiversity is protected, valued and restored.

The objective of Cork County Council's Environmental Awareness Strategy is to promote environmental awareness in all societies throughout all regions of Cork County. It desires to increase environmental knowledge in the general public, specifically target our youth, local communities, businesses and industry, NGOs and educators. An increase in environmental awareness can be achieved through a range of communications and by supporting community actions and behavioural change programmes. Ultimately these actions will drive our society towards an ecologically sustainable life style and sustainable work practices.

The five year strategy (2016-2020) outlines key areas of focus from climate change to sustainable living to protection of natural environment and litter pollution – areas that all require integration into education programmes. The objectives proposed in the Environmental Awareness Strategy work in harmony with other Council policies and action plans. The strategy is driven by the Council's priorities as identified in the Corporate Plan, Litter Plan and the Southern Region Waste Management Plan. Successful implementation will bring about a positive relationship between local government and civil society, a collective responsibility for our environment and an ethic of partnership building.

It will have promoted local actions that support consideration of the local environment including social and economic impacts. Citizens will be environmentally educated, more aware of their environmental impact and conscious that behavioural change is key: "Taking care of the environment is taking care of ourselves".

The strategy is a guide to the general public on key environmental awareness issues being promoted in Cork County and areas for their participation. It is intended for internal use by Council staff and its networking partners. The Environmental Awareness & Research Unit will lead the implementation of this strategy. To download the report visit: www.corkcoco.ie >Environment >

Dr Mary Stack, Senior Scientist & Environmental Awareness Officer, Environmental Awareness & Research Unit, Environment Department, Inniscarra Waterworks, Inniscarra, Co. Cork.
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1. Climate Change

ISSUE: To reverse the increase of carbon emissions in the provision of Cork County Council public services. Lack of awareness in the general public as unknowing contributors to increasing global carbon emissions.

STRATEGY OBJECTIVES

- To assist in the provision of public awareness programmes on climate change.
- To assist with the implementation of the National Climate Change Strategy in Cork County.
- To participate in EU lead research and action programmes at local community level.
- Through regulatory actions, via planning and licensing policies and authorisations, the Council will promote a sustainable society in Cork County and implement national targets for climate change reduction.
- The Council shall reduce CO_2 emissions from Council owned public buildings and promote the use of renewable energy sources and in the delivery of services.
- Disseminate information regarding best practice e.g. in relation to climate change actions and support demonstration projects undertaken by the community / NGO groups / stakeholders.
- Provide energy awareness, green circular economy information and assistant to the public via the Council's Environment Directorate and in partnership with government agencies.

Promoting sustainable travel at work *(Photos Dr Mary Stack)*

Promoting awareness on energy conservation and climate change initiatives.
(Photos Billy Magill & Dr Mary Stack)

2. Sustainable Living

ISSUE: To assist with the implementation of EU and National policies on waste management and supporting measures through which Ireland will make the further progress necessary to become a sustainable society, with a clear focus on resource efficiency and the virtual elimination of landfilling of municipal waste.

A Guide to Managing Your Household Waste & Domestic Water Usage

STRATEGY OBJECTIVES

- Promote the waste hierarchy of waste avoidance and elimination.
- Encourage and support the recovery and reuse of waste.
- Promote the use of repair and reuse stores.
- Promote the use of online exchange networks for the reuse of goods e.g. www.GiveorGet.ie for households, SMILE Exchange for businesses.
- Assist in educating the public, Council staff and commercial entities in waste minimisation, substitution of harmful chemicals, diversion of hazardous waste streams and the correct separation of waste, including food waste.
- Promote upcycling through the Council's "Pride in the Community School Garden Competition" run by Cork Federation of Muintir na Tire.
- Promote energy and water conservation practices.
- Promote smarter travel to work and life events.
- Promote the preparation and use of maps displaying sustainable services / facilities in towns and villages.

May is compost awareness month and is acknowledged via an exhibit in County Hall.
(Photo Dr Mary Stack)

3. Anti-Litter Awareness

ISSUE: Litter is present along rural and urban roads, foreshores, amenity parks and most areas utilized our residents and visitors. Along with the unsightly visual affect, litter is polluting our environment and poses health and safety issues.
A pet faeces deposit in a public place is an aesthetic nuisance and spoils our enjoyment of the environment. It is also a health hazard to the public and is seen as a significant environmental problem. Pet fouling in public places is a breach of the Litter Act.

STRATEGY OBJECTIVES

- Increase awareness of the problems associated with litter.
- Support the education of our children on anti-litter initiatives via the Green Schools programme.
- Municipal District Councils to work in partnership with local community organisations e.g. Tidy Towns groups, encouraging neighbourhood cleanups and reporting of illegal dumping and participation in the Council's Anti-litter Challenge initiative for towns and villages.
- Encourage day trippers to beaches, parks and public places to take their rubbish home and their participation in non government organisation programmes e.g. Leave no Trace and Clean Coast.
- Support national initiatives on chewing gum pollution.
- Increase the public's awareness of the problems associated with pet fouling.
- Increase awareness on the use of pet faeces disposal bins provided by Municipal District Councils and the County Council.
- Encourage pet owners to collect and correctly dispose of faeces. Encourage the use of *any bag and bin* policy.
- Encourage responsible pet ownership.
- Encourage participation in awareness programmes e.g. Green Dog Walkers.

Green Schools Award for Litter Prevention.
(Photo Billy Magill)

Green Dog Walkers anti-litter campaign promoting behavioural change and raising awareness of dog fouling as a litter offence. *(Photo Billy Magill)*

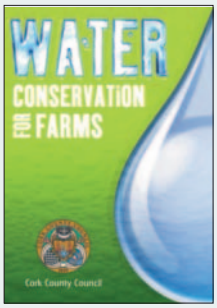
National Spring Clean Launch with the assistance of Glounthaune Tidy Towns. *(Photo Billy Magill)*

4. Water Conservation

ISSUE: Water is a finite resource and vast quantities of treated purified water are needlessly wasted. A conservation awareness programme is needed across all sectors of society in Cork County. A greater appreciation for this finite resource as a necessity for life is required. Water for potable consumption must meet strict EU standards. To prepare, store and distribute water to the end user incurs a cost. The 'user pays' principle addresses this associated cost.

STRATEGY OBJECTIVES

- Education, information and public awareness initiatives are essential in the support of water source management and potable water conservation.
- Promote the reporting of leaks to the local authority (service provider for Irish Water in Cork County).
- Promote education programmes on the sustainable use of water in all sectors.
- Support the water conservation module of the Green Flag Programme in schools.
- Support the EPA's BeGreen suite of activities and programmes for the commercial sector.
- Promote sustainable recreational waterborne sporting activities.
- Support Global Action initiatives on sustainable practices in the home.
- Promote rainwater harvesting.
- Encourage sustainable gardening practices.



Water Conservation Guide for Farms.

Water purification plant in Cork County.
(Photo Dr Mary Stack)

Measuring flow rates in school taps.
(Photo Dr Mary Stack)

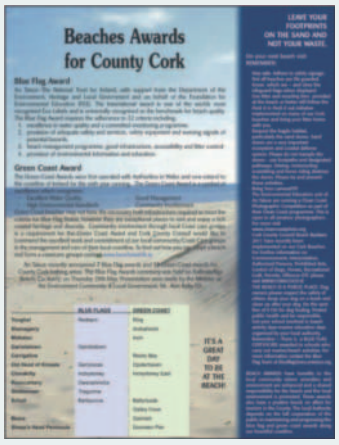
5. Protection of Our Freshwater & Coastal Environments

ISSUE: The lack of awareness of the frailty of our water ecosystems, its vulnerability to pollution and the requirement to protect aqua wildlife habitats and abstraction sources for drinking water supplies, is evident across all sectors of society.
Nutrient enrichment causing eutrophication is a significant threat to Cork's rivers and some coastal areas.

STRATEGY OBJECTIVES

- Support the public participation in awareness-raising programmes and initiatives.
- Support the EPA river water management plans of the South West River Basin District and the Local Authority Water and Communities Office (LAWCO).
- Promotion of water protection measures that can be undertaken on farms, in businesses and commercial sectors.
- Promote the reporting of pollution incidents to the Local and Harbour Authorities and Fisheries Board.
- Promote the correct disposal by householders of hazardous household and gardening chemicals.
- Promote pollution awareness initiatives and voluntary accreditation schemes, for clubs / individuals and commercial entities, where water is used by them for recreational purposes.

Segregation of marine waste in Union Hall Harbour. *(Photo Dr Mary Stack)*



Promoting our Blue Flag Beaches.

Highlighting the impact of marine pollution.
(Photos Billy Magill & Dr Mary Stack)

6. Protecting Our Biodiversity

ISSUE: Lack of awareness of the impact of our citizen's daily actions on their local ecosystem-environment and the threat of habitat lost from their locality.

STRATEGY OBJECTIVES

- Promote the development of local biodiversity initiatives in the Council's biodiversity plan through partnership and support of community groups and other local organisations.
- Promote education, information and public awareness initiatives which support local biodiversity actions.
- Promote the reporting of alien species to the National Parks & Wildlife Service, National Roads Authority or Local Authority.
- Promote the All-Ireland Pollinator Plan 2015-2020.
- Support the biodiversity module of the Green Flag Programme in schools. Promote the improvement of wildlife habitats in schools and increase their awareness of invasive alien species.
- Support NGOs and Local Enterprise Offices in community awareness events and actions, on biodiversity and invasive alien species.
- Promote sustainable recreational land, air and waterborne recreational activities.
- Support initiatives to reduce the use of chemical herbicides and pesticides in the environment.
- Encourage sustainable gardening practices.
- Provide guidance documents on biodiversity-friendly land management practises, such as the control of invasive species and hedgerow management.

Left: Pesticides have a negative impact on wildlife. *(Photo Dr Mary Stack)* ***Right: Japanese Knotweed requires professional intervention to halt the spread of this non-native invasive species.*** *(Photo Robbie Murphy)*

7. Research

ISSUE: Environmental Awareness and Research Unit shall develop and disseminate innovative and effective research programmes that will provide assistance to the Council, the Directorate and our customers. To participate and support Regional, National and EU research proposals in line with Corporate policy.

STRATEGY OBJECTIVES

- Engage in EU research programmes such as the EU Strategy on Adaptation to Climate Change.
- Participation in Ireland-Wales Co-operation programme in support of the Adaptation of the Irish Sea and coastal communities to climate change and promoting climate change adaptation, risk prevention and management.
- EU Marine Strategy Framework Directive (MSFD) shall be supported in the implementation of research initiatives for local solutions of marine litter.
- As a member of the EPA's Local Authority Prevention Network (LAPN), develop new methods to make communities more sustainable.
- Encourage partnerships with associates in academia, state agencies, research institutions, the business sector, non-governmental organisations and other local authorities in both in Ireland and EU states.

8. General Education & Awareness

Many actions can be employed to educate and raise environmental awareness in the community. These actions will empower people to participate effectively in democratic change towards a better environment for all. Recognition on the complexity of environmental issues will be realised and the need to develop solutions collectively accepted. In environmental education everyone has something to learn and something to contribute.
Regular interaction with community groups and other relevant stakeholders is required to promote local environmental projects and local initiatives. It is important to mobilize and build on learner's knowledge and competencies.
Financial support via grants schemes for projects / initiatives is key in assisting with community awareness-raising and for the promotion of a positive benefit on their local environment.
Sponsorship of such events and programmes will increase the public's focus on climate change and adaptation strategies. Some examples of which are listed here:

- Supporting the Green Flag environmental awareness programme for schools.
- Developing and disseminating educational materials e.g. water conservation guides for schools or factsheets, such as those developed by Sherkin Island Marine Station on water protection and biodiversity.
- Facilitating environmental award initiatives and local competitions, for example "Pride in the Community" by the Cork Federation of Muintir na Tire.
- Facilitating environmental talks and information seminars, directed at the general public.
- Encouraging businesses to have environmental education inhouse action days for staff and outreach initiatives with their local community.

Looking at Antibiotic Resistance Through the Lens of Biodiversity

By Martin Cormican & Dearbhaile Morris

THE diversity of life that we see, the animals, trees and toadstools is sustained by a much older diversity of invisible life that makes all of this possible. Mostly when we speak of the value of biodiversity and of the need to protect it we think of the big stuff but the balance and diversity of the little stuff is just as critical. In this article I would like to look at antibiotic resistance as a disturbance of biodiversity and to suggest that beyond the obvious fact that it makes it harder to treat infection it is an important example of how dramatically humankind can change microbial biodiversity to our own detriment.

For many millions of years before there were people, there were microorganisms. The numbers of microorganisms and the diversity of microorganisms that exist is almost impossible to grasp. Throughout these millions of years microorganisms have been competing with each other for the space and resources to live and adapting to a changing planet. This process of evolution has formed a global community of microorganisms with an astonishing diversity, resilience and adaptability. This microbial world is everywhere around us, on us, and in us. Most of the microbes in the world could not be found by old-style microbiology of growing bugs in the laboratory and so the full extent of diversity has only recently been appreciated. There are microbes that can survive boiling or massive doses of radiation or starvation for years or decades. Give them ideal conditions and a single bacterial cell may become millions within hours. They swap genetic material so that new forms of microbes are constantly developing. Some microbes in soil and water produce poisons to kill off competing microbes. In many cases other microbes produce things that inactivate or pump away particular poisons so that the poison does not work on them.

A little less than a 100 years ago Alexander Fleming and others discovered some of these microbial poisons. We call these microbial poisons antibiotics. The best know example is probably penicillin although there are many others. The wonder of antibiotics is that although deadly to many bacteria that cause disease they are much less toxic for people and animals. It is hard to understand what a miracle antibiotics were in the 1940's. People that were expected to die began to make full recoveries and go back to live full lives. In the early days antibiotics were so precious that in some cases hospitals would collect the urine of patients on antibiotics to recycle the antibiotic shed in urine. In some cases quite a lot of the antibiotic given comes out in the urine and more of it in faeces. Over the years the pharmaceutical industry developed superb systems for making large quantities of high quality antibiotics at very low cost. This means that many antibiotics, especially older antibiotics, now cost cents and are affordable to all. Low cost antibiotics help many people to live longer and better lives. Low cost also means that no one tries to recycle antibiotics from urine anymore. Now the antibiotics that are passed out in the urine or faeces go down the drain into the sewer or the septic tank. Worse still some people who forget to take their antibiotic tablets chuck them down the toilet or into a household bin. Antibiotics became so cheap and we became so casual about them that farmers under pressure to produce huge amounts of cheap meat started to use them to make food animals gain weight a little faster. They are sprayed on fruit trees, they are added to farmed fish tanks. The world now produces hundreds of thousands of tonnes of antibiotics every year for all sorts of uses and a good deal of that ends up going down the drain in human and animal urine and faeces.

Fleming and the others who developed antibiotics predicted from the early days that if people were not careful with this natural miracle the microbes would change and the antibiotics would no longer work. This is the problem of antibiotic resistance. It was clear within a few years that this prediction was right. Hospital laboratories began to find new variants of well know bacteria that were antibiotic resistant. Almost

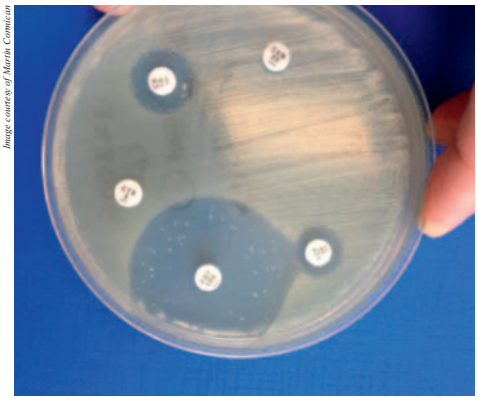


Image courtesy of Martin Cormican

This image shows bacteria growing on an agar culture plate, with the white paper discs containing an antibiotic. You can see that the surface of the plate is mostly covered with a dense growth of bacteria however there is a zone of clearance around the paper discs where most of the bacteria cannot grow. Yet within this area of clearance we can see some scattered little white islands of bacterial growth. Each of these little islands represents millions of bacteria that have grown overnight from one cell that has a genetic change, making it resistant to the antibiotic.

every new antibiotic discovered was followed by new type of bacteria resistant to the antibiotic within a very short period of time. The resistance was related to new genes that carried genetic code for resistance. Where did the resistance genes come from? In at least some cases the genes have been traced back to bacteria that never cause disease but that live in soil and water. Of course that makes sense because that's where the antibiotics come from. Once the genes got into bacteria that normally live in or on people and animals they began to spread quickly. The individual resistance genes started to link together into libraries of genes coding for resistance to many antibiotics and the libraries of genes could move easily from one bacteria to another. If a bacteria carrying resistance genes gets onto a person or animal taking antibiotics it often has a big advantage and quickly takes over and grows into billions or trillions of bacteria that come out in faeces and ends up going down the drain.

There have been a lot of studies on how antibiotics in the body of humans and animals lead to resistant bacteria and how the bacteria spread directly between people and between animals. There has been much less study of what happens to antibiotics and antibiotic resistant bacteria that go down the drains. Because there are lots of people taking antibiotics in hospitals and a lot of antibiotic resistant bacteria in hospitals we were especially interested to look at hospital sewage. We decided to look especially at one antibiotic called ciprofloxacin because, as it is important for healthcare and is widely used, there is a growing problem of resistance to it and it seems to persist in the environment. The Environmental Protection Agency funded our research group in NUIGalway and colleagues in the UCD School of Biosystems Engineering to study this issue. We were very fortunate to find hospitals and local authorities who were happy to work with us. This project would not have been possible without them.

What we found is that antibiotic resistant gut bacteria (E. coli) are present in large numbers not only in hospital sewers but are also present in general city sewage. We found that good sewage treatment processes removes most of the antibiotic resistant bacteria. We also estimated the risk for someone swimming in the sea near a sewage treatment plant of picking up antibiotic resistant bacteria that had escaped from the sewage treatment plant. Our estimate is that the risk is very low as the bacteria are diluted in sea-water however up to a 100 fold or more bacteria would be released in untreated sewage so that waters receiving untreated sewage are likely to be a much greater risk.

We also estimated that the concentration of the antibiotic ciprofloxacin that is likely to be present in hospital sewage is low because of large dilution effects. Although most city sewage treatment processes were not designed to remove ciprofloxacin it is likely that a significant part of the ciprofloxacin released is retained in the sludge in the treatment plant. In general terms we estimate that the levels discharged are not likely to be high enough to have a direct harmful effect on people but that it may be enough to give an advantage to bacteria in the environment that are resistant to ciprofloxacin. This could help to spread antibiotic resistant bacteria.

The good news then is that direct short-term harm to people from contact with antibiotic resistant bacteria and antibiotics in sewage is probably very low in places where sewage is properly treated but there are reasons for caution. Some antibiotic resistant faecal bacteria do escape into the general environment even when a sewage treatment plant is working well. Even if pick up of these bacteria by people happens rarely it may be important because once a new type of resistant bacteria gets established in one person it may be able to spread very easily to others. In relation to antibiotics in sewage our estimate is that the antibiotics may make sewage a better place for antibiotic resistant bacteria to live and may encourage growth of bacteria that pick up new resistance genes from the many different naturally resistant microbes that live in the environment.

There is wider view of this project. Many of the kinds of antibiotic resistant bacteria we are finding in sewage (and in rivers and lakes in other projects) did not exist 70 years ago. Quite apart from the risk of antibiotic resistance in health care this represents a massive distortion of the known invisible biodiversity. Given that we have such a poor understanding of microbial biodiversity we must ask what else have we done to unknown biodiversity as a result of allowing hundreds of thousands of tonnes of antibiotics enter the global environment every year? The range of substances we toss into the environment that impact on microbial biodiversity is of course much wider than antibiotics. There are many other drugs, antibacterial soaps, disinfectants, and metals such as silver and copper.

Most microbes are good for us. We cannot live without them. Our current lifestyles are changing global microbial diversity in ways that are likely to make life shorter and more miserable for many people. We should take reasonably practical steps to limit disturbance of microbial biodiversity in the general environment both in the interests of controlling antibiotic resistance and for more general environmental reasons. We need a robust national system to get people to safely dispose of unused antibiotics. Consecutive Ministers for Health or Environment have done little about this. There are emerging technologies to remove drugs and bacteria from hospital sewage, we should use them. We need to stop the growing obsession with consumer disinfectants and antibacterial soaps and antimicrobial coatings. For almost all purposes in the home and community proper cleaning is enough and in fact regular contact with harmless microbes is probably good for us.

This is not a plea for action to save microbes. It is a plea that we see the value to us of microbial biodiversity and the price we are paying for disturbing it. The microbes don't need our concern. Whatever perturbation of the microbial world we cause in the next few decades or centuries is a minor disturbance of the billions of years of infighting of the microbial world. If we destroy the environment that sustains our civilisation the microbial world will close over our tracks in blink of an eye (a couple of hundred or a couple of thousand years) and carry on as it always has.

Professor Martin Cormican and Dr Dearbhaile Morris work at the Centre for Health from Environment at NUIGalway. They have been studying antibiotic resistance for more than 10 years. The Centre for Health from Environment promotes the idea that our health and wellbeing are totally dependent on the global environment that sustains us.

Out on the Open Ocean

Image courtesy of MARMAP, SCDNR.

Marcel Reichert on board the *R/V Palmetto*, holding a speckled hind before returning it to the ocean. Speckled hind is one of the species that the SCDNR reef fish survey is monitoring.

By Marcel Reichert

THE landing at Cork airport was smooth. Before long, I was on my way to Sherkin Island. The landscape, road signs, and towns; a flood of great memories accompany me on the ride through Innishannon, Clonakilty, and Skibbereen to Baltimore. It is May of 2015, and I find myself back in Ireland after 30 years wondering why it had taken me such a long time to return. I am traveling to Sherkin Island for the celebration of Matt Murphy's birthday (a significant one, let's leave it at that) and the Sherkin Island Marine Station's 40th anniversary. In the mid-80's, it was the study of marine sponges, algae, corals, bryozoans and other organisms that brought me to Sherkin in the first place. I spent three summers conducting research that involved a lot of diving in the spectacular underwater world around the island. And of course, as one of the Marine Station's "Bods", activities also included assisting the Murphy family with the day-to-day operations of the Station. This involved, among other things, cooking meals for dozens of youngsters, transporting sheep and bales of hay in an inflatable boat from island to island, and building what is currently the Marine Station's exhibit hall and library. And of course, taking kids out canoeing, horseback riding, swimming, and introducing them to the wonderful world of rock pool ecology. I loved every minute of it and my time at Sherkin Island played a huge role in developing a broad appreciation for our natural world, and shaping me into the scientist I am today.

These days, we all face the challenges of responsible use and management of our precious resources, and in my current position at the South Carolina Department of Natural Resources (SCDNR), I am much involved in that process. While waiting for the ferry to Sherkin Island I remember a research cruise earlier in May. Standing on the back deck of the *Research Vessel Palmetto*, I was holding my first cup of coffee of the day. It is about 5am, the sun was coming up, and no land in sight. A few dolphins accompany the boat, surfing the bow waves. Several of the crew join me and we silently gaze over a slick ocean towards the rising sun. Contemplating the day's activities and catch, I am thinking "out on the open ocean, wonderful sunrise, dolphins around the boat, we go fishing and call it work; not a bad job if you ask me." We are on the Atlantic about 50 miles off South Carolina on board SCDNR's largest research vessel. Closer to shore, other members of our team conduct research on another research vessel, the *Lady Lisa*, a former shrimp trawler. They are trawling in shallow water to study population trends in shrimp, crabs, mackerels, herring, coastal sharks, rays, sea turtles and other animals.

Over ten years now I have been a fisheries scientist with SCDNR, leading a team of 30 biologists and scientists in monitoring fish populations off the southeastern coast of the US. Each year, members of our research group are at sea for 40 to 60 days during 5-10 days trips deploying fish traps, trawls, and hook and line gear to monitor populations of fish and crustaceans that are important for recreational and commercial fisheries in the region. On this trip we mostly concentrate on monitoring areas of rocky bottom with abundant growth of algae, sponges, corals, and other critters. These habitats are very popular with recreational anglers and commercial fishermen as they are home to large numbers of fish, including groupers, snapper and sea bass. We use baited "chevron" traps, arrow-head shaped fish traps equipped with under water video cameras. The fish that are caught are identified, measured and weighed, and the otoliths (or earstones), reproductive organs and other tissues are removed for later examination. The otoliths are calcium carbonate structures located in the inner ear of finfish. Rings deposited in the otoliths each year are used to determine the age of the fish, similar to how rings in trees are used. The reproductive tissues are examined to determine the sex and maturity of each fish. Many important fish species in this region are what's called protogenous hermaphrodites, meaning that they are born as females and transition to males at a certain age and size. When this transition occurs is important information for stock assessments and fisheries management, because sufficient females and males should remain in the population for healthy reproduction, securing sustainable recruitment to a viable long term fishery. The data we collect are provide to state agencies, the US National Marine Fisheries Service, and fisheries management organizations for use in stock assessments and fisheries management.

Dr Marcel Reichert, Senior Scientist, South Carolina Department of Natural Resources, Charleston, South Carolina.

Image courtesy of MARMAP, SCDNR.

Marcel Reichert and other survey staff retrieve a fish trap with a small catch of black sea bass, a common species collected in the traps.

Image courtesy of Marcel Reichert

Aerial view of the SCDNR's Marine Resources Division's laboratory and office complex in Charleston, South Carolina, with the extensive South Carolina salt marshes and the Atlantic Ocean in the back ground. The R/V Palmetto can be seen in the boat slip, ready to leave for another research cruise.

Image courtesy of MARMAP, SCDNR.

A yellowfin grouper showing "fireback" colours, a beautiful, but rare catch for the survey.

Dr. Marcel Reichert is a Senior Scientist with the South Carolina Department of Natural Resources in Charleston, South Carolina, U.S.A. He grew up in Holland where he earned his MS degree at the University of Amsterdam and a PhD from the University of Groningen. His Master's research brought him to Sherkin Island in the mid-80's, where he studied rocky subtidal communities in Roaringwater Bay. After working as a researcher at the Netherlands Institute for Sea Research for several years, he moved to the US in 1992 to continue his research at the University of South Carolina. In 2004, he started working at SCDNR, where he currently leads a group of 30 scientists and biologists involved in monitoring fish populations in waters off the southeastern US. He is also involved in fisheries management in that region and is the current Chair of the South Atlantic Fisheries Management Council's Scientific and Statistical Committee. He is an experienced SCUBA diver and his underwater explorations include several hundred dives in Irish waters, mostly around Sherkin Island. Information on his research can be found at http://www.dnr.sc.gov/marine/mrri/MARMAP and http://www.dnr.sc.gov/marine/mrri/SEAMAp/.

Nature conservation and rural development

Image courtesy of Fundația ADEPT

Sheep need pasture and in Transylvania, as over much of upland southern Europe, sheep grazing is a traditional management regime that survives and helps promote biodiversity.

By John Akeroyd

FOR twelve years I co-edited *Plant Talk,* a magazine devoted to global plant conservation. We published a wide range of conservation stories, drawing examples from every continent, but wherever one looks the problems and issues are similar. It has also become increasingly apparent to me – and I've learned a great deal more during 15 years working in Romania – that conservation requires not just the study of plant and animal biology and ecology but of sociology, politics and economics. This is especially true of farmed landscapes, not least in Europe, where traditional management practices frequently support higher levels of biodiversity than in semi-natural habitats or wilderness.

In such landscapes, maintained by pastoralism or mixed farming, it is the farmers themselves, the people who created these biodiversity-rich environments, whom we must first protect. From the outset, Fundația ADEPT, the Anglo-Romanian NGO with whom I've worked in Transylvania, put local farming communities and families centre-stage. This complex project has involved activities as varied as biological surveys, scientific and popular articles, new or restored milk-collection points, handbooks for farmers and traditional food producers, mobile phone apps and mountain-bike paths. To address sustainable rural development, on the one hand we need to conserve rich natural resources of plants, animals, habitats and soils, and on the other ensure the economic future of sometimes fragile farming communities. If they can combine the best of traditional farming with innovative technical solutions to build a prosperous economy, and to maintain substantial biodiversity, these rural communities and the landscapes they maintain should be models for development. Above all, nature conservation mustn't conflict with the aspirations of local people and, as Kenyan conservationist Mwangi Githiru has noted, "be misconstrued as a hindrance to economic prosperity, apparently disenfranchising the poor by denying them the right to improve their livelihoods."

More recently I've explored two other southern European farmed landscapes, the Cévennes in France's Massif Central and the Greek island of Lesvos in the Aegean Sea, which have both survived and prospered through careful traditional land use. The Cévennes is unspoilt Mediterranean countryside of mountains and steep river-valleys, with habitats ranging from lowland scrub and open evergreen oak woods, through chestnut-covered slopes and terraces, beech and semi-evergreen oak forests, heath and scrub up to high plateaux pastures of the Causses. For millennia the rural economy was based on the wood, nuts and flour of the chestnut trees, and sheep grazing the Causses, barren and stony but bright with wildflowers in late spring and summer, and dotted with ancient dolmens and other Bronze Age and earlier megalithic monuments. Agriculture and biodiversity survive, if a once-prosperous silk industry has disappeared.

Lesvos, now tragically in the news as thousands of Syrian and other refugees arrive there from Turkey, is a hilly island, much of it still covered with wood-pasture – mature, well-spaced trees under which livestock graze. On lower slopes, olive groves so managed have colourful spring displays of wildflowers such as orchids, anemones and other bulbs, once a feature of many parts of the Mediterranean region. In the hills semi-deciduous oaks, and higher still chestnuts, create a green, almost English countryside, all farmland of one sort or another, where even rarities such as wild peonies and yellow rhododendrons survive. Here is a remarkable glimpse of how ancient Greece might have looked, yet a landscape that still yields a living today. Although farming communities here, the Massif Central and Transylvania may seem disadvantaged in the modern commercial world, they provide invaluable land stewardship, protect biodiversity and other ecological 'goods and services', retain natural and human resources and skills, and are in a strong position to exploit market niches for quality food products. Lesvos's 11 million olive trees produce 20,000 tonnes of pale golden olive oil; one of the most notable products of the Causses is the esteemed blue-veined Roquefort cheese; while Transylvanian meadows yield prized honey, cheese, ham and other pork products. All these regions are also high quality tourism destinations, able to capitalize on their scenery, history, sense of place and local food products.

In Ireland, the wildflower-rich, limestone countryside of the Burren is an example too of a heritage landscape conserved within the framework of traditional farming in the modern world. In late October 2016, I and my colleague Nat Page from Fundația ADEPT attended an international conference in Corofin, Co. Clare, on High Nature Value Farming in Europe, part of events based around the Burren Winterage Weekend. Alongside examples from across Europe, we learned how 500 or so farming families are maintaining the Burren as a living landscape, hearing speakers and group discussions, meeting farmers, walking with them over their land and being welcomed into village festivities with food, wine, traditional music and 'Straw Boys' dancers. The famous gentians, orchids and other flowers depend on the farmers, who themselves live and work as an integral element of this special countryside. Let's hope sustainable development and enhanced rural economies may again provide a good livelihood, one linked directly to the landscape, for farming families, whether in Ireland, France, Greece, Romania or anywhere in the world.

Dr John Akeroyd, who has written and edited several books for Sherkin Marine Station, is a botanical consultant and writer whose special interest is landscape conservation in eastern Europe and the Mediterranean region.

Image courtesy of Fundația ADEPT

A sophisticated mowing-machine cutting hay near Sighisoara in Transylvania, Romania – innovative technology enables small farms to be easier, profitable and wildlife-friendly.

Image courtesy of Bob Gibbon

Traditional hay-making in Transylvania is good for wildflowers and wildlife, but is labour-intensive and often uneconomical, and lacks appeal for a younger generation.

POLYNESIA – AN OCEAN REALM

Underwater Exploration In The South Pacific

A Review by Matt Murphy

PETE ATKINSON is the author of *Polynesia - An Ocean Realm. Underwater Exploration in the South Pacific.* Pete has had a fascinating life making a living on and under the sea. He came to the marine station as a volunteer underwater photographer in 1978 to photograph the marine life in the waters of Roaringwater Bay. What intrigued me from the very start was his enthusiasm. He had built his own acrylic underwater housing for his camera, a Fujica SLR, as he had no money to buy a ready-made one. Within a few days of his arrival he said he needed a darkroom to make prints. The list of items he needed grew by the day, including Cibachrome chemicals - at the time one of the most expensive processes for developing photographs. One has to remember that in those days the Marine Station was just a few years old and had very little money but I took a chance and said okay. I made phone calls here and there and succeeded in getting the necessary items. We converted a bedroom in my home into a darkroom, which meant I had Pete on my doorstep every day. I soon learned that I was dealing with a perfectionist who was never happy with the photographs he took underwater. He always wanted to improve on what he had taken. During his time at the Station, Pete's camera became our eyes underwater and we got a real glimpse of the beauty of the marine life in the waters around Sherkin. Many of his images were part of the our Exhibitions in Cork City in the 1980s and 1990s. One of my favourite's, brittlestars on a sponge, which was taken in the waters near the Station, hangs in our office today.

Pete always talked about his dream to buy a yacht and sail to distant waters and make a career out of photographing whales, dolphins, sharks and coral. People thought he was insane but I believed he could and encouraged him to follow his dream. On graduating from college he had got a job as a technician in the zoology Department at Bangor University, North Wales, so he had a regular income. He had purchased a dilapidated wreck of a house (his words) which he completely renovated in his spare time. He sold the house to purchase a yacht, named *Eila*, which he found in Lymington, Hampshire. Having left his job in Bangor, he spent the winter working on a dredging barge at Lymington to earn money to make a few alterations to *Eila* and get her ready for her first journey.

He spent three months in the Scilly Isles accumulating photographs to submit to a photo agency. He returned to Sherkin on a few occasions in the meantime to continue his underwater photography and tell me of his plans. As his journey began he headed for Portugal with his then girlfriend and then on to the Caribbean. Always the grafter, he spent a year there earning a living before sailing on alone for Panama and the Pacific, whilst his girlfriend remained in Antigua.

His book describes his many journeys to the South Pacific Islands, with *Eila*, sometimes alone and other times with his companion Vicki Allen, whom he met in the Cook Islands. He made many improvements to *Eila* over the years, which he owned for 17 years and sailed her 45,000 miles. He gives a wonderful and most interesting description of *Eila* in Appendix 1, with beautiful photographs. In it he describes the rig, sails, dinghy, compressor and how he navigated. A timber boat, *Eila* was built in 1935 at Bursledon on the south coast of England and cost £11,000. She was 11 m on deck, 8 m on the waterline and had a beam of 2.75m and 1.7m draft. The hull was planked with pitch pine. She weighed 10 ton, had a Perkins 4.108 diesel engine and was over 40 years old when he purchased her. Elia carried 130 litres of diesel in a fibre tank but more importantly she carried a 90 litre stainless steel tank for water and 45 litres in jerrycans. He described how he gathered fresh water while at sea: *"with a roll in the main and the boom topped up we can catch a lot of rain water at sea. A funnel and tube at the gooseneck directs this straight into the tank"*.

In 1999, Pete sold *Eila* and while in New Zealand bought another boat named *Vigia*. She was a 44ft long, 24 ton aluminium yacht, hard to handle in gales. He installed a Roland electric piano, yes a piano, on her. He owned *Vigia* for 7 years sailing her about 15,000 miles.

Images courtesy of Pete Atkinson

Clockwise from top left: **Pete Atkinson in Apataki with his home-made housing for the Nikon F4 and actionfinder; From the masthead of *Eila*, Pete gets an exquisite view of Baie Hana Vave in Fatu Hiva, The Marquesas Islands; The clarity of the water at Beveridge Reef can be breathtaking; Grey reef sharks swimming around *Eila* at the sand flat at Beveridge Reef.**

The reader will find "Appendix II: Photography" like an A to Z of underwater photography. It includes the many camera housings he built - the cameras and lenses, the Ektachrome film he used and much more. In Pete's words: *"To take photos underwater you need to be perfectly comfortable underwater. Personally, I am much more at ease when I'm diving alone; a good buddy is usually a distraction, an incompetent buddy is just a nightmare."*

Every page is an adventure, whether wonderful stories of his journeys or stunning pictures of whales, sharks or dolphins or mantas. Oh to be able to visit those far away places and dive in those crystal blue waters. My favourite chapter was when he and his companion, Vicki Allen, met a spinner dolphin, whom they named Bojangles, whilst anchored at Apataki, a subgroup of the Tuamotu Archipelago in French Polynesia. They were resting on deck and they thought they saw a fish jumping about half a mile away, breaking the calm of the atoll lagoon. Through binoculars Pete saw it was a dolphin. Immediately Vicki grabbed the snorkelling gear and he his camera case and they both piled into the dinghy and drove a discreet distance from her. They both entered the water and the dolphin swam around them "bombarding them with clicks and whistles, tossing her head as though sniffing out a clearer sonic view". Then a grey reef shark appeared and they thought there would be a battle between them but no such thing. Both "were indifferent to one another; the shark more interested in the aliens - us." Over the next few days Bojangles came and went. Both she and Vicki swam together, often for a couple of hours, whilst Pete took many photos. After four days at anchor the winds increased from the southeast and they had to leave. On the final night Bojangles visited them and Vicki and Pete said their goodbyes to her.

The chapter *"The Remotest Reefs"* begins: *"Lost in the immensity of the Pacific between the Cook Islands and Tonga lies a tiny ring of coral enclosing a shallow lagoon. No trees, no islands, no land at all. Just ocean and coral beneath the endless sky."* Pete goes on to describe approaching the northern edge of Beveridge Reef where they saw two humpback whales. They entered the lagoon and anchored on the shallow sand flat. There was to the south of them a new wreck of a fishing boat from Seattle, the Nicky Lou. They *"slipped over the side for a snorkel"* and into the crystal water, which had a strange aquarium feel. Amongst the coral were many clownfish, anemones and clams, red pencils urchins, knife fish and shoals of fry and operu. Next morning as he crossed the lagoon in his dinghy he saw a huge creature, an adult whale with her calf, in about 15 m of water. When the whales moved away, with his mask he looked in the water where they had been and saw large schools of jacks and many grey reef sharks. Pete caught one of the jacks and went for a dive at a nearby reef. He put the fish carcass under a heavy piece of rock on the seabed and soon a couple of grey reef sharks turned up and he was able to take photographs. As he retreated up the slope one shark followed him and began to bother him, repeatedly making close passes quite fast. Even when he put his camera in the dinghy it came after him. As Pete said: *"The shark could probably hear my heart going boom-tiddy-boom nineteen to the dozen"*. There are over a dozen wonderful photos of sharks with this chapter and knowing Pete took most of these whilst in the water with them, confirms what I have always said to him - that he is insane for taking such risks. In the 30 years plus that I have known him, his fascination with sharks has never waned.

There is a feast of photographs in the book. The one that stands out for me is the photograph of the mother whale and her calf. In all there are over 330 images, each more beautiful than the next. Not only are they of marine life but of Pete's visits to the many islands in the Southern Pacific Ocean, places such as the Cook Islands, Society Islands, the Marquesas, the Tuamotur Archipelago and Tahiti. In Fatu Hiva in the Marquesas, where he photographed a White-tip reef shark - the famous Thor Heyerdahl spent two years many years previously and wrote one of his books on his time there.

In 2004 Pete sailed to Cairns, Queensland, Australia. There he *"changed course"*, sold the boat and married the lovely and very talented Thai photographer Darin Limsuansub. In 2010 they move permanently to Phuket, Thailand, *"where personal freedoms seemed very similar to living on a yacht."*

If one has dreams of visiting the South Pacific Islands, to leave behind the pressures of modern living - knowing of course that those dreams will never come true - then the next best thing is Pete's wonderful book of incredible photos and his interesting accounts of visits to the many islands in this special part of the world. I am so happy that he was able to follow his dream and live this idyllic life photographing the great wonders of the sea. His career has seen him become an award-winning Getty Images photographer, with his photographs having won many awards, including the Innovation Award at the 2004 Wildlife Photographer of the Year and the award for "Best British Underwater Photographer" in 1999 and 2001.

Polynesia ~ An Ocean Realm *by Pete Atkinson is now available as an ebook at www.peteatkinson.com/book US$9.99 48000 words, 339 pictures 223 pages. Signed hardcover copies, 11 x 13" landscape, weight 2kg, are available from the author for €75.00 including SAL p&p to Ireland. Email: peteatkinson00@gmail.com*

Heteractis magnifica is a symbiotic host of the pink anemonefish, *Amphiprion perideraion* Vava'u, Tonga.

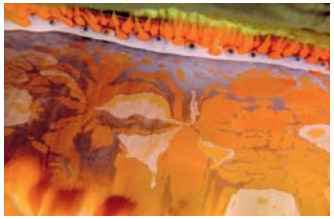
Images courtesy of Pete Atkinson

(See review on page 15)

Humpback whale, *Megaptera novaeangliae*, with its calf, in Vava'u, Tonga.

Clear ocean water is driven over the reef at the south-east corner of the lagoon in Bora Bora where Vicki feeds double-saddle butterfly fish, *Chaetodon ulietensis*.

A grey reef shark passes close overhead at Beveridge Reef.



The mantle patterns of the thorny oyster, *Spondylus varius*.

POLYNESIA – AN OCEAN REALM

By Pete Atkinson

Akamaru, Île Gambier, had an exceptionally photogenic palm tree.

Vicki points at one of the many manta rays which gather outside the pass at Fanning Island.

Bottlenose dolphins, *Tursiops truncatus*, come to *Eila's* bow.

Tobi Bernhard won the top prize at Wildlife Photographer of the year in 2001 with a shot taken at Beveridge Reef. Here he is feeding grey reef sharks at Pete's favourite coral head.

Sampling Fish for the Water Framework Directive

A surface floating monofilament multi-mesh CEN standard survey gill net on Lough Brin, Co. Kerry.

Images courtesy of Inland Fisheries Ireland

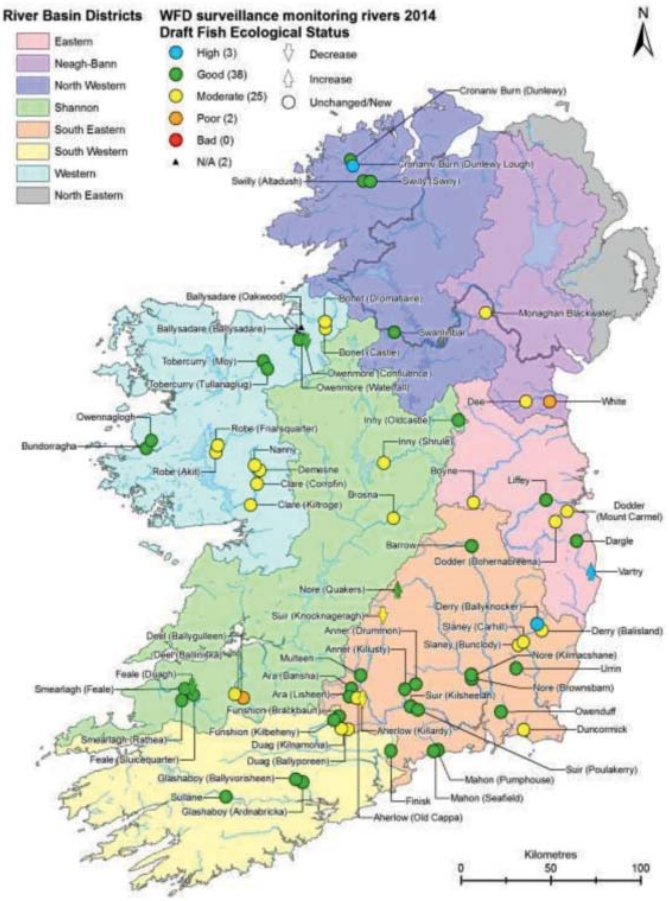
Processing the nets and fish on Lough Easky, Co. Sligo.

Processing fish for length, weight and scale samples.

By Suzanne Campion

IN December 2014, Inland Fisheries Ireland (IFI) launched a summary report on the findings of fish stock surveys undertaken in all water bodies (lakes, rivers and transitional waters) during 2014. The report, 'Sampling Fish for the Water Framework Directive', also outlines the current ecological status of fish stocks in each water body.

IFI has been assigned the responsibility by the Environmental Protection Agency (EPA) to deliver the fish monitoring requirements of the Water Framework Directive (WFD). The fundamental objectives of the WDF are to protect and maintain the status of waters that are already of good or high quality, to prevent any further deterioration, and to restore all waters that are impaired so that they achieve at least a good ecological status.



Classification of river sites using the FCS2 Ireland classification tool (the five symbol colours on the map indicate ecological status from high to bad, the arrow symbols indicate an increase or decrease in ecological status since previous survey, the circular symbols indicate no change in status since previous survey or new sites surveyed).

The fish monitoring programme has been conducted annually since 2007 at specified locations. The second year of the third three-year cycle began in 2014 with an extensive surveillance monitoring programme; 70 river sites, 26 lakes and seven transitional water bodies were surveyed throughout the country.

This work provides information on the ecological status of fish species present in selected waterbodies as well as information on their abundance, growth and population demographics for fishery managers, legislators, angling clubs, fishery owners and other interested parties".

The information captured in the report gives us an increased understanding of the dynamics and changes in our fish populations at sample locations throughout Ireland."

2014 Report Findings

During 2014, 26 lakes were surveyed with 19 fish species and two types of hybrids identified. A total of 12,205 fish were recorded. Eel was the most common fish species recorded (96 per cent of lakes surveyed) followed by brown trout (81 per cent), perch (65 per cent), roach (42 per cent) and pike (38 per cent).

In general, salmon, brown trout, sea trout and Arctic char were the dominant species in the north, west and south-west of the country. Perch were recorded for the first time in a lake in Donegal. This introduction was illegal and the source is unknown; further investigation will be undertaken by IFI.

Experimental hydro acoustic surveys were carried out on Loughs Caragh, Allen, Melvin, Beagh and Leane to complement the routine surveys. Initial results show that Lough Allen has a large population of pelagic fish, dominated by pollan and juvenile perch; Lough Leane continues to sustain a good population of Killarney shad; Lough Beagh has a healthy Arctic char population; and Loughs Melvin and Caragh continue to sustain small Arctic char populations.

According to the report, 62 per cent of lakes were classified as 'good' or better status, with three sites having improved in status since they were last classified. The geographical variation in ecological status reflects the change in fish communities of upland lakes with little human disturbance versus the fish communities of lowland lakes subject to more intensive anthropogenic pressures.

A total of 14 fish species and one type of hybrid (roach x bream) were recorded in 70 river sites (or 50 water bodies) during 2014. A total of 13,480 fish were counted. Brown trout was the most common fish species recorded (96 per cent of sites), followed by salmon (77 per cent), eel (56 per cent), stone loach (50 per cent), minnow (39 per cent), and three-spined stickleback (39 per cent). Sixty per cent of river sites were classified as 'good' or better status, with two sites having improved in status since they were last classified.

A total of 50 fish species (or 40,362 individual fish) were recorded across two transitional waters (seven transitional water bodies). The highest number of species recorded in a water body was 29, in the Lower Shannon Estuary. Flounder and sand goby were the most widespread species, while sprat was the most abundant. Some important angling species documented during these surveys included brown trout, European sea bass, salmon, sea trout, pollack and conger eel. Overall both waters achieved 'good' status.

The report is available for review and download at: www.wfdfish.ie/wp-content/uploads/2010/05/WFD_Report_2014_FINAL.pdf. An interactive fish survey map is available at www.ifigis.ie/wfdfishmap.

Suzanne Campion, Head of Business Development, Inland Fisheries Ireland. www.fisheriesireland.ie www.wfdfish.ie.

ECO ECHOES:

The Environmental Legacy of the First Generation of Glow-in-the-Dark Watch Dials

By Walter Mugdan[1]

January, 2016

IT is hard to imagine that something as innocuous as a glow-in-the-dark watch dial could be the cause of terrible human tragedies, and be the source of a bitter environmental legacy that has been difficult, disruptive and expensive to address.

The story begins in 1917 when the U.S. Radium Corporation opened a factory in the town of Orange, New Jersey. Its business there was to extract radium from ore to produce a paint that was luminous – that is, it would glow in the dark. In fact, the brand name of the paint was "Undark." As the United States prepared to enter the First World War, it contracted with U.S. Radium to produce glow-in-the-dark watch dials for American soldiers.

Radium is the highly radioactive element identified in 1898 by Marie Curie – the first woman to win a Nobel Prize, and the first person and the only woman to win one twice. In the early part of the twentieth century many quack medical claims were made about radium, asserting that it could cure a variety of ills. In fact, it is extremely dangerous, causing cancer and other diseases. Its "daughter" decay product, radon gas (which occurs widely in nature), is second only to tobacco as a leading cause of lung cancer, causing some 21,000 deaths annually in the U.S. alone.

U.S. Radium hired young women to paint the watch dials. Younger people tended to have the steadier hands needed for the fine work of painting the dials. Many young men were heading off to military service and, in any event, it was believed that women were better at this sort of task than men. The women used delicate, camel hair paintbrushes in their work. They would bend close over the watch dials as they applied the paint. Worse yet, in order to bring the paintbrushes to the fine point needed for this work, they would repeatedly lick the brush, ingesting radium paint as they did so. Some of the women also used the paint on their fingernails for a novel, glow-in-the-dark polish.

Within just a few years, many of the women began to suffer terrible diseases. Among the most painful and disfiguring consequences was "radium jaw," or necrosis of the jawbones, which received some of the highest doses of radioactivity as the women pointed their brushes with their lips. It is not known how many of the 80 to 100 women employed by U.S. Radium died, but the number is probably high.

The gruesome story becomes even worse: it turns out the U.S. Radium company was keenly aware of the danger of exposure to the radioactivity. Managers and chemists who worked for the company routinely used shielding and protective clothing when handling the material; but the women painting the dials were assured their work was safe, and were even encouraged to point the brushes in their mouths. Worst of all, the company engaged in a reprehensible campaign of disinformation, suggesting that the women's ailments were attributable to syphilis, a sexually transmitted disease.

Images courtesy of US EPA

Clocks and watches glowing in the dark from the use of radium.

Radium vault demolition in 2008.

Images courtesy of US EPA

Soil sampling.

In 1925 the Essex County Medical Examiner issued a bombshell report officially linking the deaths of the U.S. Radium workers to their occupational radium exposures. In 1926 the company ceased its operations in Orange.

One severely ill former employee, Grace Fryer, decided to sue U.S. Radium. It took her nearly two years to find a lawyer willing to represent her. Eventually, four other former employees joined the lawsuit. When the case finally reached court in 1928, the five women were so sick they could not even raise their hands to take the oath. Before the case reached the jury the company settled, agreeing to pay each of the five $10,000 (about $138,000 today), plus a $6,000 annual payment as long as they remained alive. The company also agreed to pay all their medical and legal expenses.

This legal action by the Radium Girls, as they came to be known, was history's first example of what is now called a "toxic tort" lawsuit – that is, a personal injury claim based on exposure to a toxic chemical. The notorious case and the publicity surrounding it were an important factor in the development of occupational health and safety standards and laws. (Radium paint continued to be used for watch dials into the 1960s, but the workers were properly trained and provided with protective equipment.)

However, the unfortunate story of the U.S. Radium Corporation does not end there. During its ten years of operation the company processed many thousands of tons of ore to extract the radium. The left over waste – still dangerously radioactive – was simply dumped on the factory property and remained there for decades. But it gets even worse: much of the waste ore was given away to be used as backfill for residential construction projects, for use as aggregate to make concrete for sidewalks and foundations, and for fill to re-grade low-lying areas in the surrounding communities of West Orange, Montclair and Glen Ridge.

Many hundreds of residential properties were contaminated with radioactive materials, of which the homeowners knew absolutely nothing until the early 1980s. By the middle of the previous decade Americans had finally begun to wake up to the deeply disturbing environmental legacy of our industrial past. Infamous sites like Love Canal near Niagara Falls in New York State spurred Congress to pass, in 1980, the so-called "Superfund" law that gave the U.S. Environmental Protection Agency (EPA) the responsibility to identify and clean up the worst of these sites.

The author's previous articles in *Sherkin Comment* have described the landmark Superfund law. One of its notable features is that EPA can require those responsible for the contamination to carry out or pay for the cleanup.

The U.S. Radium factory site itself, and the contaminated properties in Montclair and Glen Ridge, were among the earliest sites to be placed on the national Superfund priority list, in 1983 and 1985, respectively. By that time, however, the company was out of business, so the cleanup work had to be paid by the government from the fund that gives the law its colloquial name.

The work has been hugely expensive, in addition to being disruptive to the affected residents and communities. Contaminated soil had to be excavated from hundreds of properties, while the residents were relocated to temporary living quarters. Some homes had so much radioactive waste material underneath that the only solution was for EPA to purchase the house, and demolish it to get at the wastes below. Tens of thousands of tons of these dangerously radioactive wastes had to be carefully handled by workers in cumbersome protective gear, containerized for shipment, and sent across the continent for disposal at specially constructed and permitted facilities. The cleanup work has cost over $206 million in public funds.

We will never know how many residents suffered health effects from their exposure to the radioactive wastes on which they were living, sometimes over many decades. What we do know is that we owe a deep debt of gratitude to the unfortunate but brave Radium Girls, who used their last energies to expose the unforgiveable actions of a callous employer, and start to lay the groundwork for safer conditions for industrial workers everywhere.

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BLACK SEA-BREAM

(Spondyliosoma cantharus) in Irish Waters

Photography courtesy of www.wicklowboatcharters.ie

Black Sea-Bream taken by Collie Ennis off Wicklow on 16.08.2014.

Photography courtesy of Andrew Marriott - MarLIN

Black Sea-Bream (*Spondyliosoma cantharus*).

By Declan T.G. Quigley

ALTHOUGH Black Sea-Bream (*Spondyliosoma cantharus*) [BSB] are widely distributed in the Eastern Atlantic, ranging from Scandinavia to the Mediterranean and Black Seas and southwards along the African coast to Angola and northern Namibia, the species is generally regarded as uncommon north of the English Channel. However, it is possible that BSB and other sparid species may eventually become more common in more northern European waters if the present increasing trend in sea water temperatures continues. Indeed, the remains of BSB have been found in Danish archaeological sites dating from the last Atlantic warm period, 7000–3900 BC.

Despite the general paucity of historical references, the discovery of BSB remains at *Illaunloughan Island* (off Portmagee), an early (7–9th century) medieval monastery, suggests that the species was captured and consumed in SW Ireland for many generations. Rutty (1772) remarked that the species (as *Cantharus rondeletii*) was found off the coast of Co Dublin *"about the rocks of Bullock, Dunleary and Killeny Bay"*, Thompson (1846) described an unripe male specimen weighing 1.36kg (40cm FL) which was captured on 18.05.1846 on *"foul ground"* at Cultra Point, Belfast, and a second specimen, measuring c.45cm, was taken at Kilmore Quay on 15.11.1846. Andrews (1860 & 1870) reported on the occurrence of the BSB (as *C. griseus*) off the SW coast of Ireland. Couch (1862) remarked that the species was *"common on the west and south coasts of England and Ireland, but as it is a solitary fish it can scarcely be called abundant"*. Kennedy (1954) noted that *"only relatively few specimens had been taken on the Irish coast"*, and Went & Kennedy (1976) regarded the species as *"scarce"* in Irish inshore waters.

Although there are still relatively few authenticated records of the BSB from Irish inshore waters (N = 29), it is interesting to note that almost 55% of the records reported since 1846 were recorded from Co Kerry (Table 1). Elsewhere, the species has been recorded infrequently from Irish inshore waters: E (17.2%), SE-S (20.7%) and NW-N (6.9%) coasts, with no records from the west coast (Quigley & Flannery, 1997 & 2005; Quigley, 2002).

The BSB is a *protogynous hermaphrodite* i.e. most individuals initially develop as functional females (at 20cm TL and 2–4 years of age) prior to becoming functional males (at 35cm TL and 7–8 years of age). Although the species is not known to spawn in Irish waters, it regularly spawns in shallow (5–10m) inshore waters of the eastern English Channel between mid-April and mid-June when seawater temperatures reach 12–14°C. BSB are one of the few nest-building species of sea-breams. The male digs a depression in the sandy sea-bed in which the female sheds her eggs, 32–554k depending on size. The eggs are guarded by the male until they hatch (after 9–10 days). The young tend to form a loose school around the nest for several weeks after hatching, but by autumn, the juveniles (7–8cm) and sub-adults (<20cm) are commonly found in coastal waters where they remain for 2–3 years before migrating to deeper offshore waters (50–100m, occasionally to 300m) west of the English Channel where the pre-spawning adults overwinter, often near wrecks and rocky outcrops. The vast majority (75%) of BSB recorded from Irish inshore were taken during the first half of the year.

While female BSB mature at an early age, their fecundity is relatively low. However, their low fecundity is compensated to some extent by the parental care provided by the males at the nesting site and the species's relatively long life span (up to 20 years of age). Nevertheless, the overall growth rate of both males and females in the English Channel is relatively slow. For example, specimens weighing 1kg (39–40cm) are at least 8–9 years of age. Although the estimated maximum size reported for the species is 60cm SL, this would appear to be exceptional, and the average length is 20–30cm TL. While BSB primarily feed on green algae (particularly *Enteromorpha*), they are also opportunistic omnivores that exploit a wide variety of other prey, including crustaceans, molluscs, worms, echinoderms, squid and small fish.

The BSB is a highly migratory shoaling semi-pelagic species which has been increasingly targeted by commercial fishing vessels in NW European waters since the late-1970s, primarily by French pair-pelagic trawlers in the English Channel (72% of landings) and to a lesser extent, in Biscay. BSB are currently not abundant enough in Irish waters to support a targeted fishery. Indeed, over the last decade, a total of only c.8 tonnes was reported as a by-catch by Spanish (64%) and French (36%) vessels fishing long-lines (64%) and gill nets (36%) in Irish offshore waters, primarily off the SW coast.

BSB would appear to have been specifically targeted as an alternative to the Red Sea-Bream (*Pagellus bogaraveo*) [RSB], a species which was heavily over-exploited during the 1960s and 1970s, and eventually collapsed during the early 1970s (Quigley, 2013). It is possible that the exponential increase in aquaculture production of Gilthead Sea-Bream (*Sparus aurata*) [GHSB] in the Mediterranean since the early 1990s (Quigley 2015) may have modulated the economic viability of commercial fishing for wild BSB over the last couple of decades (Figure 1).

The hermaphroditic nature and slow growth rate of BSB may have important consequences for the sustained reproductive capacity of the stock. Between 1977 and 1979, the modal size of BSB decreased significantly from 37–38cm to 28–30cm as the UK fishery expanded. From an annual average of 6088 tonnes during the late 1970s, French landings from the English Channel slumped to 1082 tonnes during the 1980s, but thereafter gradually increased again to 3780 tonnes during the 2000s (4864 tonnes was landed during 2010). Apart from a minimum size regulation of 23cm TL, the species is not subject to any EU TAC and Quota regulations and little is known about the stock's current status.

Although BSB have occasionally been reported by anglers from Irish waters since 1967, the species was only recently (2010) included by the *Irish Specimen Fish Committee* in its list of eligible species at a minimum qualifying specimen weight of 1kg. Since then, only two specimens have been ratified: the first specimen, weighing 1.11kg (39cm TL), was captured by David McCormick off Killybegs on 21.08.2011, and the second specimen, weighing 1kg, was captured by Eddie Butler off Kilmore Quay on 08.09.2014. Although a larger specimen, weighing 1.362kg, was captured on rod and line by Fred Cooper in Carnlough Bay on 21.07.1979, and a specimen of similar size was taken by a commercial trawler off the SW coast in 1967 (Went, 1968), the vast majority (83%) of BSB recorded by both anglers and commercial vessels from Irish inshore waters to date weighed <1kg (Mean 654g; Range 86–1362g). Indeed, specimens weighing >1kg are very rare in commercial catches throughout the species range. BSB are specifically targeted on a seasonal basis by anglers in the English Channel. The current UK Rod-Caught (Boat) Record, weighing 3.125kg, was captured by J.A. Garlick on a wreck off Torquay, Devon in 1977. It would appear that the largest specimens may have a preference for wrecks and/or rocky outcrops and to some extent this may afford them some level of protection.

It is interesting to note that a few BSB, albeit none of specimen size, have recently been caught by anglers on the wreck of the *SS Laurentic* at the mouth of Lough Swilly and from several areas along the east coast, including Carlingford Lough, Wicklow and Wexford. Brennan (1982) remarked that although BSB *"are not specifically fished for in Ireland, they could well be present in some areas without anglers being aware of it"*.

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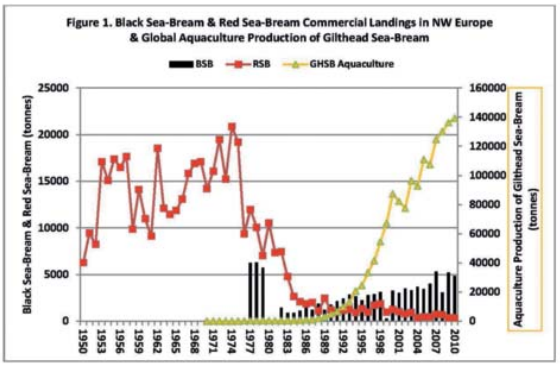
Table 1. Maritime Regional Distribution of Black Sea-Bream Records from Irish Waters

County/Location	Inshore Records (<200m) (1846-2014)	% Inshore	Region	ICES Zone	% Offshore (>200m) (2002-2012)
Kerry (Dingle Bay)	16	55.2	SW	VIIj + k	99.9
Louth (Castletown River, Dundalk)	3	17.2	E	VIIa	0.0
Dublin (8km S Kish Lighthouse)	1				
Down (Cultra Point, Belfast Bay)	1				
Wexford (Kilmore Quay)	4	20.7	S+SE	VIIg	0.0
Waterford (51° 48.50"N, 07° 18"W)	1				
Cork (Ballycotton)	1				
Donegal (Killybegs)	1	6.9	N+NW	VIa	0.0
Antrim (Carnlough Bay)	1				
Clare - Sligo	0	0.0	W	VIIb	0.1
Total	29	100.0			100.0



Into the Noosa Everglades

By Anthony Toole

QUITE suddenly, it seemed, we drifted into silence. Yet we realised, just as quickly, that the quietness consisted only of the absence of chatter and the noises of the engine and swish through the water of the boat we had left. We had merely exchanged these for the hiss of cicadas in the surrounding forest, which rose to a shrill whistle, then fell to a sibilance, recurring in an endless sequence of waves. And during the troughs, we heard only the light splash of paddles and soft lap of water against the sides of the canoe.

A Brahminy kite watched us from its perch on a tall eucalyptus, but before I could photograph it, it spread its wings and drifted off into the canopy, leaving us to continue our gentle progress toward Harry's Hut.

At 9 am, about thirty of us had packed into the cruise vessel, which took us into the narrows of the Noosa River, past an incongruous mixture of plush waterside dwellings and houseboats that had seen better days. Our skipper and guide, Trevor, had been doing this job for thirty-five years, and knew every twist of the river and every hidden shoal and tree branch, and assured us that the boat was capable of safely negotiating water no more than knee-deep.

The river narrowed even further as it split around the heart-shaped Makepeace Island. This was owned by Brett Godfrey and Sir Richard Branson, who had transformed it into an exclusive resort open to anyone willing to spend a few thousand dollars each night to stay here. Little of the resort was visible to us, as the shoreline retained its almost pristine density of vegetation.

Noosa stands at the mouth of its eponymous river, at the northern end of Queensland's Sunshine Coast, a strip of bays and sandy beaches running north of Brisbane, in Australia. The towns that characterise the coastline are in quiet contrast to the brash, high-rise clutter of the Gold Coast, to the city's south.

Noosa's name comes from an Aboriginal word, 'Noothera', meaning 'shady place'. European settlement began here in the 19th century, when loggers arrived to cut down the scribbly gum and blackbutt trees, and increased when gold was discovered in nearby Gympie. Latterly, however, property development around Noosa has been restricted, limiting the heights of buildings and the growth in population. This, together with the proximity of Noosa National Park, to the east of the town, led in 2007 to the region being declared a UNESCO Biosphere Reserve, one of only fifteen in Australia and the first in Queensland. Such designation recognises the achievement of a balance between nature and human usage, emphasising the needs of conservation, sustainable development and scientific research.

Noosa River runs for sixty kilometres, and its excellent water quality is due to the protected nature of its catchment, one-third of which lies within the Great Sandy National Park. The shallow, brackish lakes to either side of the mainstream are tidal, and are important nurseries for juvenile fish. As we continued upriver, and across the small Lake Cooroibah, we had to slow down so as not to upset the occasional anglers' canoes.

The river narrowed again, then opened out into the vast Lake Cootharaba, Queensland's largest salt-water lake. Despite its huge area, its average depth, Trevor informed us, was no more than one metre. Nevertheless, we sped across it and slowed down only as we approached the narrows of the next river section, which marked the start of the Noosa Everglades and the entrance to the Great Sandy National Park. Here, the river carried tannins from the forest trees to create a sharply defined brown patch that extended several hundred metres into the lake.

We passed through another neck and into a smaller lake over which the blooms of blue water lilies rose above extensive rafts of their foliage. Islets of vegetation that rose over the surface were populated by colonies of pelicans and pied cormorants. We pulled across to Fig Tree Point, where we disembarked for a coffee-cake-and-biscuits break before thirteen of us, took to five canoes for the next five kilometres of our journey.

We moved into the Everglades, taking a few minutes to get used to steering our canoe away from the tree branches that either hung over the water or had fallen and lay like skeleton arms reaching up from the mud. After we had gone about a kilometre, we heard the chug of the cruise boat coming around the bend behind us and waved at our erstwhile companions who had opted for the less energetic journey.

The Noosa Biosphere marks an overlap between Queensland's southern temperate and northern tropical zones. As a result, it contains some 60 distinct habitats in which more than 1300 species of plant thrive along with more than 700 species of native fauna, which include 30 amphibians, 150 fish, 63 mammals and 75 reptiles. Eastern grey kangaroos hop freely through the bush over which large numbers of flying foxes take to the air at dusk. Among the reptiles are blue-tongued lizards, red-bellied black snakes and lace monitors, which survive on a diet of insects, small mammals and birds' eggs.

The most abundant creatures, however, are the birds, which number more than 300 species. These constitute over 44% of all Australia's bird species, more than can be seen in the vastly larger Kakadu National Park in the Northern Territory. Small birds find that the forest provides shelter from predators. Larger ones are less concerned about being seen.

Shortly after passing the Brahminy kite, we saw a white-breasted sea eagle on another tall tree. It was completely indifferent to our proximity. A black kite circled high above us. Small flocks of rainbow lorikeets flew across the river and cockatoos squawked noisily from the trees. We heard the cackle of a kookaburra and spotted a brush turkey scratching its way through the undergrowth.

We arrived at Harry's Hut, a forest camping ground, with an appetite that would do justice to the splendid barbecue that Trevor had prepared for us while we paddled upstream. We had a choice between steak, barramundi and a vegetarian option, with salad and cooked vegetables. Several of us then plunged into the river to swim in its warm waters among the shoals of catfish that circled around the cruise boat.

For the return trip, to give myself a better opportunity to photograph some of the bird life, I opted to take the cruise boat, leaving a young lady to take my place in my son's canoe. On arrival at Fig Tree Point, I found the jetty guarded by a water dragon, which held its ground until I crept to within five metres of it, then it disappeared into the undergrowth.

In 1836, the ship Stirling Castle ran aground farther up the Queensland coast. The crew managed to reach what is now Fraser Island (*Sherkin Comment,* No. 32), also part of the Great Sandy National Park, where they either died from starvation or were killed by aboriginals. The captain's wife, Eliza Fraser, after whom the island is named, was kept alive by the natives until she was rescued by a convict, John Graham, somewhere in the vicinity of Fig Tree Point. Her story provided the inspiration for the 1976 novel *'A Fringe of Leaves'* by Australian Nobel Prize winning author, Patrick White.

We waited little more than half-an-hour for the canoeists to re-join us, then we headed back to Noosa. The Cooloola area of the Great Sandy National Park, in which we had spent our day, occupies more than 60 000 hectares. Most can only be explored on foot or by means of 4WD vehicle. Indeed there are many walking tracks, varying in length from a few hundred metres to ones that take several days to complete. Our 6½-hour excursion had covered only a small length of the Noosa River, but it had been continuously fascinating, even exciting and a great deal of fun, and had given us much more than just a glimpse of one of Australia's great remaining pristine wildernesses.

Image courtesy of Anthony Toole

Clockwise from top: Pelicans; Entering the Noosa Everglades; Mooring at Harry's Hut; Rainbow Lorikeets; Water Lily; Pied Cormorants; Brush Turkey; Kookaburra; Catfish; Water Dragon.

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Whales, Helicopters and a Quad Bike

Further experiences of a marine biologist

By Chris Spurrier

IN my previous article I described how Jacques Cousteau had been the inspiration behind my interest in marine biology; as soon as I was old enough I had learned to dive. I worked on zooplankton during my first season as a volunteer at Sherkin Island Marine Station in 1980, but I was itching to get involved in a diving project. The team from the Natural History Museum (NHM), London, as it is now known, that had visited that summer included the sponge taxonomist Shirley Stone and the marine biologist and polychaete (bristle-worm) taxonomist Dr David George. Both were influential in the development of my career. Shirley had made a big impression on Matt Murphy, and when I expressed an interest in returning to Sherkin in 1981 I was duly dispatched to meet Shirley at the Museum to work out the details of our future sponge study, which became two years of detailed diving observation on half a dozen monitored specimens in differing environmental conditions.

The financial reality of volunteering for three years was beginning to make itself felt so I returned to working as a milkman for another year or two and later became a window-cleaner. But at the same time, encouraged by the opportunity I had been given at Sherkin and the knowledge I had acquired, I continued to develop my interest. I became an active member of the Marine Conservation Society (MCS) in the UK and contributed to their programme of diving surveys, sometimes enlisting the help of my local sub-aqua club with whom I regularly dived all around the British Isles and Ireland.

It wasn't until 1987, having taken part in a preliminary Channel Tunnel sublittoral survey with MCS on behalf of the Nature Conservancy Council the previous year, that I was offered my first paid work as a marine biologist in a team led by Dr Elizabeth Wood, an independent consultant, who had been contracted by Eurotunnel to undertake the underwater environmental survey. In 1981 the Health and Safety Executive (HSE) in the UK had introduced new legislation that required certification for divers to be able to carry out paid work, which was targeted primarily at the commercial diving fraternity. But it also applied to scientific divers and in order to facilitate the work of existing scientists who dived, a 'granny clause' permitted them to receive a certificate (known as a Part IV) on the basis of a demonstrated experience. I was fortunate that my diving history on Sherkin had allowed me to take advantage of this clause, so I already had my HSE Part IV qualification.

At the same time as the diving surveys for Eurotunnel, an intertidal (shore) study was being carried out by the NHM, led by Dr George who was then also chairman of MCS. This connection led me, in 1990, to join the diving team in the Marine Biological Services Division at the NHM that was headed by Dr George. They were carrying out an environmental impact assessment (EIA) of the planned installation of a long-sea sewage outfall for Anglian Water in Norfolk. At the end of the diving work I asked if there was anything useful I could do to help at the Museum on wet and windy days when I couldn't clean windows and I ended up working as a freelance marine biologist there for the next 20 years!

The study in Norfolk employed the well-known 'sawn-off waste paper bin and post office sack' methodology to collect benthic sediment samples which I then helped to analyse. The mixed seabed substrate included flint pebbles and cobbles which supported a mainly encrusting fauna characterised by diverse bryozoan (sea-mat), hydroid (sea firs) and sponge communities. I had already acquired some of the skills needed to identify sponges and the expertise of colleagues at the Museum allowed me to develop a proficiency in new animal groups. By now I had gained some of that much needed experience that was previously lacking.

When I was a student, the perceived route to employment was through specialisation in a particular field, usually through a doctorate, but I have always found a good all round knowledge, with the added bow-string of familiarity with some of the less well-known groups, to be an advantage.

My free-lance status and flexibility afforded me the opportunity to take on other diving surveys when offers came my way (I have never actively pursued work) and so I have participated in a range of conservation review studies for government bodies and work contracted by independent consultancies.

The Museum study in Norfolk continued for a number of years, including several following construction and implementation of the outfall to monitor its potential impact. It is unusual these days to get the opportunity to work on relatively long-term studies of this nature, but the NHM was also involved in another EIA, this time for a proposed gas pipeline, near Barrow-in-Furness, Cumbria. Its route crossed a Site of Special Scientific Interest and following post-reinstatement work, we monitored the progress of the sensitive saltmarsh habitat until the recovery to its original condition was complete several years later.

As part of the marine contracts team I was involved in many and varied projects. The NHM has kept a record since 1913 of all cetacean strandings (whales, dolphins and porpoises) on the UK coastline. Large beached animals attract considerable media attention and public interest and I attended northern bottlenose, minke, fin and killer whale strandings as well as retrieving dozens of porpoises and dolphins for post mortem examination by veterinary pathologists at London Zoo with whom we collaborated on the project. I played a key role in maintaining an accurate record of all such events on a national database. Paper records were always retained and updated alongside the digital version: the comments in the Editorial by Matt Murphy (Sherkin Comment No.59) were particularly pertinent.

I also had the opportunity to travel abroad, on one occasion to assess the damage to a coral reef in the Red Sea from a cargo ship's grounding, and during several fieldwork trips to the United Arab Emirates to carry out an EIA for an oil company in relation to a proposal to develop the gas potential of a concession area. The environmentally sensitive site in the UAE was within a Marine Protected Area and had additional accreditation as a UNESCO Biosphere Reserve primarily because it supported the majority of the world's second largest population of dugongs. But it was also of importance for bottlenose and Indo-Pacific humpback dolphins, hawksbill and green turtles and numerous shorebird and waterfowl species. As well as diving and snorkelling on the shallow shoal and surrounding reefs we conducted aerial surveys by helicopter to count dugong and cetacean numbers and to investigate proposed pipeline routes. This type of experience may be closer to the romantic image that is often conjured up of a marine biologist's work and was indeed approaching the glamourous lifestyle portrayed by Jacques Cousteau's television programmes. But it is the exception rather than the rule and I have had my share of cold, wet, muddy, tiring and monotonous work as well. Nevertheless my preference is for work in Britain and Ireland where I have a better understanding of the marine life that abounds in our seas.

Although I didn't actually get the one job that I did apply for in the late 1970s as Lundy Marine Warden, I happened to know Nigel Thomas, the successful applicant, because I had been at college with him and so as not to be totally outdone I assisted him in setting up an underwater trail during a visit to the island in 1978. Nigel went on to become a managing director of a successful environmental consultancy, now taken over by a larger company. I kept in touch and was invited to work for them several years ago when a large part of their work involved epifaunal analysis of samples very similar to those I had been working on at the Museum; I am still employed by them from time to time to address their quality control requirement.

The majority of my recent work has involved more local studies in Kent and Sussex, particularly on chalk shores. I have helped to collate data as evidence to support the work of the Wildlife Trusts in pushing for the designation of Marine Conservation Zones. I believe that our knowledge of the marine environment has come a long way since I began my career, but the lethargic pace at which legislation is directed at protecting it is a continuing source of frustration. It is a credit to Ireland that when the importance of Lough Hyne was recognised it was designated as Europe's first Marine Nature Reserve as early as 1981. In England, Lundy didn't become a statutory reserve until 1986 and there are still only three in the UK. Although various other categories of marine protected area are now in existence there is still a long way to go before the UK government's promised objective of an ecologically coherent network is achieved. But I am happy in knowing that the work I have done over the years continues to contribute to this process.

I do not consider myself to be an expert in any field but I have gained a considerable experience which began with the opportunity given to me on Sherkin. My career may not have been typical of other marine scientists but I have always enjoyed the freedom that my freelance arrangement offered and in hindsight I am glad that I did not commit to an approach at one time to join the Museum full-time. In an environment of redundancies and cut-backs, I still have plenty of work as a window-cleaner to fall back on. I am probably the only marine biologist who declares window-cleaning as his joint occupation on tax returns, but I wouldn't have it any other way!

Photograph: courtesy of Patrick Campbell, NHM

The author sieving mud samples collected for the analysis of infaunal invertebrates.

Photograph: courtesy of Patrick Campbell, NHM

Four-wheel drive 'all-terrain vehicle' and trailer used to collect mud samples at one of the monitoring sites during an EIA study along the course of a gas pipeline in Cumbria.

Photograph taken by Charles Walker & reproduced courtesy of David George

Helicopter used for aerial surveillance of an offshore shoal in the UAE. I discovered that although shorts were fine on the ground they were not the best attire at 10,000 feet with the doors open for photography!

Chris Spurrier is a freelance marine biologist based in Kent who specialises in encrusting fauna. He is hoping to return to Sherkin this summer to impart some of his knowledge of bryozoans to a study of the local fauna.

Sun's lifeline for remote Indian hospitals

An experiment using solar panels to provide electric power so that blood banks can be run in rural areas could save many thousands of lives across India.

By Nivedita Khandekar

NEW DELHI, 15 April, 2016 − The perennial problem of power cuts in India makes the storing of blood for transfusions virtually impossible in rural areas, forcing seriously ill patients to travel many miles for treatment. But now an experiment with solar power in a remote Himalayan hospital has changed that.

The erratic electricity supply in the Ziro Valley's Hiro general hospital, in the Himalayan state of Arunachal Pradesh, northeastern India, meant that its blood bank could not operate as its stock needed to be kept at a constant 2°C to 6°C.

The hospital, at an altitude of 5,357 feet, is about five-hour drive away from the state capital, Itanagar. The area is heavily dependent on the central grid as it does not produce enough of its own power, and many areas in the mountains are still without any electricity supply.

But with India rapidly increasing the use of solar power to meet its climate change commitments, costs are coming down, so Hiro hospital decided to experiment to see if it could use solar electricity to get a stable supply to store blood and also to carry out the necessary tests to screen for diseases.

Medical facilities

The blood bank was started in October last year with a private sponsor for a five-kilowatt solar power system. It provided enough power to make blood tests and storage possible, and the idea is now being extended within this hospital and in many other more remote medical facilities across India.

Dr Joram Khopey, the blood bank officer at Hapoli hospital, says: "Screening tests for transfusion-transmissible infections − especially HIV, Hepatitis B, Hepatitis C, syphilis and malarial parasites − are carried out before blood is okayed for transfusion. The results take three days and, with no refrigeration, it would not be possible to store the collected blood units for future use."

Before the blood bank started, patients were referred to a tertiary care hospital if they needed blood, and that meant at least half a day's journey. So many went directly to hospitals in bigger towns in the neighbouring state.

With the solar-powered facility, the local population can now look forward to not having to send patients − including pregnant women needing Caesarian sections − to faraway places because of the lack of blood stocks.

Not that the idea caught on instantly. Only four people came forward at a blood donation camp held last December. But more volunteered later and, by January, a total of 14 units of blood were received. Five of these were used in transfusions, so the project was deemed a success.

Dr K Horming, medical superintendent at Hapoli hospital, says: "The government has now sanctioned solar panels for 10 kilowatt power generation for the hospital's delivery, emergency, immunisation, occupational therapy, and the nurses' rooms."

In addition, the Arunachal Pradesh state government has incorporated plans for solar-powered blood banks for its two general hospitals and 13 district hospitals. "We have already sanctioned funds for it in the 2016-17 budget," says Ramesh Negi, Arunachal Pradesh's chief secretary.

Good option

Of the 650 districts in India, about 60 do not have a blood bank because of lack of electricity or human resources. But that will now change.

Dr Apurba Ghosh, secretary general of the Federation of Blood Donor Organisations of India, says: "Solar energy can be a good option to run those blood banks waiting for power among these 60 districts. We can now aim for more blood banks across the country."

India has 2,760 recognised blood banks for a population of approximately 1.25 billion, and most of the blood banks are in urban or metropolitan centres.

Mobile solar panels can also be used for cooling blood in donation camps held in rural areas.

The Indian government has endorsed this idea. Dr Manisha Srivastava, a member of the Ministry of Health and Family Welfare Technical Resource Group on blood transfusion, says: "This will be really useful for remote areas, which have a perennial power shortage.

"The blood storage centres in the plains will be run on solar energy (using portable photovoltaic panels), and for those in the hills there can be a combination of solar and ice-lined boxes."

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Courtesy of Climate News Network
www.climatenewsnetwork.net


Image courtesy of Robbie Murphy

The Lough of Cork City

in the early part of the 20th century

IN my younger days, the Lough was a dirty, muddy pool, with rough earthen edges which easily broke into the water. It was known locally as Paddy Canty's pond, after a local man who reared ducks on it. The building of the concrete walks a wall around the water's edge was a great development - a wonderful amenity.

The Lough froze over most winters, and was such a source of ice (for freezing food, fish etc.) that a number of ice-houses grew up around it. One of these was built against the right-hand gate as you entered the grounds of the Lough Church. This was still in use - for saving waste paper for sale - during my years in the parish (1955 to 1970). Another much larger ice-house was on the left-hand side of the road leading down to the Lough. This was large enough to become a builder's headquarters in my time. Later it was replaced by a series of houses.

Skating on the Lough was always fun, and the few who owned bicycles were able to cycle around in relative safety. One fascinating item was that the swans kept a small round area free of ice by continuing to swim around it.

Some years before my time a Fr. Patrick Cahalane, C.C., decided to drain the Lough. He achieved this mainly by using the exit from the western end of the Lough where a grating allows excess water to escape underground to join the Mardyke stream and ultimately the River Lee.

An old friend Joseph Wrenne (father of Fr. Frank Wrenne, R.I.P.) who lived at Ophelia Place on the east side of the Lough told me that he had clear memories of walking across the dried-up Lough to UCC where he was professor for some years before becoming Cork County manager.

The project died a sudden death: people woke up one morning to find the Lough back - fed by springs, bringing the water from the hills to the south. People draining the Lough should have been alerted to the impossibility of this by taking account of the large amount of water flowing constantly out of the Lough through the grating at its western end.

Fishing in the Lough was a favourite pastime of youngsters in my time. We visited there with rod, line and hook on a daily basis, bringing home our catch (roach - about the size of gold-fish) in a jam jar. There were regular fishing competitions and later, yachting competitions, which were very popular. Today we can be thankful that the project of draining the Lough did not succeed.

Rev. Fr James Good

Publications of Interest

The Essential Guide to Beachcombing and the Strandline

By Steve Trewhella & Julie Hatcher

Wild Nature Press

www.wildnaturepress.com

ISBN: 978-0-9573946-7-4

Price £16.99 stg / 2015

It is almost inevitable when walking along the shoreline that you'll spot something of interest - shells, seaweeds, crabs, jellyfish, flotsam and jetsam, sandhoppers, birds, plants - the list is endless. Discovering what's what in this unique environment has been made easier by this excellent book "The Essential Guide to Beachcombing and the Strandline". Written in a very accessible way, the book highlights a real cross-section of the objects and species you could find, many accompanied with clear photographs - the Common Razor Shell, Flat Periwinkles, Queen Scallop, tests of the Green Sea Urchin, claws of the Edible Crab, the moulted shell of Shrimp and Lobster, a dolphin's vertebrae or a piece of drift wood covered in shipworm holes.

The book explain how sea glass, shells and pebbles collected from the beach plus a sprinkling of imagination can provide a great activity, especially after a beach walk on a blustery day. Sea glass are pieces of glass that have rolled around the beach or seafloor and are well worn, rounded and frosted. The colourful array and variety of fishing buoys found can also make an interesting display at a seaside home. However, the plethora of rubbish that washing up on the shore, which the authors document in the section on "Marine and beach litter", highlights the extent of this problem. The book looks at how the litter enters the sea and the problems it creates for wildlife. It gives us information on threats and conservation measures and ask us all to committed to the "The Two-Minute Beach Clean". They explain that if more and more people were to spend just two minutes removing litter each time they visit the beach, this small difference could mean all of us making a BIG difference.

This ever-changing ecosystem, is not only home to marine life but many other animals and plants that live on the edge of the water, including insects such as ground beetles, woodlice, crickets, earwigs and springtails; plants such as Rock Samphire, Sea Mayweed and Sea Rocket; and many coastal birds. The book includes photographs of some of the regular birds found on the strandline, such as Oystercatchers, Ringed Plover, Sanderling and Turnstones.

One of the most essential pages to read in the book is the one on "Keeping Safe". Beaches and rocky shores are hazard places, the weather forecast and tide times need to be checked before setting out. Carry a mobile phone, beware of cliff falls and soft mud and sinking sand underfoot. Tell someone where you are going and time of returning and always wash hands after handling debris on the shore. It should also be noted that one should be careful of what you do handle as there can be many hidden dangers in this type of debris.

The book is dedicated to the authors' children and grandchildren who accompanied them to the beach on numerous occasions, helping them to scour the strandline for treasure. Not only would this book make a wonderful gift for any parent, grandparent, aunt or uncle, but vice versa. It is a book that will appeal to anyone interested in going for walks along to the beach or just interested in the seashore.

The Rivers Dodder and Poddle

Mills, storms, droughts and the public water supply

By Don McEntee & Michael Corcoran

www.fourcourtspress.ie

ISBN: 978-1-907002-27-4

Price: €19.95 /2016

This book is the third title issued by Dublin City Council exploring the engineering history and heritage of the city. Dublin has a large number of rivers, the three largest are the Liffey, Dodder and Tolka. This book is about the Dodder and its tributaries, of which the Poddle is the most notable, focusing primarily on their engineering history and topography.

The authors have spent most of their working life with Dublin City Council. Before reading this book one should first go to the authors notes at the back of the book. They give the reader a better understanding as to why they were the ideal people to bring together this fascinating history of the Rivers Dodder and Poddle. Don McEntee has been a Senior Engineer since 1998 and Michael Corcoran, now retired from the City Council, began working for the City Council in 1948 in administration. The latter has already written a history of the Dublin tramways and the history of water and drainage in Dublin. After his retirement, he was invited back on a part-time basis to the Drainage Division to record and catalogue thousands of old drawings on to the computer.

Along with the Liffey and the Tolka, the Dodder, together with its tributaries, has served the city of Dublin well. Over the centuries it has provided water to the mills, monasteries and farmers along its course. It has also provided a water supply to the Townships of Rathmines and Rathgar, later to be incorporated into the wider Dublin public water network. One learns so much of the history and work on both the Dodder and the Poddle, which included flour, paper, woollen, iron and cotton mills, in the main from 1843 to 1912. The book illustrates, describes and numbers each mill and marks them on OS maps.

The book covers 23 chapters and includes a feast of drawings, maps and paintings, some of which go back to the 17th century. Photographs abound of rivers, bridges and spillways. There are 37 bridges over the Dodder, some are little used, while others are major road bridges. An unusual one is the metal footbridge at Beaver Row, which replaced a wooden footbridge to facilitate workers living on Beaver Row access to the Beaver Hat Factory on the north side of the River Dodder. Another is the pedestrian ford at Bushy Park, which is a series of stepping stones - a reminder to people that before bridges were built this was the only means of crossing the Dodder. The photographs of the Bohernabreena Spillways, upgraded in 2002, are better than a thousand words in showing the work undertaken.

The chapter on flooding on the Dodder shows how such events are not confined to the present day. We learn of the major rainstorms and floods from 1600s to the present and the damaged caused. For example on 4th September 1931 the Dodder flash flood rose 4.5m, inundating Milltown cottages (since demolished), and causing extensive damage to Lower Dodder Road and Ballsbridge and the railway bridge at Lansdown. It also outlines more contemporary floods in 1986, 2002 and 2001. Along with flooding, other natural events have affected the rivers - in the chapter on Droughts and Snowfalls we learn that in 1887 a drought lasted for 161 days from 23rd May until 31st October. Whilst in January 1814 the worst snowfall rendered roads impassable for months.

The lay person will find the history of the river Dodder and Poddle intriguing. This book is a credit to the two authors, whose exploration and documentation of the rivers' engineering history, have provided an invaluable record for future generations.

A Portrait of Connemara

by Mark Joyce

www.currach.ie

ISBN: 978-1-78218-844-5

Price: €19.99/2015

This is a book of photographs, capturing landscapes and portraits of Connemara. The author grew up in this beautiful region, in the townland of Recess. He tells of his childhood being idyllic - his summers free to roam the hills and roads with abandon. He cycled the region to such places as Roundstone, Doohulla, Ballyconneely, Clifden and Cleggan. Those journeys through the countryside had a permanent imprint on his mind as one can see from the photographs in this book. The first photograph of the mountains reflecting in the waters of the Inagh Valley is a wonderful introduction. Indeed it is my favour of over 100 photographs (captions for each are listed at the back of the book). The valley must be a special place for Mark Joyce as he has taken a number of others. I will mention a few of the photographs that stand out for me. Granny's hands taken at Recess tell a story of age and hard work, better than a thousand words. Young Sadie holding a spider crab shell over her face as only a child can. The shipwreck the Plassey washed ashore in Inis Oirr in 1960. This brought memories of my honeymoon on the island in 1962. The windswept hawthorn on the bog road at Roundstone shows how the weather can be severe so similar to an exposed area here on Sherkin. There are a host of beautiful photographs from throughout the region at Leenore, Dog's Bay, Roundstone, Inish Nee, Glinisk. The final section of the book is of 20 portraits of people in the region. His daughter Alice's cute smile, John cutting turf in the bog and the thoughtful face of Steven, who also features on the cover.

For those who hold Connemara dear to their hearts, this is a wonderful reminder of its wildness and its beauty. For those who have yet to visit, its a flavour of what's to come.

Biodiversity Ireland Identification Guides to Ireland's Ladybirds & Ireland's Trees and Shrubs

Swatches are available from the NBDC for €6.00 each (postage free).

Size: 8.5 cm x 12.5 cm.

The National Biodiversity Data Centre have introduced two new identification swatches to their series – one on Ireland's Ladybirds and the other on Ireland's Trees and Shrubs.

The Ladybird swatch provides information on the identification of 19 Irish ladybird species. Each species has its own "page" giving the name, description, distribution and further information, together with a colour illustration of the upperside and its possible variations. An illustration of the species's larval stage is also given, along with a life-sized scale drawing. Ladybirds are identified by the number of spots or streaks and colour on their upperside, varying from 2 spots to 24, depending on the species.

The second swatch describes the 35 native Irish trees and shrubs, with the exception of detailed willow descriptions. A tree is generally defined as a woody plant that is over 10m tall, with a single trunk. A shrub is a woody plant, generally under 10m with several trunks. Similar to the Ladybird swatch, each "page" features a different species, with a photograph of the leaf and the tree in bud, a small illustration of the tree shape, its average height, habitat etc.. The final "pages" contain a Winter identification keys, which will help your identify trees or shrubs based primarily on winter bud structure and arrangement.

Both of these laminated swatches, each of which would fit into your hand, are ideal for the classroom or to carry around on a countryside walk. They also include details for submitting recordings to the National Biodiversity Data Centre.

The Stonefly (Plecoptera) of Ireland – Distribution, Life Histories & Ecology

By Hugh Feeley, Jan-Robert Baars & Mary Kelly-Quinn

National Biodiversity Data Centre

www.biodiversityireland.ie

ISBN: 978-1-911172-01-7

Price: €22.00/2016

The Stonefly (Plecoptera) of Ireland – Distribution, Life Histories & Ecology is the first distribution atlas produced by the National Biodiversity Data Centre. Stoneflies are an important component of Ireland's freshwater habitats and, due to their sensitivity to habitat degradation and organic pollution, are a key water quality indicator group. The 82 page book presents the first comprehensive overview of the state of knowledge on this important group in Ireland.

The authors, Hugh Feeley, Jan-Robert Baars and Mary Kelly-Quinn, have combined detailed descriptions of stonefly ecology, comprehensive 10km distribution maps, complemented with beautiful images and photographs of all 19 species that occur in Ireland.

The Stonefly of Ireland dataset upon which this atlas is based is also published through the Data Centre's mapping system Biodiversity Maps, and the records are available for other researchers to use.

The Stonefly (Plecoptera of Ireland – Distribution, Life Histories & Ecology can be ordered online from the National Biodiversity Data Centre for €22 (inclusive of postage & packaging) http://www.biodiversityireland.ie/product/the-stonefly-plecoptera-of-ireland/

Biodiversity Ireland Magazine

www.biodiversity.ie

Biodiversity Ireland magazine is published twice annually by the National Biodiversity Data Centre (NBDC). The Autumn/Winter issue contains a very interesting article on the All Ireland Pollinator Plan 2015-2020, which sees 68 organisations enlisted to save our bees. We learn that without bees Irish farmers who grow such crops as strawberries, tomatoes and oil rape would have greatly reduced yields. Here in Ireland we have 98 different bee species, which include the honeybee, 20 different species of bumblebee and 77 species of solitary bee. The economic contribution of pollination by wild bees has been assessed at being worth €1,800 to €2,400 per hectare.

Padraig Whooley of the Irish Whale and Dolphin Group writes how his interest in whales began 23 years ago after attending an IWDG meeting in Trinity College, Dublin. Since then his life has been a journey identifying whales and dolphins, especially in West Cork where he lives. In recognition of his outstanding contribution to biological recording in Ireland the NBDC awarded him its Distinguished Recorder award in 2015. Other articles include "Catch the Bug" by Brian Nelson who introduces the shieldbugs with 15 wonderful colour photographs. Liam Lysaght, the Director of NBDC talks on "Why I record biodiversity".

This is an excellent magazine available online at http://www.biodiversityireland.ie/downloads/publications/biodiversity-ireland/

Heritage Churches of County Cork

A Review by Matt Murphy

THIS book is the third in a series of publications on heritage sites and buildings in County Cork, published as part of the County Cork Heritage Plan. The first two were the Heritage Buildings and the Heritage Houses of the County.

As part of this project, numerous Heritage Groups and individuals throughout the County were asked to get involved, by recommending the inclusion of any churches in their local area, together with any stories or details they could provide about them. There was a huge response, greatly outweighing the scope of the publication.

The book begins by explaining how through the millennia worship has always been a feature of human society. We learn about the rise of Christianity throughout the world but especially in Ireland. In Munster, tradition holds that Christianity was brought by three missionary saints, before the arrival of Saint Patrick in Ireland. They are Saint Ailbe of Emly in Tipperary, Saint Déclán of Ardmore in Water and Saint Ciarán of Cape Clear Island in West Cork. Through their work, and that of the many later Irish saints, the country was gradually converted to Christianity by the end of the sixth century. Many of these saints are associated with and actively venerated in various places across Cork, for example, the patron saints, Colmán, Finbarr and Fachtna of the respective modern Dioceses of Cloyne, Cork and Ross and Saint Gobnait of Ballyvourney, Saint Fanahan of Brigown (modern-day Mitchelstown) and Saint Molaga of Aghacross.

The history of churches in Cork County has been at least 1,500 years in the making. The type of church buildings evolved over time, from small timber structures, to bigger, more permanent buildings. Many of these large and impressive Heritage Churches remain in use today and this publication looks at these churches, aiming to create an awareness of the rich variety in age, size and style of this key part of the heritage of County Cork.

With over a thousand Heritage Churches in the county, it was not possible to include every church so thirty examples were selected. These range from St. Caithighearn's Church, Kilcatherine, south west in the Beara Peninsula, north to The Church of the Holy Cross in Charleville and east to St. Mary's Collegiate Church in Youghal, arguably the finest example of a medieval gothic church in County Cork, which has been in use for nearly 800 years.

The book carries us through the Early Medieval Period (5th to 11th century), the High Medieval Period (12th to 14th century), the Late Medieval Period (15th and 16th century) and on to the Post Medieval Period (17th to 19th century). Each chapter sets out the historical context of the period, including the major religious and societal developments and events that influenced changes in practices and places of Christian worship. An illustration showing the Timeline of Church Development over this time, gives a marvellous overview.

Example one of the Heritage Churches is an Early Christian Monastery at Tullylease near Charleville. The first monastery built on the site was of timber by St. Berrihert in the 7th century followed by the stone church in the 12th century. The ruin houses a nationally important collection of medieval grave slabs and other inscribed stones including St. Berrihert's grave marker, described as one of the finest Early Christians decorated cross slabs in Ireland. It is interesting to read that an aerial photograph by the late Dr. Daphne Pochin Mould (see *Sherkin Comment* No 59) confirmed the presence of the ecclesiastical enclosure at Tullylease.

The following are other examples that have been selected to represent the typical examples of each period of church building in the county: Saint Colman's Cloyne, is the long-standing cathedral for the Church of Ireland Diocese of Cloyne. As a cathedral, housing the bishop's throne or cathedra, it is the primary or 'mother' church of the diocese. An important, largely 13th century building, it is one of only a few large Gothic churches in Cork and is located on the site of the late 6th century monastery of Cloyne's patron, Saint Colman.

Also named in honour of Saint Colman, is Cobh's Catholic church, Saint Colman's Cathedral. Sitting overlooking the town and Cork Harbour, the building is both physically and metaphorically the pinnacle of Neo-Geothic architecture.

A short distance from Ovens is the magnificent remains of the 15th century Franciscan friary of Kilcrea. It presents a picturesque view of the upstanding built heritage of one of the powerhouses of medieval Christian worship in Cork.

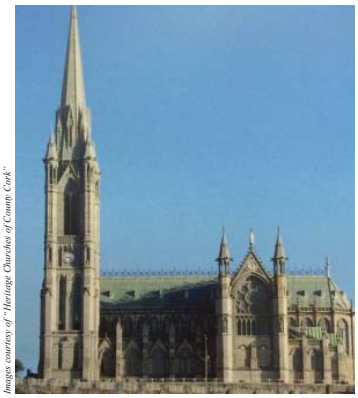
Saint Fachtna's, Rosscarbery, is the smallest cathedral in Ireland and is still in use as the cathedral church of the Church of Ireland Diocese of Ross. Dotted throughout the book are "Did you know...." For Saint Facthna's: Inside the narthex of the cathedral, above the door to the western porch, is the carved head of a bearded Saint Facthna. Kissing this stone is reputed to be a cure for toothache!

St. John the Baptist Church in Kinsale is set on the hillside overlooking the town and was completed just three years after the passing of the Roman Catholic Relief Act of 1829. It represents a significant phase of expansion and construction for the Catholic Church, replacing an earlier, less ostentatious building, which stood on the same site.

The landmark Methodist Church in Bandon stands at the eastern end of the town centre, at Bridge Street. Bandon, because of its historical background, as a newly settled plantation town, has a large number of churches of various denominations.

The Sisters of Mercy Convent in Bantry was one of a number of educational religious institutions built throughout Cork in the 19th century. The purpose of the convent at Bantry was to provide education to girls of the prosperous town and its locality, across the spectrum of lower and middle class Catholic families. We read that the construction of the convent and chapel in the 1860s and 1870s was only possible as a result of donations by the Murphy family, of Murphy's Brewery fame. Fanny Murphy was one of the founding sisters of the convent.

Many of the churches featured in this publication are subject to statutory protection. The early to late ruined medieval churches are generally considered to be of archaeologial importance, while churches post-dating 1700, most of which are still in active use, are generally included in the Record of Protected Structures and afforded statutory protection. Some churches by virtue of their combined archaeological and architectural importance may be protected under both the National Monuments Act 1920-2004 and the Planning and Development Act 2000-2010. Some Heritage Churches, however, have no formal protection.



Images courtesy of "Heritage Churches of County Cork"

Clockwise from top left: Kilcatherine Church, Eyeries on the Beara Peninsula; Saint Colman's Cathedral, Cloyne; St. Colman's Cathedral Cobh, the interior of St. John the Baptist Church, Kinsale.

Also included in the book is a Pictorial of Additional Heritage Churches of County Cork, such as St. Columba's Catholic Church in Douglas, Tullig (or Tullagh) Church of Ireland, just outside Baltimore, the Catholic Church of the Most Holy Rosary, Kilcoe, the Methodist Church in Clonakilty, Church of Ireland parish church in Inchigeelagh and the early 19th century Catholic Church on Cape Clear.

This is a fascinating book. It gives a real insight into the development of the county's Church buildings throughout history. The book highlights the significance of these buildings in their communities, buildings which many may have taken for granted or given a second thought to in heritage terms. The work that the Heritage Unit of Cork Council has been carrying out, documenting various aspects of the County's heritage sites and building is providing an important record for us and future generations.

Heritage Church of County Cork. Heritage Unit Cork County Council.
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JUNIOR PAGES

Black John the Bogus Pirate

By John Joyce

AVAST there, Mates! Did you know that the ocean covers 70% of planet Earth and creates 50% of the oxygen in the atmosphere – enough for 'Every Second Breath' that we take? Did you know that more people (12) have WALKED on the Moon that have even SEEN the deepest part of the ocean directly? Or that plastic waste – when dropped into the ocean – never EVER goes away! 'Ocean Literacy' is all about 'understanding the ocean's influence on YOU and YOUR influence on the ocean'. It is based on SEVEN PRINCIPLES:

1. THE EARTH HAS ONE BIG OCEAN WITH MANY FEATURES
2. THE OCEAN AND LIFE IN THE OCEAN SHAPES THE FEATURES OF EARTH
3. THE OCEAN IS A MAJOR INFLUENCE ON WEATHER AND CLIMATE
4. THE OCEAN MADE EARTH HABITABLE
5. THE OCEAN SUPPORTS A GREAT DIVERSITY OF LIFE AND ECOSYSTEMS
6. THE OCEANS AND HUMANS ARE INEXTRICABLY INTERCONNECTED
7. THE OCEAN IS LARGELY UNEXPLORED

Over the next few issues of *Sherkin Comment* we'll be looking at these seven principles, finding out where you can learn more about them and have a lot of fun along the way.

In the meantime, here are some resources to get you started:

www.explorers.ie – The Marine Institute's Education page for schools
http://oceanliteracy.wp2.coexploration.org/ - Great ocean literacy site with lots of resources and information.
http://www.emsea.eu/ – Home of European Marine Educators Association
And, of course, the excellent Sherkin Island 'Children's Corner' at:
http://www.sherkinmarine.ie/childrenscorner.htm

Join me – 'Black John the Bogus Pirate'- on Facebook at
https://www.facebook.com/BlackJohntheBogusPirate/

1st PRINCIPLE - The Earth has One Big Ocean with Many Features

While we talk about 'The Seven Seas', planet Earth has only ONE ocean to which every sea is connected. This not only makes it possible to sail from one 'Sea' to another all over the world, but for every sea to influence all the others.

The Ocean is the largest single feature on the planet. It contains mountains higher than Mount Everest and canyons many times longer and deeper than the Grand Canyon. It regulates the world's climate by stabilising the temperature of the Earth and by creating an atmosphere, which protects life on Earth from the most dangerous forms of radiation from the Sun including intense ultraviolet light. The atmosphere, created by the Ocean, also protects us from small meteorites, which burn up due to friction with the atmosphere before hitting the surface.

Bringing the Ocean to the Classroom

While few countries have 'Ocean Studies' as a dedicated subject on their school curricula, it is possible to 'marinise' existing curriculum strands by using marine examples. A good example of this is the 'Explorers' Education Programme, which is supported by the Marine Institute, and is funded under the Marine Research Programme by the Irish Government. It is tuned to the Irish SESE curriculum.

For Fun Facts check out
www.spindriftpress.com

Flotsam & Jetsam

The strandline is a marine environment where unusual objects are sometimes found. If you walk on the shore, along the high tide mark, you will often find debris that has been left behind by the outgoing tide. These may be animals and plants that have been drifting in the sea, having been washed off the rocks. They may also have come from deeper waters, either floating freely or attached to wreckage. Much of what is found is possibly dead. Due to the pounding of the waves, it is usual to find only small pieces of plants or animals. It is important to remember this when you are trying to identify them, as they can look very different when whole. It is not possible to list everything that could be washed up. The ocean covers a huge area, and is inhabited by countless animals and plants. Here is just a sample of what can be seen.

Common Cuttlefish

The Cuttlefish (see inset) belongs to the same family as the Octopus and Squid and lives in bays and estuaries. When the Cuttlefish is alive, the bone inside its body has many tiny holes which fill with gas. These help it float.

When the Cuttlefish dies and decays, the bone floats about in the water for a long time and is sometimes washed up on the shore.

The Mermaid's Purse

The Mermaid's Purse is the egg case laid by the dogfish in deeper waters. It has long, twisted tendrils on each corner which are used to anchor the egg case to seaweed or other structures on the sea bottom. It is light brown and almost see-through. The egg case is usually only seen when it is washed up on the shore, and then it is often dry and hard. It is normally empty, as the young fish will have hatched by the time the case is washed ashore.

Rubbish

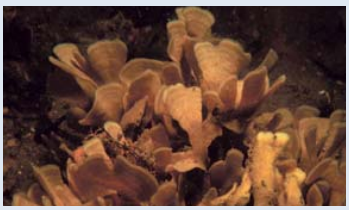
Unfortunately not everything that washes up on the shoreline is totally natural. The tide can often brings in rubbish, which has been dumped into the sea. Be careful what you touch as it may be dangerous.

Common Whelk Eggmass

The eggs of the Common Whelk look like a mass of bubbles stuck together, each "bubble" containing one egg. When the eggs are freshly laid, they are spongy but they are rarely seen in that state. Usually, the egg-masses are empty by the time they have been washed up on the shore, as the young will already have hatched. The egg cases dry out on the beach and become very brittle.

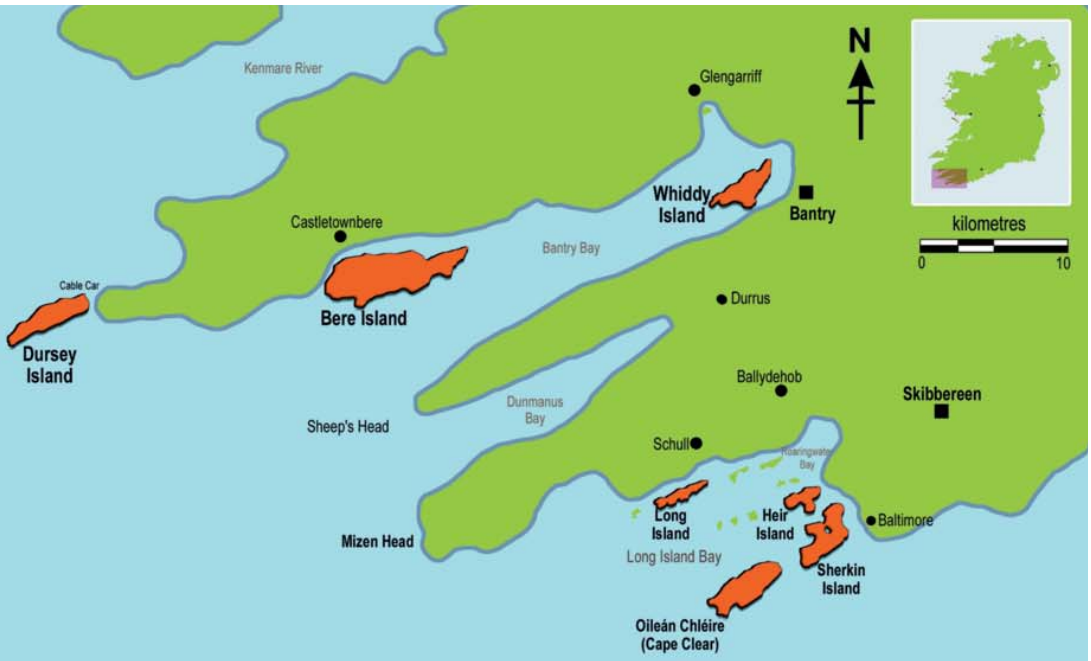
Hornwrack

Hornwrack looks like a plant, but in fact it is made up of many animals living together in a group, or colony. It is found in deep waters, and is only seen on the seashore when it is washed up after storms. In deeper waters, it can be found growing in huge beds on rocks and stones where it also provides food and shelter for a large variety of creatures.



From the book: *"A Beginner's Guide to Ireland's Seashore"* (see below). Images Paul Kay.

In West Cork, on the southern coast of Ireland, there are seven inhabited islands: Dursey, Bere and Whiddy in Bantry Bay and Sherkin, Heir, Long and Oileán Chléire in Roaringwater and Long Island Bays.
Each has their own unique features, helping to make them special places to live on or visit.
To find out more about these islands, go to: www.westcorkislands.com. To explore all of Ireland's islands go to: www.discoverireland.ie



West Cork Islands

Find the Island

With the help of the map above, can you match the photograph with the island?
(Answers on page 30)

Images courtesy of Robbie Murphy

1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____

North, South, East or West? (Answers on page 30)

a. Is Sherkin Island nearer to Whiddy Island or Dursey Island? _____
b. Name the island which can be reached by cable car. _____
c. Which island is the most southerly in Ireland? _____
d. Which is the largest inhabited island in West Cork? _____
e. Which island is nearest to Baltimore? _____
f. Which island is nearest to the town of Bantry? _____
g. Which island is nearest to Schull Harbour? _____
h. Which island is north of Sherkin Island, in Roaringwater Bay? _____

ISLAND SEARCH (Answers on page 30)

Bere * Dursey * Heir * Long * Oileán Chléire * Sherkin * Whiddy

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

Make your way around the inhabited West Cork Islands. Take turns to roll the dice and move the relevant amount of spaces. First to arrive back at the pier is the winner.

GAISCE – *the President's Award*

Golden Day for Gaisce Awardees

2015 marked a big milestone for Gaisce as it celebrated 30 years in operation.

Images courtesy of Gaisce – the President's Award

FORTY SEVEN young people from across the island of Ireland were celebrating recently as they were presented with Gaisce Gold Awards by President Michael D. Higgins at a ceremony which took place in Dublin on December 7th.

In order to achieve the Gaisce Gold Award, the young people successfully completed five challenge areas for a minimum of 52 weeks - developing a personal skill, volunteering in their community and participating in a physical activity. The Awardees also embarked on a five day Adventure Journey and a week-long Residential Project as part of their Gaisce Award challenge.

Patron of Gaisce, President Michael D Higgins attended the special ceremony at Dublin Castle where he met with the Awardees and their families. Former Rose of Tralee and Gaisce Bronze Award holder Maria Walsh was MC for the occasion.

Margaret Tobin from Carrick on Suir was among the Gold Awardees at December's ceremony. Margaret is the third sibling in her family to complete the Award. For her Adventure Journey challenge, Margaret completed a cycle in excess of 300 KM, which took her across counties Tipperary, Waterford, Wexford and Kilkenny. Margaret said "through taking part in Gaisce I learned that personal development occurs everyday through everything we commit ourselves to".

Liam Quigley a past pupil of Cashel Community School volunteered with the Order of Malta for his Community Involvement challenge. Liam found that his Gaisce Gold experience helped him to decide to pursue a career in music, he said "I personally feel that through Gaisce, I found my passion for singing and performing up on stage. Singing led me to study Musical Theatre in DIT Conservatory Music and Drama".

Some Awardees travelled abroad to complete their Residential Project challenge. Jack Pearson from Manorcunningham in Donegal travelled to Thailand to volunteer at a rehabilitation centre for people living with AIDS and HIV. Recalling his Gaisce experience, Jack said "I have learned that I am capable of much more than what I thought, this experience has opened up doors for me within many areas of social and professional life".

Speaking at the Gold Award Presentation ceremony, John Concannon, Chairman of Gaisce – The President's Award said "The Gaisce Gold Award challenge is not an easy one – it demands motivation, determination and focus over the course of weeks, months and in many cases, years. I would like to congratulate all of the Gold Award recipients today on completing the Gaisce Gold Challenge."

Over 20,000 young people participate in Gaisce each year. 2015 marked a big milestone for Gaisce as it celebrated 30 years in operation. Since 1985 over 300,000 young people have participated in Gaisce.

For more information on Gaisce - The President's Award or to rise to the Gaisce challenge, visit www.gaisce.ie

From top: **President Michael D. Higgins presenting Gaisce Gold Awards to Margaret Tobin, Liam Quigley and Jack Pearson.**

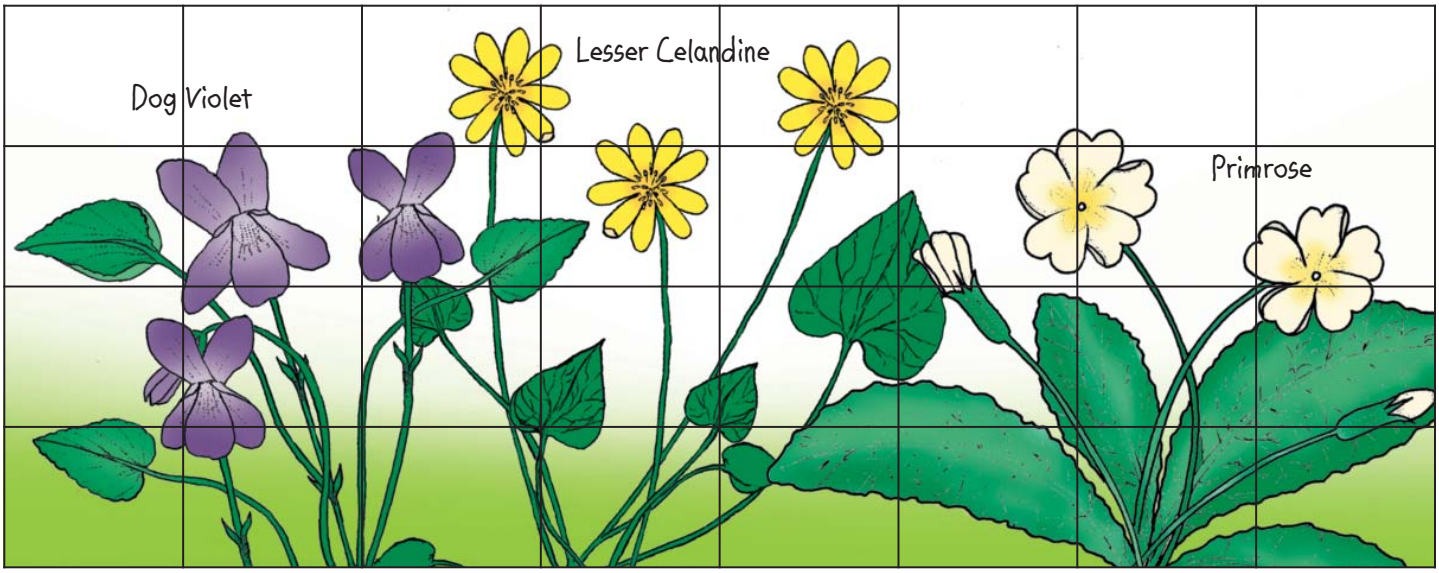
ANSWERS TO WEST CORK ISLANDS - PAGE 28:

Find the Island: 1 = Whiddy; 2 = Oileán Chléire; 3 = Sherkin; 4 = Bere; 5 = Heir; 6 = Long; 7 = Dursey

North, South, East or West? a = Whiddy; b = Dursey; c = Oileán Chléire; d = Bere; e = Sherkin; f = Whiddy; g = Long; h = Heir.

Island Search (Over,Down,Direction): Bere (9,3,SE); Dursey (14,6,NW); Heir (9,4,NE); Long (1,5,E); Oileán Chléire (1,2,E); Sherkin (7,3,E); Whiddy (15,6,N).

WILD BLOOMS



Images courtesy of Sherkin Island Marine Station/Audrey Murphy

SPRINGTIME and early summer on the islands of West Cork (see page 28) means the arrival of colourful flowers. If you visit at that time, here are three flowers that you see on most of the islands.

This is also an opportunity to make your own jigsaw. You can cut each square of the flower scene above (make sure you have permission to use the scissors) and place each piece in the correct box on the empty grid.

If you don't want to cut the pieces then you could just be creative and draw the picture into the empty grids, square by square.

Common Dog Violet

Viola riviniana

Sailchuach chon

The Dog Violet is perhaps the commonest wild violet. A perennial, it is found on hedge-banks, grassy places, woodlands and on mountains. The flower, which blooms from April until June, has no scent and some late season flowers have no petals. Its seeds are dispersed by ants.

Lesser Celandine

Ranunculus ficaria

Grán arcáin

Lesser Celandine is one of the first wild flowers of the year. A low growing perennial, its dark heart-shaped leaves provide a beautiful backdrop to its very glossy yellow petals. It is widespread and common in damp shady places and is considered by some to be a garden weed. By midsummer, all the plants have withered, but survive below ground as a cluster of small tubers, ready to sprout again in late winter.

Primrose

Primula vulgaris

Sabhaircín

The Primrose is a low perennial and a favourite of many. It has a rosette of long crinkly leaves from which grow pale yellow flowers with deep yellow centres. These flowers are sweetly scented. It is widespread in woods, scrub, grassy banks, sea cliffs and on mountain ledges. It has been exterminated in some areas, having been dug up and removed to gardens.

Recycling Stories from the US

By Mike Ludwig

HAVE you ever wondered what happens to the materials we recycle? Moreover, are we really helping the environment, are just postponing being buried by the things we throw out whether in a trash, or recycle bin? The answer appears to be a mixed story of varying degrees of success and failures. Successful recycling requires attention to details to get the intended benefits. For instance, it takes only a few coloured bottles in the clear glass bin to destroy the value of the whole bin. If the coloured glass is broken, removing it is not cost effective. The glass recycler will use the bin as coloured glass at considerably diminished value (coloured glass is currently worth about US$2.00 per ton. Clear glass is worth about US$100.00 per ton.). Another problem is that relatively few materials are designed to be recycled and so the energy needed to complete a recycling effort can exceed the amount needed to create new items. This makes recycling that product uneconomical and impractical. Glass, aluminium and most metals in general, can be recycled with only minor losses. However, all too often those recycling processes generate pollutants that must be removed by the recycler. For instance, steel recycling is reported to be a source of the highly hazardous Dioxin family of toxic compounds.

Another problem is that many materials do not have the ability to be recycled indefinitely. Often, recycling is possible only two or three times before the material can no longer be recycled. Once a material reaches that state it must be disposed of in more conventional and usually destructive ways. Plastics are the worst of the recycled materials. A plastic soda bottle can be recycled into fleece for jackets, non-food containers, commercial-grade carpet, plastic lumber, and park benches but the change cannot be reversed. The jacket, park bench or deck lumber cannot be recycled into another soda bottle so at the end of its second service life it is waste. This phenomenon, known in the industry as "cascading" or "downcycling," has a troubling consequence. It means that most plastic – including the tiny proportion that finds its way into another bottle will eventually end up in the landfill.

Reflective of this are the number of new plastic products placed into service and by how much they exceed the recycling that does occur. For instance, the water in plastic bottles business caused plastic bottle production to skyrocket in the mid-1990s. Production of all plastic packaging increased by 1 billion pounds in a single year during that period. Over the same period, the estimated amount of plastic collected for recycling rose by just 69 million pounds. Using the reported values of new production versus recycled indicates that for every 14-ton increase in new plastic production there was a one-ton increase in plastics recycling. While recycling has increased significantly from those years, the evidence is clear that plastics are not meeting recycling objectives. The litter seen on land and sea are evidence of this. Similarly, the U.S. recycling rate of paper rose to 65.4 percent in 2014, up from 63.5 percent in 2013. Approximately 35 percent of the paper we use is not being recycled.

Sometimes a recycling effort falls prey to optimism. When New York City decided to use recycled glass (crushed) as a component of asphalt pavement one of the first efforts was a roadway in front of the US Environmental Protection Agency in lower Manhattan. While the presence of glass in the pavement presented no danger to humans or damage to vehicle tires, there were problems. The City discovered two interesting and negative characteristics; the material reflected a lot of light, and when the pavement was wet, it became surprisingly slippery. Deemed serious problems, the pavement was quickly replaced. The biggest limitation from these discoveries was that glassphalt use must be limited to lower-speed roadways thus missing out its application to build or repair high-speed highways where pavement demand is high.

Finally some good news! Aluminium, steel and other metals come from metal ores. They require mining, extracting, shipping and refining which are very energy-intensive and polluting processes. Recycling aluminium, steel and other metals is a much greener process that requires far less energy and creates much less pollution (usually). It is estimated that recycling aluminium cans requires just 5 percent of the energy needed to make a new one. Unlike recycled plastics and other items, there is no significant downsizing to metals recycling. Typically, well over 95% of aluminium cans are recycled. Moreover, the process is so fast that a recycled can be back on store shelves as a new can in just 60 days. Aluminium recycling is among the environmental movement's great success stories.

The recycling of aluminium, steel and other metals is a much greener process than that of other materials.

Environmentalists may point to the success of aluminium and other metals recycling, however, the success of metal recycling usually comes down to money. Scrap metal prices have soared in recent years. Although price is driven by demand, costs of extraction, shipping and other factors, recycling is likely to remain cheapest. Helping this along are municipalities and retailers that have found that metal, especially aluminium recycling centers are popular with customers, and aluminium manufacturers are willing to pay for recycled metals since they save money over using virgin metal ores.

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