



SHERKIN COMMENT

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ESB Environmental
Photography Awards

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by Elizabeth Maguire (age 14)

- a winner in the Junior section of the
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Editorial

Back to Nature

By Matt Murphy

THERE is a major crisis today in Ireland in the voluntary sector. A selfishness seems to have taken over people's lives so much so that they have either no interest or no time to get involved with voluntary organisations. We hear of Simon - who care for the homeless and the St. Vincent de Paul Society - the great champion of the less well off, having great difficulty in finding people to help on a voluntary basis. Sadly, this shortage of people willing to give some free time to groups or organisations is widespread in many organisations throughout the country.

One group who have always lacked support are those involved in the environment. When one looks at their membership numbers and age profile it shows they have failed to attract the younger generations. The issue has never been addressed.

We have seen, in recent years, the wonderful developments made in Natural History teaching within primary schools. Most young people have a far greater awareness than their elders on what is needed to protect our environment for the future. They believe in recycling, in conservation and in the protection of wildlife - both terrestrial and marine. But with this huge reservoir of talent, why are they not being drawn into the environmental organisations in Ireland? This is a question that needs to be addressed urgently by the likes of An Taisce (membership 3,600), BirdWatch Ireland (6,000) and Irish Wildlife Trust (2,000).

There is a now a special fund introduced for 2001 to be administered by the Department of the Environment and Local Government for voluntary environmental groups, which will help to support and develop their administrative structures. Maybe some of this money can be channelled to encourage the

forming of small local groups that will organise terrestrial and marine field days in their localities to encourage young people to get out and learn about nature. If one compares Ireland's progress with environmental organisations in Britain we pale in comparison. The membership of many such groups runs to hundreds of thousands and overall is close to 1½ million. Ireland's environmental groups combined only number around 16-17,000. On a population comparison basis then Ireland's groups should have membership of at least 75,000. But what is even more damning is that in Ireland we have a mere handful of naturalist clubs. Most groups are local protest groups, normally with a specific issue. When the issue goes away the group usually goes to ground.

but a few I could mention. However, there is one very special one which, if young people become "hooked", will become a lifetime passion - and that is nature. This hobby can be developed in so many directions - plants, birds, seaweeds, insects, butterflies and moths - to name but a few.

Maybe Ireland's environmentalists should ponder on why Greenpeace, the international environmental group who blazed a trail in environmental protests in the 1980s and early 1990s had to retrench worldwide closing offices, reducing staff because of greatly reduced donations from the public. Did people tire of the same old negative rhetoric and hype from the organisation instead of giving leadership in a positive way?

Many companies in Ireland today have active social clubs, which looks after the social interests of members. Perhaps this would be a good place to start encouraging the formation of a naturalist club for adults and children? A golf outing is the norm in most companies - why not a guided day trip to the seashore?

We have, in this issue of "Sherkin Comment", included three articles on very special people who have contributed so much to Ireland's natural history, two were born in the 19th century, the other in the 20th century. They are Major Robert F. Rutledge - ornithologist (birds), Ms. Kathleen King - bryologist (mosses) and Tony O'Mahony - botanist (wild plants). Each has led by example and dedication. We need to have more naturalists, not three but thousands, who will follow in the footsteps of these wonderful people. They are there waiting to be encouraged, in every corner of the country and from all age groups. Can Ireland's environmental organisations meet the challenge and give them an opportunity to understand and enjoy the wonders of nature? If not, then these organisations have not delivered on the aims and commitments of their founding members.

"I believe young people need a hobby...there is one very special one which, if young people become "hooked", will become a lifetime passion - and that is nature."

Recently an EU report put Ireland's young people at the top of the European hard drinking league. The Minister for Health, Michéal Martin, responded by stating he was introducing a major national alcohol awareness campaign. He stated "All round they are drinking more, being drunk more often and binge-drinking is a particular phenomena. The statistics are shocking. We must stop kidding ourselves and face up to the reality of our national alcohol problem." However, whilst the Minister's campaign is good in itself, it will not succeed unless this massive teenage drinking habit can be replaced by something more positive for the young people concerned. I believe young people need a hobby that they can enjoy like angling, hillwalking, camping, canoeing, stamp collecting are

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ROBERT F. RUTTLEDGE

The Doyen of Irish Ornithology

By Oscar Merne

MY own interest in birds started at an early age: I have distinct memories of hungry Redwings and Fieldfares coming to the garden bird table during the heavy snows of 1947. At the age of twelve, in the mid-1950s, I was old enough to become a member of the Dublin Naturalists' Field Club, and, naturally, gravitated towards its Bird Group. By this stage I was beginning to realise that there was a literature on Irish birds - documenting the status and distribution of birds in Ireland, not simply aids to field identification of birds - and three names stood out as the people responsible for much of this: Kennedy, Rutledge and Scroope, who published *The Birds of Ireland* in 1954. But to me these were enigmatic figures, senior ornithologists, operating on a much higher plane than a young beginner. After a couple of years I was old enough to "graduate" from the DNFC Bird Group to the august Irish Ornithologists' Club (one of the founding constituents of the present-day BirdWatch Ireland), which published the annual *Irish Bird Report*. The editor of this report was R.F. Rutledge. But he remained an enigmatic figure for some time as he lived near Lough Carra in (then) remote Co. Mayo and did not come to the Dublin meet-



"Irish Bird Report - First Annual Report 1953", which was edited by R.F. Rutledge

ings of the IOC. However, as the ornithological career of myself and a couple of other young friends progressed we started to make observations of birds which were worthy of inclusion in the *Irish Bird Report*, so we plucked up courage and started to write to the Editor. To our great surprise and delight we got back not short minimalist replies thanking us for our contributions, but long, enthusiastic, hand-written letters of great encouragement - and sometimes of great tact when some of our over-imaginative observations could not be accepted for publication in the scientific record!

Since those early days in the 1950s I have enjoyed nearly fifty years of continuous contact with "The Major" (as he was affectionately called by his many ornithological friends and correspondents), and his unflagging enthusiasm, encouragement and ever-enquiring intellect have been a tremendous stimulant to me and others in delving into a whole range of questions on the status and distribution of Irish birds, and their conservation. As I write this I am happy to report that Robert (Robin) Rutledge is now living in his third century and, although now confined to a nursing home, is as keen as ever on what is happening in the ornithological world. His latest letter to me urges further enquiry as to where Little Gulls are out at sea when not driven inshore by gales.

Robin Rutledge was born in Carlow in 1899 but he moved to Co. Mayo as a young boy and there began what turned out to be an unbroken (and unprecedented) run of diaries, journals and meticulous recording of bird observations covering ninety years. At the age of seventeen he published his first notes on birds in Mayo in the *Irish Naturalist* and the *Zoologist*. A long series of notes, papers, contributions to reports, the editorship of the *Irish Bird Report*, and several

books, followed throughout most of the 20th century. In recognition of this major contribution to the scientific ornithological literature Dublin University awarded Robin Rutledge with an honorary doctorate in 1981.

Professionally Robin Rutledge was a soldier, serving in the Indian cavalry from 1918 to 1942, and attaining the rank of Major. He was awarded the Military Cross. Throughout this period, while on leave at home in Mayo, he continued his bird observations and published frequently in the *Irish Naturalist/Irish Naturalists' Journal* and *British Birds*. On his retirement and return to Mayo one of the first quests he embarked on was a search for the elusive nocturnal Leach's Petrel, which took him to dozens of remote and nearly inaccessible islands on the west coast. This was done in the days before mist-nets and portable tape recorders, which make petrels searches today a much easier task, and provided the first comprehensive data on the distribution of Storm Petrels in Ireland.

Bird migration was always one of Robin Rutledge's great interests and soon after the establishment of Bird Observatories in Britain he founded the Bird Observatory on Great Saltee. This operated from 1950 to 1963 and provided much valuable information on the movements of birds in spring and autumn. The Observatory was also the only place in Ireland where one could systematically train as a bird ringer. This is where I started bird ringing in 1959, an activity which continues to this day as part of my research work with National Parks & Wildlife.

Robin Rutledge was passionately concerned about the conservation of Irish birds, especially waterfowl and their wetland habitats, which, over his long life, he had seen diminishing through drainage and land claim. He was largely responsible for the establishment of the Wexford Wildfowl Reserve on the North Slob, which was the wintering ground for about half the world population of the threatened Greenland White-fronted Goose. I have very fond memories of the ten years which I spent there as the first warden of the reserve.

He was an enthusiastic founding member of the Irish Wildfowl Committee, which later became the Irish Wildbird Conservancy/ Bird-Watch Ireland. The organisation honoured him by appointing him as its first president and, later, by naming its headquarters Rutledge House.

This brief article is an attempt to summarise just some of the highlights of the ornithological career of a remarkable man, whose contribution to bird science and conservation over most of the 20th century has been enormous. Equally important, in my view, is the enthusiastic encouragement and leadership which Robin Rutledge gave to people of my generation. I thank him for this and wish him well in the 21st century.

Oscar Merne heads the Bird Research Section of National Parks & Wildlife, Dúchas The Heritage Service, 7 Ely Place, Dublin 2.

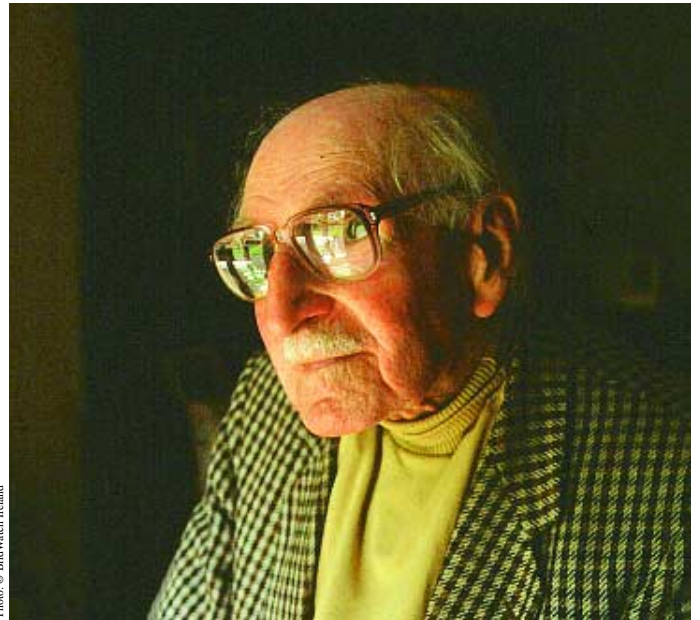


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Robin F. Rutledge, whose contribution to bird science and conservation over most of the 20th century has been enormous.



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CINDERELLA ELEMENTS

By Anthony Toole

IF a person were stopped at random and asked to name as many of the chemical elements as possible, he would readily list about a dozen. With a little prompting, it is likely that this figure could be doubled. If a few names were suggested, the same person would probably admit familiarity with some of them. The full total, however, would be unlikely to rise above about forty. This is fewer than half the existing elements.

Some elements, like oxygen, nitrogen and carbon are everywhere. Most people could mention two or three uses for iron, copper, aluminium and several other elements. They could almost certainly state one use for less familiar elements such as tungsten, perhaps, or vanadium. Even rare elements, such as gold, silver and platinum are well known. But the majority would lie outside their knowledge. The chemistry specialist also, who may well be able to name all the elements, would be hard pressed to give one useful piece of information about a high proportion of them.

Yet many of the lesser-known elements turn up in unexpected places. They often have everyday uses that remain unacknowledged. Some have a variety of functions, while others are limited in their applications. Still others are finding increasing usefulness as technology advances and the demand for new materials with novel properties expands.

Most elements are metals, and as such are often alloyed with other metals to enhance their properties or the range of their applications. Many are not rare, and their lack of use frequently reflects the lateness of their discovery.

Zirconium is more abundant in the earth's rocks than copper, lead, zinc, tin and other well-known metals. It has been known in semi-precious stones, such as zircon, for many centuries, but was not isolated as the pure metal until 1824. It is non-toxic, environmentally safe and does not corrode at high temperatures. Zirconium metal is used widely to make the cans that hold fuel rods in nuclear reactors, as it does not absorb neutrons and so, unlike other metals, does not become radioactive. Its compounds are replacing those of lead in

paints, and its hydrochloride is taking over from the aluminium equivalent in some deodorants. Zirconium phosphate is used in kidney dialysis machines.

The dioxide of zirconium is remarkably strong and stable. It can withstand the corrosiveness of hot acids, alkalis and metals. It is almost as hard as diamond, yet remains as flexible as steel, and is at the forefront of a new generation of ceramic materials.

In the Periodic Table, zirconium is bracketed on the left and right by the metals yttrium and niobium. At temperatures close to absolute zero, minus 273 degrees centigrade, metals will conduct electricity without resistance, a phenomenon known as superconductivity. Alloys containing yttrium and niobium have shown the ability to superconduct at much higher temperatures, a property that has implications for the generation of electricity at low cost.

A compound containing lithium and niobium has shown promise in the field of holography, in which data can be stored and retrieved in 3-dimensional form by the use of lasers.

The elements that appear below yttrium, zirconium and niobium in the Periodic Table also have uses, despite their relative obscurity. Lanthanum, for example, is a metal that gives strength to alloys of aluminium and magnesium and some steels. It is also used to create a spark in lighter flints. Hafnium and tantalum are added to tungsten, the metal with the highest melting point, in the manufacture of the filaments in electric light bulbs.

Near neighbours of these elements, osmium and iridium form alloys that are hard wearing and do not easily corrode. They are used widely in spark plugs and to make the writing tips of pen nibs.

Pollution is a major problem in the modern world. The burning of diesel oil in buses, lorries and an increasing number of cars produces fumes containing particles of carbon that are much larger and more abundant than are found in the exhaust emissions from petrol engines. These particulates can cause lung ailments and may even conceal cancer-causing agents. Small quantities of an oxide of lanthanum's next-door neighbour, cerium, when added to diesel fuel, effectively eliminates the

particulates. As the effect of the cerium oxide is catalytic, it has been estimated that less than 2kg would be sufficient to eliminate this form of pollution for the lifetime of an average diesel engine.

Cerium sulphide is a non-poisonous, red solid, and has become an important alternative to more toxic pigments, such as those containing lead and cadmium, in the manufacture of paints.

Europium, like hafnium, is an element that was not discovered until the beginning of the 20th Century, and has found a uniquely 20th Century everyday use. The colours on the screens of colour televisions are caused by chemicals that phosphoresce when struck by an electron beam. The colours of the earliest TV's were quite insipid, because of the lack of a red phosphor of sufficient intensity. This problem was solved by the discovery of a europium-yttrium oxysulphide that emits a much stronger red colour than previously used compounds.

Europium was, of course, named after Europe. The American equivalent, americium, which appears directly below europium in the Periodic Table, did not even exist until mid-way through the 20th Century. It is manufactured in nuclear reactors and is itself radioactive. Despite its obvious dangers, it saves many lives through its employment in smoke detectors and fire alarms. Inside the smoke detector, the radiation from the few micrograms of americium present causes the air to ionise into electrically charged particles. These in turn cause a small electric current to flow in the detector. The presence of smoke interrupts this process and the current falls, triggering the alarm.

The small sample of elements discussed here is by no means exhaustive. As the 21st Century gets under way, new technologies as yet undreamt of will emerge. Some elements exist in such small quantities that they will never find extensive use. Many others, however, have properties that are at present of only curiosity value, but which will undoubtedly provide their own unique solutions to the problems these technologies will pose.

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Answers That Matter

WASTE LICENSING REPORT 1997-1999

By Dr. Ted Nealon

THE Environmental Protection Agency (EPA) published its first report on waste licensing on 15th January 2001, covering the years 1997-1999. A new system of integrated waste licensing was introduced in Ireland in March 1997 under the Waste Management Act, 1996. The EPA was given responsibility under the Act for licensing significant waste recovery and disposal activities. The system was phased in over the period from May 1997 to October 1999.

An earlier EPA report, *Local Authority Landfill Sites in Ireland: A report for 1995-1997*, provides useful data for an assessment of progress in the management of landfills. A comparison of the two reports shows that significant progress in the design, construction, management, operation and monitoring of landfills has occurred. The latest EPA report identifies the most significant issues related to licensing as: management of landfill gas, discharges to groundwater, site management and a need for effective communication between licensees and local communities.

In the period 1997-1999, 136 applications for waste licences were received. Half of the applications made related to the operation of landfills, both local authority and private (71 facilities), with a further 29 applications related to transfer stations. Thirteen hazardous waste transfer and treatment facilities also applied for licences in the period. The remaining applications were for healthcare waste facilities, composting operations and contaminated land remediation.

One of the strengths of the waste licensing system is the opportunity for the involvement of those concerned and the general public in the decision making process and by December

1999 over 7,500 submissions on waste licensing application had been made. The EPA welcomes such public participation in the licensing process and has found it of significant assistance in making decisions.

Of the 136 applications made by the end of 1999, three applications were subsequently withdrawn or held to be invalid. Of the remainder, 30 activities were licensed by 31 December 1999 and nine were issued with proposed decisions (draft licences) by the end of 1999. By the beginning of 2001, the number of applications had risen to 148 of which 67 had been licensed with another 16 having proposed decisions issued in respect of their applications.

The most significant issues that the EPA has identified from licensing to date relate to the management of landfill gas, discharges to groundwater and surface water, site management and communications between licensees and local communities.

Many of the landfills licensed in 1999 are required to undertake significant engineering works under the conditions of their licences to improve landfill gas management and provide additional safeguards for groundwater and surface water quality.

All waste licences require a licensee to appoint a Facility Manager who has primary responsibility for the operation of a facility. The EPA believes that all significant waste facilities should have suitably qualified and experienced Facility Managers and Deputy Managers. The EPA has noted that the appointment of a Facility Manager at landfills often results in a marked improvement in the standard of operation.

The development of a communications programme to address the problem of local community concerns about the environmental impact of waste facilities is also a requirement of waste licences. The EPA considers that an important component of these programmes is the

“The advent of waste licensing, on its own, does not mean an automatic improvement or sudden adoption of best practice.”



Proposed decisions and licences are available from the EPA website - www.epa.ie

formation of a local liaison committee and regular meetings between the operator and the committee.

The advent of waste licensing, on its own, does not mean an automatic improvement or sudden adoption of best practice. This requires a determined effort by all involved and an acceptance that times have changed. The EPA, for its part, undertakes to process licence applications and enforce all waste licences in an effective, open and transparent manner.

Having issued waste licences the emphasis shifts to enforcement and compliance. The EPA considers compliance to be fundamentally important and takes its enforcement role seriously. Each licensed facility is inspected and audited regularly by the EPA.

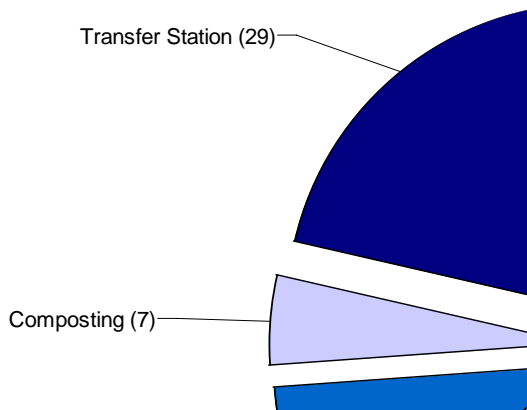
The EPA looks forward to continuing the work of raising Waste Management standards.

We are conscious of the pressing need for the necessary infrastructure to be put in place for the separate collection, recovery and safe disposal of waste so that a truly integrated approach to waste prevention and management becomes standard practice in Ireland.

All files and correspondence relating to a waste licence application are available to the public and proposed decisions and licences are placed on the EPA website (www.epa.ie). The website contains not only details of all applications and licensees but also copies of all waste licences issued.

Dr. Ted Nealon, Environmental Management Planning, EPA, P.O. Box 3000, Johnstown Castle Estate, Wexford. Tel: 053-60639; Fax: 053-60699 Website: www.epa.ie

Waste Licence Applications R



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By
Ella McSweeney

IT was over 100 years ago that captive breeding populations of the American mink were first established in its native country of North America. It had long been valued for the quality of its pelt and interest in commercial fur farming of mink soon spread to Europe. By the 1920s, captive populations were recorded in Scandinavia and Iceland.

The first escapes of mink into the wild occurred soon after its introduction into Europe. The earliest record of a wild population in Finland - in 1932 - correlated with the locations of mink farms in the country. Feral mink populations were soon established throughout Europe, hastened by deliberate releases by animal welfare campaigners. At present, the American mink is abundant throughout most European countries, such as Sweden, Finland, Ireland, Britain, Iceland, Netherlands, Spain, France and Russia.

Mink were first brought to Ireland in Killybegs Harbour, Co. Donegal, in 1951 and within a decade, over 58 unregulated fur farms were operating. It was not until 1966 that legislation regulating fur farms was introduced. Eight farms were recorded in 1990, with an annual turnover of £1.5 million. In 1999, six mink farms remained in Ireland.

Anecdotal evidence suggests that mink had established a population in the wild in Co. Down by 1956. There is a paucity of scientific data on the current distribution of mink in Ireland, but it is believed to have colonised most of the country, including Mayo and Kerry, with the spread originating in the north and east midlands. The prodigality of suitable habitat in Ireland is thought to be the reason for

its fast and successful rate of spread.

In Europe, the American mink has not co-evolved with native fauna and because of this, concern over changes in the 'equilibrium of nature' has arisen. Extensive debate has been provoked regarding its potential impact on native species. Wherever mink have become established, allegations of their negative impact on wildlife, domestic and economically-important species have been made.

It is a fact that mink will kill prey beyond their requirements. 'Surplus killing' is a reflex action which results in the killing of prey beyond that

larger than the mink and consume similar prey items, yet their presence has not impeded the successful existence of game preserves and fisheries. Since mink maintain linear territories, it is highly unlikely that the quantity of prey items taken would seriously threaten the status of a wildlife population or economic enterprise. (In the strategic control of mink by humans, the status of transient mink - juveniles without territories - is important to recognise, since the shooting of a resident mink invariably leads to the chaotic appearance of hungry transients soon after). While the addition of yet another preda-

mink in the wild. Prior to the establishment of the mink in the wild, the otter was the only medium-sized semi-aquatic carnivore in Ireland and Britain. The fact that mink take aquatic prey, coupled with their similar size to otters, led to the belief that one of the carnivores most likely to be affected by their introduction was the otter.

The apprehension felt regarding the introduction of such a versatile predator into the wild is somewhat justified. The European mink has declined in numbers throughout Europe and the American mink - up to 40% larger in body size - has been impli-

tion of European mink declined before the spread of the American mink.)

Otters and mink, however, are ecologically distinct: the larger otter possesses numerous characteristics that make it a more highly specialised and superior exploiter of aquatic prey. The smaller mink is more lissom and agile on land. A study comparing the feeding biology of the two mustelids in two lakes in Britain found that fish comprised about 92% of the otter's diet and 33% of that of the mink. This was related to species preference: the piscivorous otter took aquatic prey while mink had more terrestrial feeding habits. When

the impact of the mink on the otter population is insignificant in comparison to the many critical human-induced negative impacts on the otter's environment. The decrease in the otter population in Europe over the past 50 years is a consequence of the effects of over-hunting, organochlorides/PCBs, habitat destruction and disturbance by humans. As well as reducing the overall numbers of otters in the wild, it could well be that this facilitated the colonisation of mink in the wild, since mink exhibit a greater tolerance for conditions sub-optimal to otters, such as human disturbance. (Parallels can be drawn between this and the successful colonisation of the grey squirrel, which was largely attributed to the decline of the native red squirrel due to a virus epidemic in the 1920s). In Norfolk, mink were rare during the greatest decline in the otter population. In the north-west region of France, mink colonised the area many years after the decline of the otter population began.

What is clear is that our attitude to wildlife changes with time. While we once vilified the otter as a voracious predator and hunted it down to critical levels, we now cherish it. Likewise, it is not too long ago that red squirrels were abhorred in Britain and a bounty was put on their heads. While not predicting that mink will soon become a loved part of Ireland's wildlife, the demonisation of an animal which - due to our actions - has suffered greatly in farms and in the wild, deflects the real truth of the situation: as the critical situation with the Atlantic salmon has made clear, humans alone are the greatest threat to our native wildlife.

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The American Mink in Ireland

required to satiate the mink's appetite. This has led to conflicts with fisheries and farmers who regularly complain of such wasteful killings. Given this piece of behaviour, anxiety surrounds its potential colonisation of isolated islands, home to colonies of birds. (The mink is a capable swimmer: it can cross a body of water of up to 5 km.) There is little doubt that the damage caused to island-nesting bird populations can be considerable, and utmost caution must be taken to avoid the colonisation by mink of such habitats.

Research indicates that species which have economic value to humans, such as pheasants, chickens, salmon and trout, comprise a part of the mink diet. However, it is not clear that the unfavourable reputation attached to this animal is entirely justified. Both the native fox and otter are

not welcome, it is a fact that with domestic and economically-important species, secure fencing and penning is a prerequisite for their protection, from all predators: fox and otter, as well as mink.

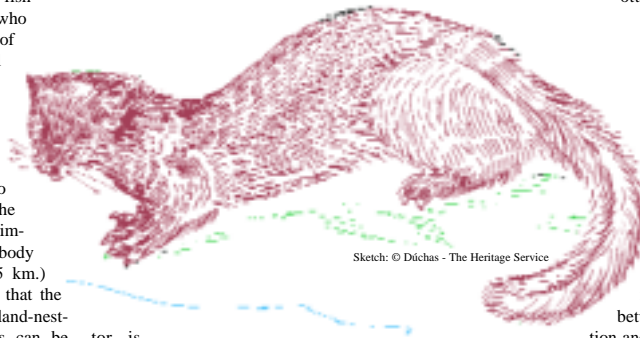
The interest surrounding the interactions between the mink and the otter *Lutra lutra* was stimulated by the dramatic decline in the otter population in Britain and Europe, which coincided with the spread of the

otter in its demise. The breeding season of the American mink commences earlier in the year than that of the European mink. Larger and stronger than its European counterpart, the male American has mated with the female European mink. The hybrid embryos are resorbed, and successful reproduction of the European mink is thus prevented. (In Finland, however, the popula-

fish was readily abundant, the superior aquatic skills of the otter coupled with its larger size, resulted in a greater ability to exploit fish prey. Dietary overlap between the two was minimal.

Studies in Ireland have been few, but the 1980/81 otter survey of Ireland failed to find a significant relationship between otter distribution and mink presence, and this was also the conclusion of the 1990/91 re-survey. A study in the Irish midlands (Chris Smal, 1988) found no indication of competition between mink and otters. Both species were recorded in all areas investigated. (Ongoing comprehensive research on the status of the American mink in Ireland, and its potential impact on otters, is necessary.)

The broad - though not unanimous - consensus is that



Sketch: © Dúchas - The Heritage Service

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DROLAIN POINT Sherkin Island



Common sea-urchin, dead man's fingers and the anemone *Actinothoe* spp. are a common sight off Drolain Point.

By Alex Sen Gupta

DROLAIN POINT is a steep, rocky promontory on the west side of Sherkin Island. From the shore, picturesque Cape Clear Island can be seen about 3 kilometres away. Under the water the vertical stratification of the bedrock and the strong wave action has produced a series of gullies and through holes, large enough to swim along.



The sea cucumber is found under rocks and crevices with just the black tentacles exposed. These tentacles filter the water for food.



Pollack is a member of the cod family and can often be seen cruising around in shoals.

The diving here can be done at any time, but for the best visibility and easiest access it is better to avoid certain conditions; a small swell will be magnified when you are diving through the narrow gullies and in poor light conditions the dive will be too dark to appreciate the vivid colours.

Entry into the water, from a small inlet on the north side of the Point, can be a little precarious over the jagged rocks covered in barnacles and mussels. You have to push your way through a thick tangle of kelp lining the shore to get into clear water. You can descend almost immediately into the bare bedrock channel at about 10 metres depth. Swimming out in a westerly direction you pass the steep rock walls lined with kelp and the beautiful red seaweed *Acrosorium venulosum*, which covers the kelp stems. Just as the bare rock bottom gives way to a kelp bed, you can bear left between two large boulders into a new channel. Here the walls are lined with stunning 'jewel' anemones of different colours and small 'devonshire cup corals', true solitary corals with a stony skeleton. Large numbers of 'sea cucumbers'

are buried in the rock cracks with only their tentacles showing, like strange black seaweed. One by one they slowly draw each food-covered tentacle into their mouth.

Swimming through the gully the swell pulls you back and forth gently. Littering the bottom there are boulders and rubble mixed with the debris of dead crabs that have been eaten by the 'common starfish', *Asterias rubens*, and by the less frequent but more impressive 'spiny starfish' *Marthesterias glacialis*. Growing up to 80 centimetres in diameter, this giant blue starfish not only feeds on crabs but also on its neighbour the 'common starfish'. The walls are covered in delicate, green and orange encrusting sponges and the soft coral 'dead man's fingers', with its white polyps often extended for feeding. Its name comes from its resemblance to swollen fingers! Also common is the snow white anemone *Actinothoe sphyrodeta*. It usually lives on cave walls and overhanging rock, as it prefers areas that are dark and sheltered. This anemone is only tolerant of clean water and gives a good indication of the quality found in the bay.

Following the channel you go through a short enclosed section covered above in 'common starfish'. Where you emerge there is an inconspicuous gully on the right. Ignoring this route for the present, you swim through a second short enclosed section and then onwards the way

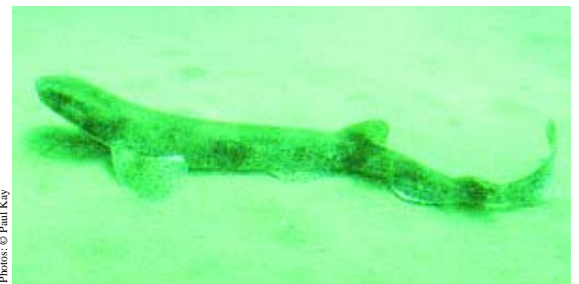
gradually slopes upwards. Soon you reach a wide channel running at right angles to the gully, its bottom is about 3 metres below. There is often a large swell here that carries you back and forth. Turning right into the channel it soon becomes narrow and steep sided, with many 'edible' sea urchins lining the walls. Numerous 'velvet swimming' crabs scuttle around the bottom. Aggressive in nature, they stand their ground and will snap at you if you attempt to touch them.

The channel soon opens out again where there is another junction and a drop to ten metres. Here you head right, keeping close to the wall. 'Ballen' wrasse and shoals of 'pollack' cruise around and the 'lesser spotted' dogfish is often seen motionless on the bottom. After a couple of minutes it is possible to turn right into an easily missed crack 2-3 metres

above the channel floor. This leads through the gully that circles back to the channel with the two 'swim through's'. Turn left back under the first swim through and you are soon back at the mouth of the gully and the bedrock-floored channel.

This is an interesting area to explore, but for those with poor navigational skills, it is easy to miss certain turns and end up travelling in circles. This is not a real problem unless you surface at the end of the dive on the south side of the Point, where the exit over the rocks is difficult without help and a snorkel back around the point may be difficult if conditions are rough.

Alex Sen Gupta - formerly a volunteer biologist at Sherkin Island Marine Station.



Photos: © Paul Kay

The lesser spotted dogfish is often seen motionless on the seabed.



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ENVIRONMENTAL PROTECTION AGENCY An Ghníomhaireacht um Chaomhú Comhchu

Trespassers on Ostrova Viktoriya



The deserted huts and radio aerials on the Russian Victoria Island.

By John Gore-Grimes

DMITRY SHPARO, the President of the Adventure Club of Moscow wrote to me on the 5th July, 2000 to say*"we understand that you are ready to pay \$12,000 U.S. for getting permissions. You will transfer \$3,000 U.S. in advance as wages for the employees who will prepare all of the documentation. The rest of \$9,000 U.S. you will transfer to our bank account after you will get all permissions"*.

This "understanding" was entirely unilateral and I had not heard of the suggested fee of \$12,000 U.S. prior to the 5th July. I had tried to get a visa through the Russian Embassy in Dublin and through the Irish Embassy in Moscow but neither could help. With some misgivings and with a sense of desperation I responded to Dmitry's e-mail on the 11th July by transferring \$3,000 U.S. to the Bank of Nova Scotia Ontario, Canada - account holder, Dmitry Shparo.

As the ice charts from the Norwegian Met Office reached me, in July 2000, it became clear that we could reach the southern tip of Franz Josef Land at Cape Flora. By the time we set sail on 21st July there was about 40 miles of 3/10ths ice to the south of the Archipelago but it would take an estimated 3½ weeks to get there and in that time we could expect a further clearance. At the time of our departure we had no visa but while in Lerwick Dmitry's e-mail of 24th July was faxed to us. Mr. Yu. Bogaevski, the Deputy Chief of the General Headquarters Armed Forces has issued a refusal which reads:

"Due to regime regulations the foreigners are not allowed to enter the area of the Archipelago"

Our departure from Howth was at 13.55 on 21st July, 2000. The sun was bright and the winds were light as we motor-sailed up the Irish Sea and through the North Channel. On board were Robert Pendleton, Reggie Revill, Peter Culleton and Nicholas Healy. Kieran Jameson had married recently and was enjoying his honeymoon in Greece. He was to join us in Lerwick in the Shetlands which he did.

We reached Lerwick to collect Kearon and headed on towards the Lofoten Islands. Passing Northwards to the Lofoten Islands there were a dozen large whales about the boat, two cables off. Some were further out but we could see the tell-tale spray of white water blowing about 20 feet or more into the air. The jet of spray from the blowhole of a whale is a cruel piece of design which, on account of its high degree of conspicuity, has greatly contributed to the diminishing numbers of these fine mammals at the hands of Earths' most savage and deadly predator. We sighted about thirty-five dolphins playing around the whales and moving in several different groups, from one whale to another. It is a magnificent display.

There was no darkness that night and at 12.33 the next day we crossed the Arctic circle.

We reached the North Cape on Saturday the 5th of August where there was an e-mail from Dmitry which read:-

"I have received a letter from the Director of Environment for Arctic Areas to say that he has no objection to your visit to Cape Flora on

Franz Josef Land. The categorical refusal of Mr. Yu. Bogavski is still in force. I will try to have a meeting with Mr. Kvashin, the Chief of the General Headquarters Military Forces, and hand over our request once more. There is still hope. Let us wait for a couple more days".

The Nooden Bar is a good place to meet merchant seamen and fishermen and we told them of our problems with Visas. The advice was clear and unanimous. "Don't do it!" Mr. Putin is not to be trusted and the likely outcome of attempting to land on Franz Josef Land was confiscation of the vessel, imprisonment in Murmansk pending trial, a trial after Christmas and a fine of U.S.\$50,000.

The distance from Honningsvaag to Cape Flora is 640 miles. The course, once clear of Helnes on the east of Mageroy is 042°. It was clear from what we had learned that the Cold War still casts a shadow over Russian Territory north of the 80° parallel. We discussed the matter and concluded that we would be in serious trouble if we tried to defy the ban.

The 11th August was a day of thick fog and slack winds. We were still headed for Cape Flora when suddenly a smart fishing vessel appeared out of the fog beside us. A smooth-talking, polite Russian called us on channel 16. We then changed to channel 12. "Hello", he said in a Russian/America accent. "Hello my friends. Where are you coming from?" The answer that he wanted and probably knew already was "Ireland" but I replied, "the North Cape". "Oh, I see", he said. "How many persons onboard and where are you going to?"

"Six", I replied, "and we are bound for Nordausetland in Svalbard". "Ah! I don't think you will get there. There is too much ice". "Yes", I agreed, "but we might at least go to Hoppen and visit the Norwegians at the radio station there". "I know Hoppen well", he said, "but you have a lot of east in your course which will not take you to Hoppen". I agreed but told him that as he could see we were a sailing boat and that we could not sail directly into the northerly airs. Sometimes we would be to the east of our track and sometimes to the west. "Yes yes", he said, "I wish you a good watch and good sailing but please do not enter Russian Territorial Waters". I told him that we had no intention of doing so and that he would soon see us with more west in our course. I wished him a good watch and

good fishing but we believed that the only "fishing" done on that vessel was "fishing for information".

Speeds were slow on Thursday, sailing at between 4 and 4.5 knots, but at least we were conserving fuel. During the afternoon we altered course for 81° N 40° E to keep clear of the territorial waters of Franz Josef Land. As I looked at the chart I spotted a small dot. It said Victoria Island beside it. On checking the Arctic pilot we learned that the flag of the USSR had been hoisted on Ostrov Viktoriya on 28th August, 1933. I had an aeronautical chart showing the world above 80° north and the Island appeared clearly on it at 80° 09' N 36° 43' E. No one on board had ever heard of this island before 16.00 on 11th of August. During the evening we crossed 75° N. The V.H.F. was still spluttering away in Russian and at midnight there were two large Russian trawlers on either side of us. Peter reported that they came dangerously close and that he had trouble avoiding them. There were five more Russian trawlers in sight during the next hour.

During the evening on 12th August we noted that the V.H.F. had gone completely silent. The numerous Russian trawlers, which we had seen earlier, had vanished. Although the World did not know of it until 14th August and we did not hear of it until 15th August, 12th August was the day of an appalling tragedy for 118 Russian seamen and their fami-

lies when the Kursk was disabled after a catastrophic explosion which sent it to the bottom of the Barents Sea.

There was a quiet anxiety aboard. At 02.40 on Monday the 14th of August we sighted Ostrov Viktoriya. It looked like a large berg with snow and ice cliffs falling down to the sea. The water temperature was -0.2° C. As we got closer we could see the summit of the island which is 344 metres high. At the top there was a building with a round casagrane dish on it.

The island was due north of us and we headed for its centre. As we came to within four miles of it we scanned every bit of it to see if there was any sign of human habitation. We approached the south end where the sea was filled with walrus playing about with big clumsy splashes. They lifted their heads and fine tusks high out of the water to get a good look at us. They have smiling mouths and laughing eyes and they looked as if they were enjoying our visit. They are incredible mammals. They use their tusks to display dominance and sometimes to fight but mainly to drag through the sediment on the seabed when searching for the molluscs. They dive down 260 feet searching for bivalves such as clams. They suck water through their mouths and squirt powerful jets at the sea floor when burrowing for clams. They fill their stomachs twice daily eating be-

tween 3,000 and 6,000 clams at a single feeding. The colony on Victoria Island was probably something in the region of 300 which would mean that they eat 109,000,000 shellfish per year. It illustrates the richness of the seabed. In the winter the walrus go to the ice edge and live in the dark in dangerously stormy conditions. They copulate at sea but only 20% of the cows born survive these harsh conditions.

The depth suddenly dropped and we moved away from the ice and snow of Ostrov Viktoriya to round a low point at its west end. We stood three cables off and as we went out to sea we noticed a complex of buildings, aerials, casagrane dishes, radar scanners,

Photos: © John Gore-Grimes



Arctic Fern in open water at 80° 09' just off shore of Victoria Island. (Inset: John Gore-Grimes)

a possible runway for aircraft and some trucks and bulldozers. If the place was occupied, we knew that we were in deep trouble but using the binoculars we could see signs of wreckage and dereliction. Anyone who has been to a Russian base will know that there is much wreckage and dereliction around them. Robert carefully looked at a hut which seemed to have windows and a door. He trained the binoculars carefully on this hut to see if there was any sign of smoke or perhaps the shimmer of diesel fumes from the chimney. There was none. As we got a little closer he could make out that the windows and doors had been forced open by ice. This was good news. We anchored about half a cable off the snow and ice which hung above a small pebble beach. It seemed like a good place to land. Our hand-held G.P.S. gave a position of 80° 09' N, 36° 43' E and the walrus played around us with amused curiosity.

We walked through a lot of debris to get to the abandoned huts. Ice had come through the windows and doors. It covered the floor. In one room there were sofas and chairs and a library of about three-hundred books. The ice was two feet thick and since it was freezing, anything above it remained quite dry. Other huts contained transmitters, receivers, generators, decoding manuals and central heating plant. There was a large well-equipped kitchen and a large living area. The sleeping quarters were in nissen huts some distance away. Outside there were two old rusted bulldozers and an old truck. There was a defunct helicopter pad and about forty 1,000 gallon oil tanks. This station had been one of many which were set up to spy on the West and, later, on NATO activities along the Norwegian border. After the collapse of the Soviet Union both money and motivation ran out. This extraordinary place was a frozen museum of the Cold War.

We walked over to a beach which had no snow on it. On the way we saw the unmistakable prints of polar bear paws. On the beach there were an estimated two-hundred walrus grunting and steaming on the sandy gravel. The larger mammals were at the outside and the young were in a thoroughly protected fortress, in the middle. The polar bears had come to have a look but they would not challenge a fully grown walrus and had no means of getting close to the young. Apart from the two hundred walrus on the island we estimate that we would have seen at least another one hundred walrus at sea. Ostrov Viktoriya is a sizeable and

important walrus colony of which very little is known.

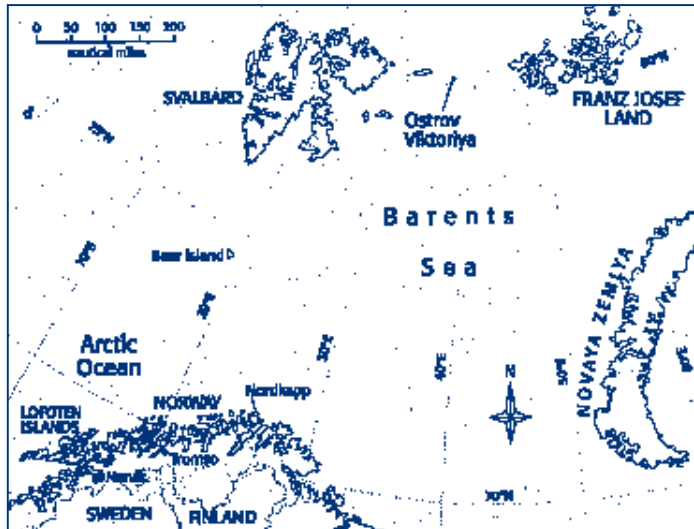
Reggie walked back to the dinghy to bring the others ashore while Robert and I set off to climb to the top of the island. The pace was slow as we tested the ground in front of us in case of ice crevices. On our way a young polar bear jumped out of the snow and dashed over the brow of the hill. It moved so quickly that we did not have time to photograph it.

The summit of Ostrov Viktoriya seemed remote when we got there. There was a large container with a casagranne dish secured with wire stays on top of it. We descended with more confidence retracing our foot-steps. In among the nissen hut dormitories we came upon the dead body of a full grown polar bear. It can't have been dead for long because the skuas had not started to feed on it. In fact the poor bear would have made a bad meal for the skuas because there was hardly a pick of flesh on it. It looked as if it had died from starvation.

"I got down to three feet before reaching the permafrost. A frightening but very real experience of global warming."

Apart from the remote chance of picking out a young walrus there was nothing else to eat on the island. The seals had gone north to the ice edge. The prospects of survival for the young bear looked bleak. As we were to find out, the ice edge which is always well populated with seals, was just 34 miles to the north east which would have been an easy swim for this young bear. If only he had known it. Food and salvation were close at hand. It is extremely unusual to reach a latitude of 80° 09' N but the waters around Victoria Island were ice free. The effects of global warming really are starting to manifest themselves. To reach 80° 44' N in a sailing boat is disturbing evidence of the melting of the polar ocean. Water was pouring from the Summit of Victoria Island which, would normally be frozen even in the Summer months.

Robert and I went for a swim which meant sliding down a snow and ice wall and crossing about five feet of pebbled beach to reach the waters edge. The air temperature was +2° C but the water temperature was -0.5° C. We were filled with admiration for polar bears, walrus, little auks, seals and other Arctic swim-



mers who do this for a living.

We set off from Ostrov Viktoriya and steered 360° true E. The sea was alive with playful walrus. Five hours later we were passing through 3/10ths ice and the seals were there popping up all around to see what was coming.

By 19.00 hours we were in the thick of the ice, poling floes away from the bow and the stern. The ice chart for the 14th August was completely accurate, showing 3/10ths ice at 80° 40' N and 7/10ths ice at 80° 44' N. We came to a full stop and the Garmin hand-held recorded 80° 44' 49" N, 36° 25' E. It was at this point that Kieran created a new record by going for a swim. The water temperature was still -0.5°C but the air temperature was just below freezing. It was an extraordinarily brave effort for such a skinny fellow!

The wind was light and blowing from the north but, in spite of this, I could see the ice closing in behind us, inching around us on a visible current. We ate dinner while Kieran still shivered at the table. I was not anxious to repeat our experience of 1998 and if we were to attempt to push further

north we might have claimed a few degrees more but, inevitably, we would have been trapped. All onboard agreed and after dinner we poled our way out of the ice. We were only about two cables away from reasonably open water but that short journey took two hours.

On the morning of 15th August at position 79° 27' N, 33° 20' E the ships G.P.S. picked up the signal and put our position on the screen chart. We were headed for Spitsbergen.

We reached Spitsbergen on the morning of 18th August and entered Billiefjord which went right up to the face of the Nordenskjold glacier touching its ice with our hands. We had been here twenty years ago but the extent to which this once mighty glacier had shrunk was alarming. In 20 years the Nordenskjold glacier has diminished by at least one quarter. We anchored off and walked across land to look at the edge of the glacier. Twenty years ago this soil had been completely firm under foot. Some bog cotton grew there but the permafrost was no more than 3 or 4 inches below the surface. On this occasion I took out my knife and scooped out the soil.

I got down to three feet before reaching the permafrost. A frightening but very real experience of global warming. At the edge of the glacier there were fast flowing streams which had not been there in 1980. The bog land over which we walked was soft and bouncy, not unlike the bogs of Mayo, but we were at 78° 30' N.

We set off across Billiefjord to the Russian coal-mining town of Pyramiden at 16.00 arriving there thirty minutes later. In 1980 this town had a population of twelve hundred but in 1998 the coal-mining operations were closed down and the reason why the Russians are leaving is that they cannot afford to keep Pyramiden going.

We tied up to the tumble-down pier and were greeted by seven Russians. The Russians downed the four bottles of whiskey in forty minutes, without so much as a drop of water. They then hurried back to finish their work and told us that they would collect us for a party. We enquired as to what time they would come but no one had a watch. They returned at 18.00 in a large truck. They drove us up hill past the tangled remains of steel and

machinery, all of which was being de-mounted and shipped to Poland. We arrived at the fire station and came to a most uncertain stop. We were taken up a ladder and onto a catwalk, almost at roof level, of the high fire station structure. At the end of the catwalk there were two small, shabby rooms which were hugely overheated. There was a plate of fish on the table which they offered to us. We suspected that this was their evening meal and we explained, incorrectly, that we had already eaten. We then unloaded eight more forty ounce bottles of Paddy, two hundred and fifty cigarettes and a hand full of cuban cigars. Drinking began in earnest. Music of a kind blasted out in this sauna room from a museum piece of a tape recorder. They had only one spool, and when it ran out after half an hour, it was rewound and re-played. Although they had very little each one of us received a present. Reggie was given a drinking cup, Nick and Robert pieces of timber with drawings skillfully scorched into the timber, depicting ships and harbours. Kieran got a picture and Peter was given a Russian crucifix on a chain. I was given a painting of "Blumen Laguna" in Spitsbergen painted by "Mien Fremd Dima". That is how the picture was inscribed on the back. Dima was an interesting man with a sad story to tell. He was a member of the elite Scorpio Troop and had the emblem of the Scorpio tattooed on his right shoulder. His three year old daughter had been killed in front of him by the Chechnynians by having her throat cut. His wife had been severely raped and Dima finally snapped. He disarmed a Chechnynian soldier and shot sixteen men. He made his escape but could not take his wife with him. That incident had happened six months before we met him and now he was "recovering" in Pyramiden.

We learned that none of the Russians in Pyramiden had heard anything at all about the sinking of the Kursk and the horrific loss of one hundred and eighteen lives. When we explained it to them they were visibly shocked.

We departed from Long-yearbyen at 22.00 on Monday 21st August and sailed to Scotland. We glided down the sound of Rassey on a dark moonless night. We dropped anchor in Portree, Scotland at 06.50 on Saturday 2nd September and on 6th September arrived home to Howth to a wonderful reception.

John Gore-Grimes, The Shack, Baily, Co. Dublin.



Part of the Walrus colony on Victoria Island.

By Dave Jackson

A new CLAMS plan was launched in Kilkieran last December. The launch of this plan is a key development in the management of aquaculture in this very beautiful and productive bay. It is also a major step towards the implementation of integrated coastal zone management in the area.

Kilkieran Bay has been a major centre for the development of aquaculture in Ireland. Aquaculture development within the bay dates back to the early seventies when management plans were put in place for the oyster beds. This was followed in the mid seventies by the development of mussel and salmon farming in the bay. Salmon production in Kilkieran Bay has evolved since the late 1970's and the bay area is currently licensed to produce 3,800 tons at over 17 locations. There is a small-scale mussel culture operation in Coonawilleen Bay and a small land based turbot on-growing unit, Turbard Iarthar Chonamara Teó, is located at Ross, Lettercallow. A number of major shellfish beds are managed and developed as extensive aquaculture operations by the local shellfish Co-Op, Comharchumman Sliogéisc Chonamara Teó. The shellfish co-op, was set up in 1985 to manage the shellfish populations of the bay at a time when drastic overfishing had almost wiped out natural shellfish populations. The natural flat oyster beds (*Ostrea edulis*) in the bay are of both national and international importance. The beds in Kilkieran Bay self seeding and are one of only nine such natural *Ostrea edulis* beds in the country. There are less than twenty such beds in Europe. The maintenance of these beds is contingent on the effective management policy, which is being implemented by the local shellfish Co-Operative. Udarás na Gaeltachta provided a development officer for the co-op, and a 4 year development plan was installed in 1995 to oversee the relaying of the existing beds and the redevelopment of other beds within Kilkieran Bay.

A number of other groups have worked closely with local interests in the development of aquaculture in the bay. The Shellfish Research Laboratory of NUIG at Crumpan, Carna has been closely associated with the development of aquaculture in Kilkieran Bay since the 1970's. The Shellfish Research Laboratory has carried out a number of research programmes in the bay. Taighde Mara Teónta, is an Udarás na Gaeltachta R&D company. Taighde Mara, whose head office is in Carna, has been associated with aquaculture in Kilkieran since it's formation in 1981.

The marine habitats found within Kilkieran Bay are of very high conservation value. A very high number of species that are rare or considered to be worthy of conservation in Ireland occur in the area. Communities of particular importance are the extensive and varied beds of free-living red calcareous algae or maerl (known locally as 'coral'). The range of maerl deposits in Kilkieran Bay, including banks of maerl debris, live maerl and mixtures of maerl, gravel and mud gives rise to a variety of communities. Within these communities are a number of rare anemones. A population of the large burrowing anemone *Pachycerianthus multiplicatus* occurs at two muddy sites within Kilkieran Bay and is known from only three other localities in Ireland. The seagrass *Zostera marina* occurs in a number of areas in Kilkieran Bay and in some areas co-occurs with maerl.

The Marine Institute has been involved in working with the local salmon farmers to develop Single Bay Management plans in Kilkieran for a number of years. This process has brought many benefits in terms of better and more efficient production and a more co-ordinated approach to environmental awareness and protection. Building on the success of the Sin-

Co-ordinated Local Aquaculture Management (CLAMS) in Kilkieran Bay, South Connemara

gle Bay Management process the local salmon farmers and the shellfish Co-Op came together to develop a CLAMS plan for the bay. The CLAMS process is a non-statutory management system, which is anchored in the national marine policy and development programmes. It is separate to licensing issues and is not intended to solve or take responsibility for all issues. The concept focuses at local bay level while still taking on board relevant national policies. The object of this process is to formulate a management plan for the bay, which incorporates and extends the concepts of Single Bay Management to all farmed species.

The CLAMS document for Cuan Chill Chiaráin (Kilkieran Bay) is one of a series of such plans that are being established country-wide. The CLAMS group is composed of representatives of all bona fide aquaculture interests such as the producers, liaison officer, and relevant regional BIM, DoMNR, MI and Udarás officers. Developing and implementing a CLAMS plan for Kilkieran Bay incorporates a strategy to encourage further integration of associated activities, i.e. fisheries enhancement/management programmes, marine tourism and angling. The first steps towards this process are already underway as through the inshore fisheries initiative the possibilities of liaison between the CLAMS group and local inshore fisheries committees which are running successful lobster v-notch programs is being explored.

What is the aim of CLAMS?

It provides a concise description of the bay in terms of physical characteristics, history, aquaculture operations, future potential, problems etc. It also allows various Codes of Practice to be customised and integrated to the aquaculture industry operating in the bay. In addition to this



The shellfish co-op aims to improve the existing oyster and scallop (above) beds and increase the sustainable yield from both the oyster and scallop fishery.



Moving smolts by helicopter to the fish cages.

it provides the framework from which a management and development plan for aquaculture in the bay can be drawn.

Another important aspect is the fact that this process acts as a focus group for the community. It is envisaged that this will provide a framework for addressing issues that affect or are affected by aquaculture activities and streamline the resolution of these situations.

In order to further develop the process of integrated management and to maximise the benefits from separation of generations and synchronous following the salmon farmers in the bay plan a further co-operative venture to manage smolt inputs into the bay. A new company has been formed which will manage smolt inputs into the bay. These will then be distributed to the various companies inshore sites the following October to ongrow. The board of Feirmeoirí Bradáin Cill Chiaráin Teó. will have directors from all the salmon companies within the bay. Effectively, the proposed plan will allow for close co-operation between the various farms, the separation of fish generations, total inner bay following and an effective Single Bay Management Plan (SBM).

The shellfish Co-Op is embarking on a new five year development plan with the goal of:

1. Improving the existing oyster and scallop beds.
2. Increasing the sustainable yield from both the oyster and scallop fishery.
3. Diversifying into other fisheries including clams and razorfish.

In the course of the consultative process with the aquaculture operators and other interested parties a number of issues in relation to the management of aquaculture within the bay were identified. These issues relate to the conservation of wild populations and communities of fauna and flora both resident within the bay and dependent on the bay and to environmental conditions within the bay.

Kilkieran Bay is a proposed SAC and, as such, there are a number of important habitats and species within the bay which require conservation. These include; the natural oyster beds (*Ostrea edulis*), beds of coralline algae or maerl, bard bottom, or epifaunal (growing on rocks), communities in the Gurraig sound, dominated by sponges and sea squirts, populations of rare sea anemones, the fauna and flora of Coill Saile creek and the shores and shallow sub-tidal areas of Mweenish Bay. The important animal and plant communities and rare species found in various parts of the bay are, in the main, in areas where there is no proposed aquaculture development. Where there is overlap, such as the shellfish beds, the management practices in place are designed to enhance the conservation to the habitat in question. The primary objective of the local shellfish Co-Op, CCSC, is the conservation and development of the shellfish beds under its control. This includes the management and development of the natural oyster beds. The conservation and management measures employed on the beds over the years are compatible with the conservation of the communities with which they co-exist. They may even be a factor in maintaining community diversity.

There are migratory populations of both salmon and sea trout, which pass through the bay. There are concerns that in the absence of effective lice management on fin fish farms in the bay there could be a negative impact on the lice infestation levels of migrating smolts. A central pillar in the Single Bay Management plan for the salmon farms in the bay is a sophisticated sea lice management protocol to minimise sea lice levels during the critical spring migration period. This is designed both to ensure efficient sea lice control and to specifically address the concerns raised by wild fishery interests.

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The Use of Lime

By Edward M. Byrne

LIME has been extensively used for approximately 2000 years although there is evidence of the use of lime dating back some 10,000 years. Excavations in Cajenu in Eastern Turkey uncovered a Terrazzo floor (dated between 7,000 -14,000 years) which had been laid with lime mortar. However, it was the Romans who perfected the use of lime. Lime mortar does not harden under water, for a hydraulic set the Romans ground together lime and volcanic ash or finely ground burnt clay tiles. The active silica and alumina in the ash and the tiles combined with the lime to produce what became known as pozzolanic cement from the name of the village of Pozzuoli, near Vesuvius, where the volcanic ash is found.

It was not until the eighteenth century that an advance in the knowledge of hydraulic limes occurred. John Smeaton who was commissioned in 1756 to rebuild the Eddystone Lighthouse off the Cornish coast, found that the best mortar was produced when pozzolana was mixed with limestone containing a considerable proportion of clayey matter. Smeaton was the first to begin to understand the chemical properties of hydraulic lime, that is material obtained by burning a mixture of lime and clay.

This was followed by the development of other natural cements, such as the 'Roman cement' obtained by James Parker by calcining nodules of argillaceous (clayey) limestone. This led to the development of 'Portland cement' (an artificial cement), which was patented by Joseph Aspdin, a Leeds bricklayer, stonemason and builder in 1824.

The use of lime went into decline with the development of Portland cement. Portland cement had a number of attractive properties, it has a rapid set time and gained strength quickly and it is less dependent on weather conditions for its application in contrast to lime cements. The latter being an important point for speedy and all year round use. The use of Portland cement in mortar and renders increased dramatically in the 20th Century. There is no doubt that many of its proper-ties are advantageous. However the style of construction also changed. Many of the buildings in which lime cements were used were built so that the

building could 'breathe', that is to say that moisture and air were transmitted through thick walls. The use of Portland cement in restoration has in many cases resulted in increased deterioration of the structure and increased costs to repair the damage caused by the Portland cement mortar or render.

So why do Portland cement mortars and renders cause more damage? Traditional masonry buildings used permeable material such as stone, brick or dried earth. Lime mortar was used with these materials. One of the key differences between lime mortar and cement mortar is that lime mortar is permeable whilst cement mortars are impermeable. Moisture can be freely adsorbed by the lime mortar and evaporated from the surface. These older structures are never completely dry nor were they intended to be. However, the permeability of the mortar ensures that the moisture is conveyed through the mortar and not the brick or stone. Thus the structure remains stable and the inside of the building dry as the moisture is conveyed to the outside for evaporation. The behaviour of these buildings is critical in assessing an approach to restoration.

Cement mortars or renders on the other hand are impermeable and rigid. These mortars will force the moisture to travel through more permeable brick or stone. The effect will be to increase the rate of deterioration/ weathering of the stone. Similarly, a cement render prevents the movement of moisture to the outside of the building where it would be able to evaporate. This can cause a build up of moisture in the stone/brick resulting in deterioration of the building blocks behind the cement render and the development of damp inside the building. A permeable mortar - a lime mortar allows the moisture to travel through the mortar and not the stone/brick thus protecting the stone.

Over the last 5 to 10 years the importance of the use of lime has begun to be understood. Although time and planning is required for the use of lime, the overall cost is less when compared to the damage which can result when using an impermeable cement mortar.

Lime production in Ireland comes from a handful of producing lime kilns, some of which produce small amounts for their own internal use. There are two industrial producing kilns one in Cork and the other in



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Carlow. The Clogrennan plant produces quicklime, made from Carlow limestone. The Traditional Lime Company purchases this quicklime and slakes it for a minimum of three months to produce lime putty. Hydraulic lime is not produced in Ireland.

The following is a brief account of the lime producing process at Saint Astier (France). At Saint Astier the limestone is a soft chalky calcareous and siliceous limestone. The lime-

stone is crushed and fed to a kiln. The fuel used is anthracite coal, which ensures a clean low sulphate product. This process produces quicklime (CaO). After burning, the product is hydrated transforming the quick lime to slaked lime. The correct hydration is of fundamental importance in the making of a true natural hydraulic lime to be used in construction. This process of slaking is exothermic. The material is then crushed in a ball mill to produce a

powder of homogenous fineness and finally the powder is bagged and sold. St. Astier hydraulic lime is imported into Ireland is available from the Traditional Lime Company, Rath, Shillelagh Road, Tullow, Co. Carlow.

Edward M. Byrne is a Building Conservation Specialist. This article has been reproduced, with permission, from "The GSI (Geological Survey of Ireland) Industrial Minerals Newsletter"

HATCHERIES

The High Price of Losing a Bet

By Jim Lichatowich

ON a cold November night in 1841, two French fishermen crept to the bank of a river and silently watched Atlantic salmon creating a new generation. Watching the salmon spawn under the light of a full moon gave them an idea; an idea that has grown into a major fisheries management tool, and unfor-

tunately it is an idea that has led to the degradation of many rivers and their native salmon and trout populations. The fishermen, Messieurs Gehin and Remy, figured out a way to artificially fertilise, incubate and hatch salmon and trout eggs. Actually they rediscovered a technique that had been around for a long time. But in their hands and with skillful public relations, the possibilities of hatcheries were exploited as never before.

By 1872, hatcheries had crossed the Atlantic Ocean and

reached the western shore of North America. The U. S. Fish Commission proclaimed that artificial propagation of fishes would make our game and commercial species so abundant that there would be no need to worry about regulations. That claim, steeped in hyperbole, was accepted as fact allowing rivers to be dammed, cleared of channel complexity, dredged, diverted, polluted, heated and silted into death traps for native fishes. Today, hatchery advocates make more modest claims, but often no more achievable. Hatcheries are still very popular especially with the bureaucracies whose budgets have benefited from the politician's willingness to fund artificial propagation of fishes instead of protecting or restoring rivers.

We bet the farm on hatcheries. We bet that concrete ponds could replace healthy rivers. It's clear that we lost the bet, but like the addicted gambler we keep laying our money down. Why have we clung so tenaciously to a technology, which according to three scientific panels, has largely failed to produce the benefits promised and has even contributed to depletion of salmon and trout populations? I found the answer not in a book on fisheries, but in a book written by the eminent physicist Freeman Dyson. In his book, *Imagined Worlds*, Dyson tells us to beware of technology derived from ideology rather than science. Hatcheries were accepted even though there was no scientific basis to the Fish Commission's claim. However, they did fit the prevailing ideology. Hatcheries fit like a glove the view that humans should simplify, control and manipulate ecosystems to emphasise a few uses that maximise profits while ignoring ecological costs. When we employ ideologically driven technology, Dyson says the problems and failures of that technology are overlooked until a lot of damage has been done. That's exactly what happened. The Endangered Species Act will eventually make us face the consequences of trading hatcheries for healthy rivers, but for now we are still in denial.

The ultimate expression of this ideology is the catchable trout programs, which deliver trout to the right spot, at the right size and at the right time to satisfy the perceived needs of the angler. Fishing is reduced to a simple market problem solved by the same mentality that will quickly deliver a hamburger when you are hungry. Where the hatchery is the primary management tool the river is reduced to little more than a stage prop, a place where the fishermen can fool themselves into thinking they are experiencing nature. In fact, the river may be a biological invalid, a place where salmon and trout cannot sustain themselves through a complete life cycle. But that doesn't matter, or does it?

Why do fly fishermen put on waders and venture into the river's current? I believe there is more to it than satisfying simple market mechanisms. The time spent with rivers and native trout is driven by more than Adam Smith's "invisible hand." The popularity of catch and release fishing is clear evidence that the experience runs much deeper than "fish in the boat."

It's a personal relationship among the woman or man, the river and its living community – trout, mayflies, stoneflies, water ouzels—all of it. That relationship is extended and strengthened by the ability to read the water, to know the trout and its habitat and the grace and beauty of perfectly placed fly. To achieve that level of experience requires a high level of knowing and understanding not of a phony river simplified, controlled and manipulated into a stage prop, but the river and the trout as they are and as they have unfolded in all their complexity and ecological beauty over millions of years. Fishing a herd of hatchery trout planted in a stream stripped of its ecological complexity has all the wonder, surprise, beauty and contentment of lunch at a fast food joint.

We simply cannot maintain salmon and trout without healthy rivers. One hundred and twenty-eight years ago we bet we could have salmon and trout without healthy rivers and lost. In the Pacific Northwest where I live, the consequences of that bet are massive listings under the federal Endangered Species Act. If hatcheries are to have a future role in salmon and trout management it must be as part of a healthy riverine ecosystem, not in lieu of them, but then healthy rivers have never been the purpose for funding hatchery programs.

Jim Lichatowich is a fishery biologist. His recent book, "Salmon Without Rivers" is a history of the Pacific salmon crisis. He now lives in Columbia City, Oregon, USA. "Reprinted with permission from Patagonia, Inc." Submitted to Patagonia Fly Fishing Catalog, 7/27/00

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Recording Ireland's Mossy Heritage

By Maura Scannell

MRS. A. L. Kathleen King (1893-1978), for many years Ireland's leading field bryologist: the collection of mosses which she donated to the National Herbarium is an important contribution to Ireland's scientific heritage.

At the height of Kathleen King's interest in mosses, when she was in her fifties and sixties, her weekly schedule might be something like this: Saturday with the Dublin Naturalists' Field Club; Sunday with the Society of Irish Foresters; mid-week, an outing with friend to Kilbeggan bog; and countless hours at the microscope in between, after which she would dry, label and package material for herbarium packets. Holidays were spent doing research in western counties. She was a meticulous and careful scientist who, apart from one small Royal Irish Academy grant for work in west Mayo, financed her studies from her own resources. And all this time her worldly status was widow, mother and housewife. Specimens collected by "A.L.K. King", and stored in the National Herbarium in Glasnevin, are her legacy to the nation.

Anastasia Lelia Catherine was born on July 5th 1893 to Lawrence and Bridget Francis Murphy (née Monaghan) and the family lived in a house on Upper Merrion Street (opposite the present Government Buildings). Her father had a drapery business around the corner in Lower Baggot Street. Her baptismal name, Catherine, became Kathleen in her home. Later she called and signed herself A.L. Kathleen King. She attended a local girls' school, the Loreto Convent on St. Stephen's Green, where she played the cello in the school orchestra, and then a Berlin finishing school. She later told a friend that she and her sister settled so well in their Berlin school that they won first prize at a Christmas test for an essay in German. Back in Dublin Kathleen became associated with the Abbey Theatre for a short time and she knew Joseph Plunkett.

After marrying young to

Edward Thomas King, a dispensary doctor at Kilmacud in south Dublin, Kathleen seemed destined for a life of suburban routine. After her husband's untimely death she was fully-occupied in rearing their four sons. The first outlet for her nascent botanical instincts and her interest in gardens was ordinary domestic economy. She had to bring up a family on a limited budget and knowing

"She was a meticulous and careful scientist who, apart from one small Royal Irish Academy grant for work in west Mayo, financed her studies from her own resources."

how to grow her own fruit and vegetables was a useful saving. She loved her garden, where she grew plums and other fruit for making tarts and jams - all from her own produce. It was a full and satisfying life.

Living in a newly-established housing estate in Mount Merrion, Kathleen was concerned about amenity planting in the area. She joined the Irish Roadside Tree Association and learned more about the siting of trees and pavement planting. Through the association she made contact with others and regularly attended the society's field meetings. Since she had no car and did not drive, other members would facilitate by offering lifts to distant outings. This delighted her, and through their generosity she was able to visit a variety of habitats in areas adjacent to State plantations.

As her botanical knowledge deepened, Kathleen began to take an interest in the cryptogams - the inconspicuous non-flowering plants such as mosses and lichens, which reproduce by means of spores rather than seeds. These plants are more difficult to study than flowering plants and thorough examination requires the use of a microscope.

Already well-versed in flowering plants - so much so that she was one of the five botanists involved in compiling the 1961 *Supplement to Colgan's Flora of the County Dublin* - she then decided to specialise in the bryophyte (the mosses and liverworts). In no time she became an expert on the species found on walls, on trees and in bogs, and her first bryological note, "*Brachythecium caepitosium* in Co. Cavan", was published in the *Irish Naturalists' Journal* in 1950 when she was 57.

The *Bryophyta* are a division of the plant kingdom and occur in moist places on every continent. They are found on trees (as epiphytes), as constituents of bogs, and on masonry. As indicators of environmental conditions they are an important part of many ecosystems. They also provide a seed-bed for the germination of many higher plants and a habitat for microfauna. Mosses are pioneer organisms, the first to colonise soil, helping to stabilise it.

To provide for her now deepening knowledge of the Bryophyta Kathleen King took out membership of the British Bryological Society (BBS) and she acquired a microscope and relevant literature.

As occasion arose, Mrs. King collected specimens in most of the 40 biological divisions of Ireland. She would then name the material, prepare them for permanent record and place them in labelled packets. Through contacts with bryologists in other countries, she exchanged her duplicates of Irish material for specimens collected further afield in alpine, arctic and mediterranean Europe. In this way an herbarium collection of some 4,000 specimens was amassed.

Her bryological labour was no mere fetish for collecting. The work sprang from a deep personal interest and Kathleen brought to it a rigour and curiosity that were unquestionably scientific.

Kathleen King added several species to the flora of Ireland. Her most interesting addition was one "which did not correspond with any known member of the moss flora of these islands" - *Moesia*



Mrs. King is seated fourth from the right in this photograph taken during a Dublin Naturalists' Field Club outing to the Wicklow Mountains circa 1950. Among those also pictured are Mollie Wigham, on Mrs King's left; behind her: Prof. J.P. Haughton (president of the DNFC at the time); and J.P. Brunner (who compiled *Flora of County Wicklow*), on her right. (Photo courtesy Diarmuid King)

tristicha (now *M. triquetra* [Hook. & Tayl.] Angstrom) - a sub-arctic zone moss, until then unknown from Ireland or Britain, although subsequently reported from sub-fossil peat in Britain. In 1958 Dr. E.F. Warburg of the Oxford Herbarium reported the find and quoted Kathleen's description of the habitat.

Her botanical interest was not confined to bryophytes. During the 1950s and '60s she continued to study flowering plants and to study and collect lichens; she also noted tree species. In 1956 she reported *Impatiens glandulifera* Royle (Indian balsam) as an addition to the flora of west Cork, Leitrim and Louth.

When Bord na Móna sought to establish the quality and potential of peat, the state agency frequently sent Kathleen, from its scientific headquarters in Newbridge, samples of turf and "scraws" [from the Irish *scraith* or scraw for "layer"] taken from Edera bog in County Longford and other midland bogs. From these samples she would help to determine the ecological composition of the new sites.

She had tremendous stamina, often covering many miles of rough terrain in a day (25 miles on one occasion in her 60s). She was never known to


develop a cold or 'flu even after a thorough wetting. She was well-organised for field excursions and, though she carried materials for collecting specimens, yet never appeared encumbered. Despite inflation, as a widow on a fixed income she managed by eliminating unnecessary extras - but never her bryological literature, her subscription to the *Irish Naturalists' Journal*, her field work, nor her membership of scientific societies. Fifty years as a practising housekeeper enabled her to cope. Advised by friends to write a nature column for a newspaper, she said that she had no desire to be a "naturalist-journalist", and preferred to devote her time to bryological work.

In 1977 Kathleen King's sight began to fail and she generously donated her herbarium of 4,000 specimens (largely Irish but also British and European) to the National Herbarium at the National Botanic Gardens in Glasnevin. It was the most important bryophyte addition since those of H.W. Lett and C.H. Waddell in the early part of the century. The material, which is excellently-documented, dates from 1947 to 1975. It includes specimens which colleagues would bring Kathleen from their trips, especially later when she

reached 80 and was no longer engaged in field work.

Kathleen King died in her 84th year, at her home in Mount Merrion on March 28th 1978. Although she had had no formal training in science, her intellect, combined with industry, enthusiasm and a tremendous vitality, made it inevitable that she would seek to make a meaningful contribution. Her published work and her herbarium, rich in oceanic/atlantic species, reveal that she contributed significantly to the advancement of bryological studies in the island of Ireland. For this A. L. Kathleen King holds an honourable place in the annals of botanical science in Ireland.

This is an abridged version of the story about Kathleen King's life and work, which appears in "Stars, Shells & Bluebells - Women Scientists and Pioneers". This excellent and inspiring publication, with biographies of 15 women, was produced by WITS (Women in Technology and Science), P.O. Box 3783, Dublin 4, and costs £4.95. ISBN 0953195309.



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STORMWATER

.....a film....a tidal wave....an urban myth?

By Coran Kelly & Vincent Fitzsimons

ALL our towns and cities must relish the regular beating of the frequent Westerlies that come over our shores. The passing of a rain belt leaves behind an urban landscape that looks washed and clean: sparkling roofs, shiny roads with an undeniable sense of freshness in the air. Indeed this is exactly what happens as rainwater sluices down drain pipes, over pavements and roads, carrying dissolved and suspended matter that it has picked up along the way, including chemicals picked up in the atmosphere. However, this run-off from our urban areas termed "stormwater" has the potential to contaminate our natural water resources, such as rivers, streams and the 'hidden' groundwater that lies beneath the land surface. There are different kinds of surface run-off which differ in their pollution potential. For example, run-off from roof surfaces in residential areas may be considered harmless relative to run-off from main roads with a high traffic density.

So what is in Stormwater

Table 1 gives a list of some of the contaminants that occur in stormwater. Currently, average lead levels in urban run-off in Britain are above the EU MAC for drinking water. It is also suggested that copper and zinc pose a significant threat, particularly due to their solubility in water. Average hydrocarbon levels in stormwater are often higher than drinking water guide levels. Even low concentrations cause problems with respect to oxygen demand, odour and taste and give rise to a visible sheen on surface waters. Herbicides from the urban environment in Britain are responsible for up to 30% of exceedances of EU MACs. Similarly, even trace concentrations of herbicides and pesticides are problematical. Generally, faecal coliform concentrations in urban stormwater are high, significantly above the guidelines for drinking water and other uses.

What is the concern?

Stormwater is often piped direct to surface water bodies or to groundwater via soakaway areas. Contaminants in water entering these

soakaways can often reach groundwater bodies relatively easily. Once in groundwater there may be very little opportunity for further breakdown before the contaminants reach private wells or wetland areas. In Britain about 80% of the regulatory authorities recorded significant changes in water quality adjacent to busy roads. The concern therefore lies in the level of contaminant and the destination of the stormwater. For example, run-off from busy roads and industrial parks that discharge to groundwater or another aquatic environment is likely to require treatment.

Is there treatment of stormwater carried out?

Where treatment might be needed it is unclear as to what provisions are made for treatment of stormwater in Ireland. With respect to run-off from roads, the Environmental Protection Agency (EPA) are planning to compare and review systems that are currently in operation here in Ireland. In Britain only about 30% of highway authorities provide some treatment of the run-off.

Some treatment systems are given in Table 2 along with typical removal efficiencies and costs that are associated with them. From the table below it can be seen that no one treatment system can remove 100% of any of the contaminants. The contaminants provide numerous difficulties that need to be overcome.

Specifically the solubility of many oil fractions such as benzene mean that oil interceptors and infiltration devices may have a negligible effect on removing the hydrocarbons. Filtration and infiltration techniques regularly fail in handling suspended solids and metals due to such factors as inappropriate sizing and lack of pre-treatment of solids.

The treatment of pesticides and herbicides is difficult and expensive. Where there is concern for water quality it is recommended that a change of practice is introduced to reduce the levels of herbicides or to use degradable chemicals that do not cause long-term problems.

It is suggested the treatment of stormwater run-off incorporates several treatment methods. This design approach is referred to as a 'treatment train' methodology. For example, the United States EPA require full tertiary treatment

and disinfection for stormwater run-off prior to discharge with respect to faecal coliform bacteria where the stormwater may end up being used for a drinking water supply.

In summary

There are numerous potential contaminants in stormwater run-off that can be classified into six types; sediment, hydrocarbons, metals, salts and nutrients, organic wastes and pesticides. These pose a potential hazard to both surface

and groundwater environments.

There are a number of methods designed to remove the contaminants. Removal efficiencies are documented for each method. Many of the contaminants have properties that make 100% removal efficiency unlikely by one single method. A treatment train approach may be more suitable to remove contaminants from stormwater run-off where necessary, for example, where stormwater from industrial areas or busy roads may be discharged to the aquatic environment.

The EPA will be producing recommendations for systems that are used to treat run-off from rural dual carriageways and motorways. It is likely that they will also indicate systems that are currently not used here in Ireland which may be suitable for certain sites.

Coran Kelly and Vincent Fitzsimons, Groundwater Section, Geological Survey of Ireland, Beggars Bush, Haddington Road, Dublin 4.

Table 2. Typical removal efficiencies and costings for treatment systems.

| Treatment System | Capital Cost (£k) | Maintenance Cost (£/yr) | Removal Efficiency (%) | | | | | |
|-------------------------|-------------------|-------------------------|------------------------|-------------------|-------|-------|-------|-------|
| | | | Zn _{tot} | Cr _{tot} | Pb | Fe | SS | HCl |
| Kerb/Grate/Trap Systems | 180-220 | 1000 | | | 10-30 | | | |
| Oil Interceptors | 10-30 | 300 | 30-50 | <10 | 30-40 | 40-60 | 30-80 | 40-80 |
| Combined Filter/Preced | 160-200 | - | 70-80 | 70-90 | 80-90 | 80-90 | 80-90 | 70-90 |
| Drains | | | | | | | | |
| Infiltration Basins | 20-50 | 2500 | 70-80 | 70-80 | 80-80 | 80-90 | 60-80 | 70-90 |
| Infiltration Lagoons | 80-100 | 2000 | 60-80 | 20-30 | 80+ | 80-90 | 60-80 | 70-90 |
| Detention Pond | 7-30 | 350 | 30-40 | <10 | 30-50 | 40-60 | 40-70 | 50-60 |
| Green Swales | 15-40 | 200 | 70-90 | 50-70 | 90+ | 80-90 | 60-90 | 70-80 |
| Wetland Systems | 15-60 | 2000 | | | | 50-80 | | 50-80 |
| Sedimentation Tank | 30-60 | 500 | 50-70 | <10 | 50-60 | 40-60 | 50-80 | 40-80 |

(Reference: Groundwater pollution from infiltration of urban stormwater run-off, Ellis, JB., 1997. Groundwater in the urban environment: Problems, processes and management, Chilton et al (eds).)

Table 1. Some stormwater contaminants and their overall type.

| Type | Contaminants |
|---------------------|--|
| Sediment | Carbon, organic solids, rubber, plastic, litter and plastics, grit, deicing grit, re-surfacing grit, asbestos, rust, metal filings, cement, sand, gravel, atmospheric dust, organic detritus, soil |
| Metals | Zinc, nickel, iron, rust, cadmium, arsenic, lead, copper, chromium, manganese |
| Hydrocarbons | Petrol and oil, hydraulic fluid, antifreeze, olefins, tar and bitumen, asphalt, grease, solvents |
| Salts and nutrients | Nitrates, sulphates, ammonia, chlorides, phosphates, urea, bromide, cyanide, fertiliser, organo-compounds, acid rain |
| Organic Waste | Excrement, organic solids, bacteria, viruses, flesh, blood and bone |
| Others | Herbicides, pesticides |

(Reference: Control of pollution from highway drainage discharge. Report 142. Construction Ind. Research. Inf. Assoc., London.)

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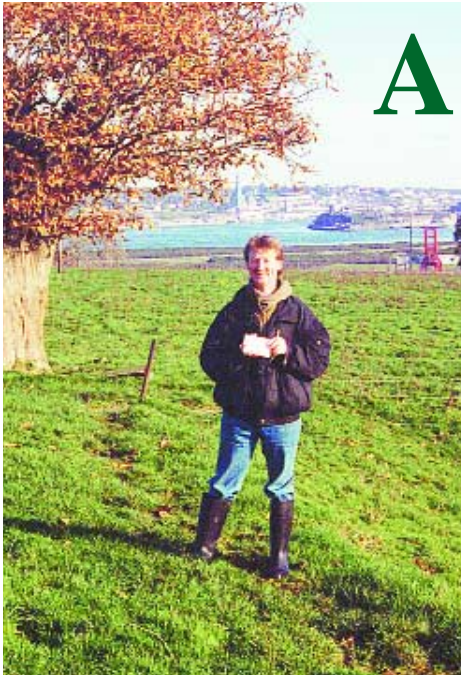
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Tony O'Mahony's fascination with botany began at an early age, ultimately leading to his role as botanical recorder for County Cork.

A Passion for Plants

immensely grateful to the botanists of old, who had the foresight and discipline to publish their work. We owe them a great debt of gratitude! Indeed, much of my own work (see later *Atlas 2000* notes) links in with, and updates, their discoveries, so that for me personally, there is very much a feeling of a continuing, living bond with such excellent former Cork botanists as R.A. Phillips, Rev. Thomas Allin, Isaac Carroll, W.T. Alexander, Dr Thomas Power and James Drummond.

At the present time, botanists from Ireland and Britain are combining their efforts to produce a major, new plant-distribution atlas, officially titled *Atlas 2000*. This vast, ambitious project (due for publication in c. 2002) is, most likely, a 'one-off', and it incorporates the distillation of thirty-six years of my own Cork botanical data! It is most appropriate that this Magnum Opus should be published at the beginning of the 21st Century, as it provides us with an invaluable overview of our current state of knowledge regarding the distributions of each native and naturalized plant species in Ireland and Britain. All future changes in species-distribution patterns will be measured against this formidable data bank – a compendium of botanical knowledge.

With the imminent publication of *Atlas 2000* in sight, my botanical work now enters a new stage, with a new focus and range of objectives. Firstly, I wish to publish what I regard as the more important elements of my protracted botanical research down the years. Secondly, I would like to survey those parts of Co. Cork for which only very inadequate botanical data is currently available, although many of these sites are widely scattered, and hard to access, in this vast county of ours. And thirdly, I hope to get more involved in the *Conservation* of important Cork wildlife habitats, such as bogs, fens, marshes, deciduous woodlands, limestone outcrops and quarries, together with coastal sand-dunes and shingle beaches, etc. In this connection, the current boom-period associated with the so-called 'Celtic Tiger' economy has been no friend to the Irish environment; rather, it has imperilled every type of wildlife habitat, and destroyed and degraded many of these.

So the question is, who do we turn to as 'Saviour' of our Wildlife Heritage at the beginning of the 21st Century? The answer, in part, must be the Irish Peatland Conservation Council, a charitable organisation dedicated to the conservation of Irish Wetlands. The IPCC subsists and operates solely on financial donations from the Public, and has undertaken trojan conservation work in recent years. In stark contrast, it is my opinion that DÚCHAS, the Irish Heritage Service, is far from fulfilling adequately its role as custodian of the Irish environment. Similarly, successive Irish governments since the foundation of the Irish Republic, have given much lip-service to conservation issues, yet very little practical financial or legislative help! As a consequence, today we reap the legacy of such appalling indifference in the form of grossly polluted and denatured river-systems and lakes; pastures clogged with the residue of cattle- and pig slurry; and once-beautiful montane heathlands now



Above: One of the first spring flowers, Common Scurvy-grass brightens cliff-tops and coastal rocks from March to May. Right: The elegant Bog Pimpernel is frequent in damp places.



Photos © Paul Kay

severely eroded by high-density sheep farming – the last a victim of woefully misguided EU headage payments in the recent past! The list of Irish environmental outrages, runs on and on. I feel very strongly about Conservation issues such as these, and contribute what finances I can (on an ongoing basis) to the IPCC. I urge other Naturalists to do the same. Only our financial contributions to nature-minded organisations such as the

IPCC, can guarantee the conservation of our wildlife heritage for future generations. At the very least, we owe them that.

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

PROFILE OF A BOTANIST: Tony O'Mahony, Botanical Recorder for County Cork.

I WAS born in Cork City on 4 June 1949, the eldest of seven children – five boys and two girls. My father, Jimmy, was an excellent fly-fisherman, and he introduced us to the marvels of the countryside at a very young age. My fascination with wildflowers developed in tandem with these countryside outings, and by the age of twelve, I had read every book dealing with wildflowers, or herbal cures, in Cork's City Library.

In 1971, having taught myself the essentials of botany, I felt the need for contact with other botanists, and sent off a heart-felt plea for help to the then Doyen of Irish Botany, Professor David A. Webb, of Trinity College, Dublin. David Webb (now deceased) proved a real friend, personally taking me on a weekend tour (June 1971) of Connemara and the Burren, areas of botanical renown on the west coast of Ireland. Our base was David's summer-house, overlooking majestic Lough Corrib. David Webb also put me in touch with Dr John Cullinane, taxonomist at the botany department, in University College, Cork. Many of John's students of that dynamic 1970s period, went on to establish fine careers for themselves in the Natural Sciences, and I remember them all with great affection –

friends such as Mick and Wendy Guiry, Paul and Geraldine Murphy, Pat Whelan, Pat McCarthy, Ciaran McCarthy and John O'Donovan, etc.

In 1974, I was invited to share the Botanical Recorder-ship of Co. Cork with Ms Maura J.P. Scannell and this partnership still continues. At that time, Maura was Head of the Herbarium in the National Botanic Gardens, Glasnevin – a position she held up to her retirement, in March 1990. Our botanical correspondence during this c. 18-year period was quite voluminous!, and fortunately I still retain her letters.

My first botanical paper was published in the *Irish Naturalists' Journal* in April 1973, and since that date I have published some thirty-two papers bearing on aspects of Irish botany, while in 1986 I contributed 18 years of ecological/botanical data to Cork County Council, for inclusion in the county development plan. Yet, truth to tell, this represents but a tiny fraction of the actual botanical data I have collated since c.1964, and it is my firm intention to publish much of the remaining work within the next decade. I resolutely believe that all Naturalists have the duty to pass on their findings for the benefit and enlightenment of future generations, and to act as a spur for the protection of what remains of our Natural History (which latter is now under enormous threat from such factors as land-rezoning, building developments, drainage, forestry and intensive farming). In this regard, I have always been



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Animal Wonder theme: "Eurpean Bee-Eater" by Daniel IP. Acevedo, La Rioja, Spain (International Award)



Wild World theme: "Untitled" by Eamonn McCarthy, Kiltimagh, Co. Mayo (Amateur Award)



Plant Magic theme: "Against all Odds" by Christian Craughwell (Age 16), Renmore, Galway (Youth Award)



Animal Wonder theme: "Still Life" by Pat O'Connor, Galway, Co. Galway (Professional Award)



Animal Wonder theme: "Red Deer Stag" by Mike Brown, Courtmacsherry, Co. Cork (Professional Award)

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Animal Wonder theme: "Perfect Balance" by Cyril Byrne, Shankill, Co. Dublin (Professional Award)



Animal Wonder theme: "Birds of a Feather..." by John Kelly, Ennis, Co. Clare (Professional Award)



Plant Magic theme: "Fern and Mist" by Patrick Reilly, Drogheda, Co. Louth (Amateur Award)



Waterworld theme: "Garden Snail & Frog" by Lorcan Brereton, Foxrock, Dublin (Professional Award)

ESTUARIES AND PORTS

Fish needs in urban settings

By Michael Ludwig

ESTUARIES are areas where fresh and salt water meet and form a salinity gradient. These areas are constantly changing, harsh environments that can vary widely in physical characteristics over a single tidal cycle. Estuaries are where humans have built ports and cities. But, they provide habitat for almost 75 percent of the fish and shellfish species that Americans consume. As Ports have developed, habitats have been altered. Filling, bulkheading, expansion of piers and dredging of harbours has so

changed estuaries that they no longer provide the habitats they once did. A remarkable statistic is that more fill has been dumped in New York Harbor than was moved to create the Panama Canal! To counter these events, efforts were begun in the 1980s to create one habitat type; wetlands. Unfortunately, there are few areas within Ports where appropriate real estate exists. In desperation, filling aquatic environment to recreate emergent wetland habitat was employed. This reduced, further, the equally important shallow water habitat. Recently, managers have begun to look at a Port's aquatic community, identifying

which species are missing and what habitat additions might encourage their recovery. Restoration of habitat began with wetlands but, has advanced to re-creation of shellfish beds and reefs as well as American lobster and fish habitats.

Enhancement of over exploited or stressed populations, either to increase harvests or to restore population levels, has a long but somewhat checkered history. While there are successes, there are more, abject, failures. The National Marine Fisheries Service experience dates from transplanting efforts in the late 1870s and augmentation efforts in the early 1880s. In recent years, there has been a serious revisit of stock augmentation and evidence is mounting, that age at release, location and habitat availability are elements of enhancement efforts that bear on the success of the activity. Stock enhancement can be performed in a variety of ways. The most notable success (Striped bass stock recovery) was achieved by limiting fishing to increase the number of breeding adults. Other approaches include releasing hatchery reared animals, increasing habitat, or protecting breeding stock by limiting access, by-catch and gear impacts or closing areas as in sanctuary declarations. Enhancement procedures have improved to the point where they merit consideration when a project cannot avoid or minimise adverse impacts, it does not afford species ample protections and resource losses are anticipated. When habitat has been degraded by natural or anthropogenic causes (dredging or filling), restoration may be called for to facilitate maintenance or the expedited return of populations to pre-disturbance levels.

Perhaps the most interesting efforts have been with lobster. Attempts at artificial enhancement of lobster populations have taken a number of different forms. These include reducing fishery induced mortality of pre-recruits and/or females, releasing hatchery produced larvae or juveniles, providing sanctuaries to protect breeding stock, and supplying additional habitat (assumes that lack of habitat limits their abundance). Recently metamorphosed, juvenile lobsters were selected for enhancement because they are heavily preyed upon and so, a slight modification of the predation rate will have a profound impact on stock size. However, to augment the population, new habitat must not simply concentrate or redistribute the existing population, but increase lobsters survival. More suitable habitat provides more lobsters with predation avoidance options

Some habitat enhancement attempts to increase lobster populations have been deemed successful although the extent of the augmentation has not been determined by monitoring. A reef of placed rock (2740 m²) was built off eastern Canada and the lobster population use was monitored for 7 years. During the first two years, the reef was colonised by lobsters larger than the average size of individuals using nearby, natural areas and the biomass was lower. This indicated that lobsters were being concentrated and may reflect the habitat use patterns by older individuals. However, after 5 years and for the duration of the monitoring, lobster sizes on the reef was similar to adjacent natural ground, but the biomass was higher than those neighbouring areas. Researchers concluded that the reef was adding habitat and producing a stock augmentation.

An artificial reef made of 8 mounds (1 m by 4 m) of construction blocks were arrayed over an area of 10 m by 30 m in Poole Bay, England. The reef was situated approximately 3 km from hard substrate inhabited by lobsters. Within three weeks of deployment, lobsters were found on the reef by divers. Population estimates of lobsters on the reef ranged from 20 to 30 animals per 100 m². Lobsters were tagged to determine their use patterns. Most of the movement of tagged lobsters reported was between units within the reef, and residence times on the reef were high. Several tagged individuals were re-sampled several times over a period of more than a year. The size of the spaces in the reefs was the important factor.

Reviewing long-term records of species use of an area often provides insights into their habitat needs. Understanding those relationships helps re-create or even establish suitable habitats. Often, having the habitat present is the incentive needed to restoring a balanced community.

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Michael Ludwig, NOAA, NMFS, Milford, CT USA 06460

TO DREDGE OR NOT TO DREDGE?

A titanic clash over whether - and how - to save the Hudson River



Looking south from inside Lock 7 at Ft. Edward

By Walter Mugdan

THE Hudson River has been fabled for its beauty since explorer Henry Hudson first followed its course north from what is now New York City. The River has played a historic role in the development of New York and the American interior.

In the last half century, however, the Hudson became the sewer for more than a million pounds of toxic chemicals. Polychlorinated biphenyls – PCBs, classified by the United States Environmental Protection Agency (EPA) as a probable carcinogen – were manufactured from 1946 to 1977 by the General Electric Corporation (GE) at two plants located 200 miles north of the Hudson's mouth in New York City. Both plants poured PCB wastes directly into the river.



Lower Hudson River from Palisades.

When a nearby dam was removed in 1973, mud laden with PCBs surged down the river. Most settled in the next lower reach of the river, behind another dam, but some of the chemicals made their way downstream all the way down to New York Harbor.

PCBs are taken up by tiny

food chain, the Hudson was largely closed to fishing for human consumption, including the commercially valuable striped bass fishery, a quarter century ago.

Can anything be done to remedy the problem?

A clash of titans is looming over precisely that question.

"The massive project — the largest environmental dredging program every undertaken — is expected to last five years, and would result in the removal of some 100,000 pounds of PCBs from the river."

plants and animals, and "bio-accumulate" all the way up the food chain into fish, birds (including the endangered Bald Eagle) and mammals (like otter and mink). To protect people at the top of the

On one side is the U.S. Government, which has determined that dredging the toxic sediments is both feasible and prudent. On the other is GE, the world's largest corporation, which as the source of the pollutants is legally responsible for the costs of cleanup.

Those costs may be very large indeed. On December 6, 2000 EPA announced its proposal for targeted dredging to clean the most heavily polluted parts of the upper Hudson, at an estimated cost of \$460 million. EPA proposes to remove 2.65 million cubic yards of PCB-contaminated mud from selected areas along a 40 mile-stretch of the river. The dredge spoils will be shipped by rail to licensed disposal facilities hundreds of miles away. The massive project — the largest

environmental dredging program every undertaken — is expected to last five years, and would result in the removal of some 100,000 pounds of PCBs from the river. Even so, enough PCBs will be left behind so that some fish species, in some parts of the river, will still be unsuitable for non-restricted human consumption decades later. But EPA predicts that all the fish will be much less contaminated, and therefore much safer, after dredging.

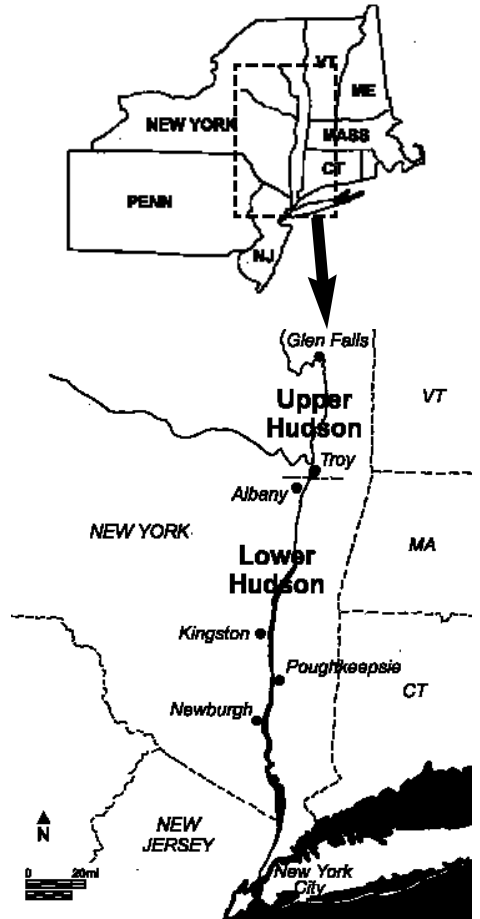
Faced with the large, potential monetary liability for this cleanup plan, GE has not been silent. Calling EPA's proposal "absurd" and claiming it would be "devastating to the river ecosystem," GE has vowed to do everything it can to stop the project.

GE argues that PCBs are not nearly as dangerous as EPA (and most scientists) believe them to be. The company goes on to assert that, in any case, natural processes are causing the older, contaminated sediments to be buried by cleaner sediments, eventually taking the PCBs out of circulation. And GE claims that the dredging work itself will recontaminate the river and disrupt shoreline communities for ten to twenty years, not the five years projected by EPA.

EPA, for its part, has concluded that widespread, permanent burial of contaminated sediments is not happening. Based on a comprehensive study, EPA determined that PCB-laden sediments are regularly exposed and redistributed, remaining "bioavailable." The debate has raged for nearly twenty years, while the Hudson has become one of the most intensely studied river ecosystems in the world. EPA's published findings cover tens of thousands of pages. Major components of the study were peer-reviewed by panels of independent scientists. Scores of meetings and informational sessions were held to keep citizens informed.

GE has challenged the EPA studies every step of the way, while spending over a hundred million dollars to stop PCBs still leaking from beneath its two former plant sites.

GE also conducted a massive campaign to generate opposition to the dredging plan. Advertisements showed dredging equipment dripping mud and water, and fuelled



Hudson River, New York, USA.

local fears that a PCB landfill would be sited in a farming community along the river.

Local and national environmental groups have girded for the fight. They, too, sent out mailings, published advertisements and sponsored events to demonstrate their concerns for the health of the Hudson ecosystem and people who fish, swim and play there.

Over a thousand attended the first public meeting after EPA announced the dredging proposal. Both sides portrayed themselves as environmentalists, some wearing green hats with anti-dredging slogans printed by GE, while others wore "moon suits" to dramatise the importance of removing the toxins. Newspapers up and down the river published editorials either lauding or condemning the EPA proposal.

More public meetings will be held, and EPA will consider all comments before making its final decision in mid-2001. That decision will have impli-

cations far beyond the banks of the Hudson. Sediments in other aquatic ecosystems throughout America, and indeed the world, are similarly contaminated – some, like the Passaic River in nearby New Jersey, with complex mixtures of pollutants including dioxin, organic chemicals and toxic heavy metals.

The Hudson decision, and the results of any dredging carried out in the historic river, will point the way for decisions on many similar projects costing millions — even billions — of dollars.

For more information, visit EPA's Hudson River web site at <http://www.epa.gov/hudson>.

Walter Mugdan is Regional Counsel of the U.S. Environmental Protection Agency, Region 2, located in New York City. Any opinions expressed herein are the writer's own, and do not necessarily reflect the views of the Agency.

What's wrong with our countryside?

By Alex Kirby

THE COUNTRYSIDE isn't working — it's not doing the environment any good, it's killing wildlife, it offers less and less to urban dwellers, and for more and more of those who actually live in it the countryside is becoming a green hell. Exaggeration? Of course. But not as much as it may sound. The United Kingdom is in the throes of a rural crisis, which is distinctive but not unique. British farmers' leaders warn of the danger of rural depopulation which could leave parts of the country as empty as the near-deserts of central France. And the Celtic Tiger may not prove forever immune.

Half a century ago, farming was the countryside's lifeblood. It isn't now. It's an adjunct, an afterthought, something UK plc tolerates the farmers doing because they're too old, or too stubborn, or too set in their ways, to learn anything else. But we can buy pretty well everything we need from abroad, and countries that do that are good client states of the USA. Farmers are constantly being told to diversify, to find other ways of making money, to the point that some now have to rely on earning enough from non-farming enterprises to subsidise their loss-making farming activities. And they do make a loss, many of them, with sheep going for a pound or less, milk and pork and almost everything else costing more to produce than they fetch at sale. Low commodity prices are not a uniquely British problem, though the high value of sterling is. But the crisis the two create is one that more and more of us are getting to know. And every sector is suffering. It used to be a case of "Horn high, corn low", or vice versa. But for the moment, everyone in farming is in it together.

There are many suggestions of what farmers should be doing instead of producing food. The EU's Common Agricultural Policy (CAP) payments should be used to pay them to be environmentally-friendly guardians, park-keepers, according to one theory. Another is that they should be paid to let their land be used (wherever possible) for lagoons, to replace the floodplains we've built over and soak up the water that climate change looks increasingly likely to dump on us.

In the meantime, farmers are in dire straits. And when they are, so is the rural economy. Shops and schools shut, there's not enough custom to keep banks and post offices open. Transport links shrivel, and jobs vanish. Writing in the London *Times* on 2 December 2000, Lucy

Pinney repeated a telling anecdote she'd heard from a Devon solicitor, Colin Chesterton:

"One of my clients lives in a remote village, and he came into court at 10.30 a.m. on a Thursday, puffing and blowing like a steam engine because he had run up the hill from the bus stop. He was shouted at by the clerk, who told him he should have caught an earlier bus, and my client replied: 'I caught the only bus. It goes back on Tuesday!'"

Not so long ago, the farmers were doing very well. But over huge swathes of the UK, the countryside wasn't. Much of the lowlands are not far from being a massive and sterile open-air factory, devoid of birds and other creatures that have lived alongside us for millennia. We are emptying the woods and the fields. We have pulled the plug on Nature.

Research by the Royal Society for the Protection of Birds (RSPB), published early in 2001, said the intensification of agriculture since 1970 had done more damage to the UK's and Europe's birds than any other single factor, including the effects of climate change, pollution and deforestation. Across 30 countries, the RSPB reported, those with the most intensive farming had suffered the most rapidly declining bird populations. It said there was a direct link between declines in numbers of once common birds and indicators of farming intensification, including cereal and milk yields and the number of tractors per farm worker. One of the authors, Paul Donald of the RSPB, said: *"Our research shows that the UK suffered the worst declines in Europe, but every country recorded a decline in the populations of birds which rely on farmland. Declines were most severe in western Europe, with six out of the worst 10 countries being in the EU, where the Common Agricultural Policy has fuelled agricultural intensification."* Dr Donald said the situation was without parallel, with some species plummeting at a rate not seen for centuries. *"The annual average rate of decline of some of our farmland birds has been greater than that of several species, including the great auk of the north Atlantic and the moas of New Zealand, between their discovery and their global extinction,"* he said. *"That such declines are taking place in formerly common birds, which have had a long association with man, is an event unique in recorded history."*

So now we have despairing farmers and van-

ishing wildlife. What else? Well, many of those who live in the country seem pretty miserable with their lot, and sometimes with good reason. In its report, *The state of the countryside 2000*, the Countryside Agency had this to say:

"England's rural communities are going through a period of great change. Some of the things people most value about life in the countryside are being eroded — and that is worrying them. There is an unsettling fear that villages and market towns are losing their sense of community, as well as the relative security and freedom from crime which many have enjoyed for a long time. The facts tend to support this, with some crimes increasing disproportionately in rural areas. Vehicle crime, for example, rose by 24% between 1991 and 1995, in rural areas, compared with 4% in urban areas and 10% in inner cities."

"On the roads, more and more vehicles are making life hazardous for pedestrians and cyclists, as well as for motorists themselves. Traffic is rising faster on rural roads than on others."

The odd thing about all of this is that many people are enjoying life in the countryside very much. They're not farmers, they're probably not people who've lived there for very long. They're people who have acquired the wealth to move out to live in the country, and at the same time can afford the mobility to get back to the

city whenever they want, for work or leisure. They've got it made, really.

This may sound like a classic class rant, an envious jeremiad against those who've made their way in life and decided to have the best of both worlds. But I don't mean it that way. My argument is not that a lot of acts of individual self-interest by the fortunate have ruined the countryside for people, Nature and generations to come. It is that we have *all* accepted by default and in almost complete ignorance three assumptions whose consequences are now becoming apparent. One is that we (in this case farmers) should produce as much as possible: the CAP rewards those who produce crops for which there is no market, and penalises those who plant trees on upland slopes to improve the environment, rather than raise still more sheep. The second is that unlimited mobility is a right to which every one of us is entitled (Dr Mayer Hillman, senior fellow emeritus of the Policy Studies Institute, London, puts the argument with brutal simplicity: "We must be encouraged to travel far less, and more slowly and therefore more fuel efficiently"). And the third unspoken assumption is that unlimited personal wealth is a goal we can all pursue without the risk of hurting society. Put those three assumptions together, and you get the sort of countryside crisis we have now.

Alex Kirby is a freelance journalist and broadcaster. He presents BBC Radio Four's environment series Costing the Earth, and reports on the environment for BBC News Online - <http://news.bbc.co.uk>

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Education and Training for Environmental Careers

Introduction

The need for qualified people with environmental training has grown in response to a requirement to implement an ever increasing amount of environmental legislation emanating at both a national and a European level. Regulation appears to have been the only real means of controlling the continued deterioration in environmental quality. Voluntary actions were limited, ineffective and much overdue despite gallant attempts by environmental groups. There are literally hundreds of items of legislation regulating various activities that impact on the environment. Environmental control is a relatively new discipline and requires the amalgamation of a variety of new and existing technical skills.

New curricula in environmental training are developing in the area of initial and continuing education. Certified competency-based training is also becoming necessary for managers and operators involved in particular environmental activities. Apart from the specific skills required by personnel in the regulatory agencies (local authorities, Department of Environment and Local Government, Environmental Protection Agency, etc.) and the regulated activities (industry, waste treatment facilities etc.) there is also a need to create an environmental awareness within the general public, particularly when it comes to issues such as domestic waste, recycling, litter, energy and transport.

Challenges

The interdisciplinary nature of working in the environmental arena is particularly evident for an organisation when it is required to complete an application for an emission licence, an Integrated Pollution Control (IPC) licence, an Environmental Impact Assessment or to install an Environmental Management System (EMS). Issues such as noise assessments, wastewater treatment, monitoring emissions to water and to atmosphere, waste prevention, storage of chemicals, emergency planning and legal issues pose technical challenges.

Where does an organisation turn to for assistance with such matters? The options available include

- engaging consultants
- re-training existing staff
- employing staff with the relevant training

Often a combination of these is required depending on the size of the organisation and their potential to impact on the environment.

Disciplines

Environmental courses draw from many disciplines but particularly within science and engineering. The majority of issues relating to the environment are probably most closely connected to the science disciplines. The monitoring of pollutants, their fate and their effects on the environment (including flora and fauna) fall within the disciplines of science while the systems used to control pollutants fall within engineering disciplines. Many third level training institutes now offer new courses within existing disciplines but with the term "Environmental" prefixed to an existing course name, or in some cases to new or already established Departments. Disciplines within physical, chemical and biological sciences and other disciplines are being subdivided into areas such as, environmental-ecology, -geology, -chemistry, -

biotechnology, -engineering, -psychology, -legislation, etc. This reflects a need for expertise in specialised areas to assist in the various facets of environmental protection.

The General Practitioner

Despite these areas of specialisation there is a requirement for people with general environmental skills to act as 'general practitioners' (environmental officers) for both the regulatory agencies and the regulated activities. Such practitioners are required to manage the day to day affairs that may impact on the environment and to report on the same. The practitioner may need to refer to the specialist on occasions, such as, for sophisticated chemical analysis (environmental chemist), toxicity testing (toxicologist), design and construction of pollution control equipment and plants (environmental engineer), environmental impacts of new developments (ecologists, archaeologists, hydrogeologists etc.) and environmental research.

The skills required by the practitioner may be a scaled down version of those of the various specialists but the practitioners are able to interrelate between these areas relevant to their situation. The EPA website, www.epa.ie provides up to date, systematic and technical data on all aspects of the environment. The ENFO website provides a broad range of environmental information for the general public.

Industry

In an industrial situation the main environmental skills required relate to the following:

- storage and containment systems for chemicals and potentially pollutant substances;
- integrity of drains;
- protection of land and groundwater;
- monitoring and controlling emissions to the atmosphere from production processes and services;
- raw water quality and use;
- wastewater production, treatment and discharge;
- sludge treatment and disposal;
- waste prevention and reduction programmes;
- classification and labelling of waste materials for storage on-site or for transport off-site;
- noise assessments;
- emergency planning;
- monitoring and control of fugitive emissions and spillages;
- documentation relating to licensing and the tracking of wastes off-site;
- implementing and maintaining an EMS.

Regulatory Agencies

With regard to the regulatory agencies, similar skills to those mentioned above are required to monitor the activities of the regulated industries to ensure compliance with licence requirements and other environmental regulations. Other areas of concern to the regulatory agencies include planning, monitoring and protection of water quality, pollution investigations, nutrient management, prosecutions, waste disposal and municipal wastewater treatment. The legal requirement for local authorities to prepare and implement Water Quality Management Plans and Waste Management Plans for their functional areas requires a substantial input by technical staff.

Environmental Protection

Environmental protection is now being recognised as an integral part of industrial processing. Examples include, monitoring energy consumption per tonne of output or feedback control between the capacity of pollution abatement equipment and production rates. In the past, environmental protection was considered a non-profit expenditure. However, nowadays good environmental performance can save money and enhance the image of the company. Accreditation to a recognised EMS, particularly EMAS or ISO 14001, can reduce the level of inspections by regulatory bodies. Environmental awareness training as a requirement of an EMS helps create awareness among employees who in turn not only bring the message to their work situation but also to their home environment. One notable company provides bottle and paper banks in its staff car park not necessarily for waste generated on site but to facilitate recycling of domestic waste generated by its staff. Visits to local schools by company staff or sponsorship of environmental competitions are other means by which some organisations are promoting environmental awareness amongst the public.

General Public

Environmental issues of concern to the general public mainly relate to:

- municipal waste disposal,
- environmental damage due to chemicals and emissions from industry,
- wastes from agriculture,
- transport and energy production,
- land use and loss of natural habitats.

It is often perceived by the public that control of these problems is the responsibility of governments, and in general they are unaware of their input to the problems or their role in alleviating them. For example, the amount of domestic refuse is increasing due to higher living standards and consumerism by the general public but the disposal of which is perceived to be a government problem. The same applies to traffic congestion, litter etc. The national survey "Attitudes and Actions" indicates that there is a low level of public awareness in Ireland on environmental issues relative to other European countries. This is being addressed through a national public education campaign with the slogan:

**'The Environment:
It's easy | to make a difference'.**

The recent appointments of Environmental Education/Awareness Officers by local authorities will also help improve this situation. A major change in attitude is required by producers, retailers and the public to control current environmental problems. The 'polluter pays' principle is well enshrined in European policy. However, will the public accept waste-based charges for refuse? Has the public a choice on accepting less packaging on commodity products? Would retailers and the public accept a re-introduction of a deposit/refund system for glass and indeed plastic containers? Would producers and consumers be prepared to accept beverages in standard bottles, as in Denmark? For example, the amount of green glass currently collected through recycling outweighs the demand for green glass by producers in Ireland.

Conclusion

Clearly there is much work to be done, not only in this area, but in all aspects of economic and social life in Ireland - only a responsible and integrated approach from both providers and recipients of Environmental Education can achieve this.

ENVIRONMENTAL COURSES

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website: www.itsligo.ie

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Fax: (01) 402 3399 website: www.dit.ie

Trinity College Dublin's - Tel: 01 608 1638
Fax: 01 671 2821 e-mail: cenv@tcd.ie
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e-mail: admissions@ul.ie Fax: (061) 330316
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National University of Ireland, Cork
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Waterford Institute of Technology -
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website: www.ulst.ac.uk

Open University in Ireland - Tel: (01) 678 5399
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Non-Third Level Courses

IBEC - Tel: (01) 660 1011 Fax: (01) 660 1717
website: www.ibec.ie

NERAC (National Environmental Research and Auditing Centre), a campus-based company at IT Sligo, Tel: (01) 857 0000 Fax: (01) 808 2020 website: www.enterprise-ireland.com

Construction Industry Federation (CIF)
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Fax: (01) 496 6953 website: www.cif.ie

Shannon Quality Training - Tel: (01) 672 4464
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website: www.commerce.ie/sqst

FAS Environmental Training Unit
Tel: (01) 607 0500 e-mail: info@fas.ie Fax: (01) 607 0600 website: www.fas.ie

Conservation Volunteers Ireland
Tel: (01) 4547185 Fax: (01) 454 6935
website: www.cvi.ie

By Declan T. Quigley

SWORDFISH

Gladiators of the Sea

THE swordfish (*Xiphias gladius*) is widely distributed in tropical, temperate and sometimes cold waters of all oceans, including the Mediterranean & Black Seas. The species normally inhabits offshore oceanic waters from the surface (meso-pelagic zone) down to depths of about 800m (meso-pelagic zone) and rarely occurs in inshore waters (i.e. within the 200m bathymetric limit). The swordfish has the greatest temperature tolerance (from 5 to 27°C) of all billfishes, a small group of fishes (12 species) which includes the Atlantic sailfish *Istiophorus albicans*, Atlantic blue marlin *Makaira nigricans* and the Atlantic white marlin *Tetrapturus albidus*. Although it is primarily a warm-water species, its migrations in the NE Atlantic consist of movements along the edge of the continental shelf toward temperate or cold waters as far north as Iceland and Norway for feeding in summer and back to warm waters in autumn for spawning and over-wintering. Swordfish are usually very solitary creatures, and only congregate in larger numbers in certain areas (e.g. Straits of Messina, near Sicily) for spawning from June - September.

Although the swordfish is regarded as rare in Irish inshore waters (only 8 specimens have been recorded since 1786, see Table 1), it is has only recently been discovered that the species is more frequent in its occurrence in offshore waters (outside the 200m bathymetric limit). Since the late 1980's, relatively large numbers of swordfish have been taken as a bye-catch in the newly developed albacore tuna (*Thunnus alalunga*) fishery off the W and SW coast. Most of these swordfish were taken in pelagic drift nets and long-lines well offshore (between 46-49°N & 10-17°W), during late summer and autumn, particularly in September and October.

The swordfish is highly prized both as an excellent food fish as well as a hard fighting big game fish by anglers. The species is heavily exploited and supports important commercial fisheries in several areas of the Atlantic, Indian and Pacific oceans; the annual world catch is estimated at around 40,000 tonnes. The most important fisheries in the NW Atlantic are from the Grand and George's Banks (featured in the



KEEL STRAND, ACHILL ISLAND, Co. MAYO: A 2.56m 47kg Swordfish caught in 1996.

recently released film "Perfect Storm") to the Gulf of Mexico and in the NE Atlantic, in the Gulf of Guinea and the Mediterranean Sea. The discovery of mercury in swordfish flesh in the 1970's led to controls being placed on its sale in the USA and this had a major impact on the fishery.

"Swordfish are so active that, other than man, only certain large sharks and cetaceans (whales & dolphins) can prey on them."

However, recent studies have shown that high levels of mercury in its flesh are not necessarily connected with industrial pollution; high levels have been found in museum specimens collected many years ago

Major sport fisheries are located in the NW Atlantic from New York to Texas, in the N and S Pacific from California to Ecuador, Peru and Northern Chile, and off the E coast of Australia and around New Zealand. The largest authenticated specimen (536kg or 1182 lb) captured on rod and line was taken off Iquique, Chile in 1953. However, specimens weighing in excess of 1500 lb (679kg) have been reported from the Pacific.

Adult swordfish are opportunistic feeders, known to forage on a wide variety of fish species and cephalopods (squid & cuttlefish) from the surface to the bottom over a wide depth range. Swordfish are so active that, other than man, only certain large sharks and cetaceans (whales & dolphins) can prey on them. A swordfish, weighing 55kg (120 lb), complete with its sword, was found in the stomach of a Shortfin mako shark *Isurus oxyrinchus* weighing about 330kg (730 lb) off the Bahamas. It is thought that the swordfish uses its sword to kill some

of its prey, particularly cephalopods, as is shown by the slashes on the bodies of prey found in their stomachs; swordfish have no teeth. The swordfish has been reported to charge upon shoals of smaller fish, striking right to left with its sword and then turning to pick up the dead and disabled fish.

Much has been written about the swordfish's reputed habit of ramming wooden ships and leaving part of its sword embedded in the planking. Although such unprovoked attacks are part of the mythology of the seas, there are several reported cases in 19th century literature and a number of authenticated examples of ships timbers embedded with bills (derived from various species of billfishes, including swordfish) on display in museums throughout the world. For example, the following story was published in the *Caledonian Mercury* in October 1843:

"Extraordinary Circumstance - The brig Lord Byron, of Limekilns, when on her voyage, at the end of last month, from the West Indies to Liverpool, suddenly sprung a leak, without any apparent cause. It was considered advisable to return to Jamaica, and on the cargo being taken out and the vessel examined, it was found that the damage was occasioned by a swordfish. The sword or bill of the fish had passed through the copper sheathing, then through the planking, in a slanting direction, to the extent of five inches, and also about eight or ten inches into the dead wood of the keel; leaving an opening in the planking in each side sufficient to admit the hand of a boy. A piece of the sword retained by the Captain is six inches long and one and a half inches thick, of solid bone; but a longer piece remains in the keel. The strength of the swordfish must have been very great, and it may have been the cause of the loss of several vessels. The vessel referred to was carried into port with very great difficulty."

Although, such reports are rare today, probably because most ships are no longer made from wood, it is interesting to note that a swordfish recently attacked the *Woods Hole Oceanographic Institute's* submersible *Alvin* at 600m. The swordfish apparently wedged its sword so tightly into a seam that it could not withdraw it

Xiphias gladius, on guard, touche!

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

| Date | Location | Method | T.L. (cm) | Wt (kg) | Reference |
|-------------|---------------------|----------------------|-----------|---------|---------------------------|
| 1786 | Wexford | net | | | Thompson (1856) |
| June 1950 | Bantry Bay | draft-net | 240 | 59.10 | Went (1950) |
| 1977 | SW coast | scallop dredge | bill only | | Minchin & Molloy (1981) |
| August 1979 | 112km S Valentia | long-line | 425 | 182.00 | Minchin & Molloy (1981) |
| 18.07.1982 | Achill Island | drift net | 394 | 206.50 | Quigley et al (1984) |
| 29.08.1987 | NW Brandon Head | pelagic dog-fish net | 140 | 8.75 | Quigley & Flannery (1989) |
| 24.07.1991 | Lough Foyle | surface gill-net | | 19.50 | Minchin (pers com) |
| 05.12.1996 | Keel Strand, Achill | stranded | 256 | 47.00 | Quigley et al. (in press) |

Table 1. Swordfish records from Irish inshore waters (within the 200m bathymetric limit)

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OPENING MAY 2001



Highway 82, the only east-west highway in lower southwestern Louisiana. Once set back from the Gulf, it is now in danger of being breached. The chenier highway rests on the last ridge between the Gulf and a vast marsh plain.



Constance Beach, Louisiana, USA. A harbinger of things to come

No Time to Lose

Facing the Future of Louisiana and the Crisis of Coastal Land Loss

By Bill Herke

THE extensive marsh of coastal Louisiana was formed on sediment deposited by the Mississippi river over the last 7,000 years. During that time the mudflats that formed were subject to wave erosion, and to subsiding below the water surface as they compacted, but sediment deposition rate exceeded mudflat loss rate, and the mudflats became covered with marsh grasses. The vegetated marsh gradually encompassed a broad band up to 50 miles wide extending from Texas to the state of Mis-

issippi. But the marsh began disappearing in the last century. Of the approximately 4 million acres of marsh existing in 1930, about a million acres have converted to open water, and this conversion is continuing at the rate of about 30,000 acres per year.

The change from increase in marsh area to decrease in area is due to human causes, and I will name a few. Since 1930, massive flood protection levees have been built along the Mississippi river nearly to its mouth. The water and sediment formerly overtopped the river bank during high water periods, and the associated sediment and nutri-

ents continually reinvigorated the marsh. The levees now prevent this. In addition, a network of dams on the Mississippi and its tributaries have reduced the amount of sediment reaching the mouth of the river and available for longshore transport and deposition. Also a pervasive network of canals has been dug throughout the marsh to facilitate oil and gas exploration and drilling, and for navigation. This has changed the hydrology of the area, allowing more rapid ingress of salt water into fresh marsh regions and accelerated drainage of fresh water to the Gulf of Mexico. The result

has been the death of some of the fresh marsh vegetation, and a resulting erosion of the highly organic soil because the roots are no longer there to hold the soil in place.

The conversion of marsh to open water is facilitated by the fact that the majority of the marsh is less than 3 feet above sea level. Loss of the marsh has extremely serious consequences. The Coalition to Restore Coastal Louisiana is a coalition of individuals, businesses, civic and environmental groups and communities who have come together to work for the future of Louisiana's coast. The Coalition recently published a 57-page report (titled "No Time to Lose") outlining the problem of marsh loss, the economic and environmental losses involved, and the steps necessary to restore the marsh. Some of the economic and environmental losses from not taking these steps are:

1. Loss of protection for oil and gas production facilities. What is now the land-based support centre for the Gulf of Mexico's oil and gas industry will become open water; 55,000 jobs could be lost.
2. Louisiana's wetlands and barrier islands protect navigation channels, anchorages, and waterways from winds and waves. The nation's most

nationally important port system is at risk.

3. Louisiana's commercial fishery catch (about a billion pounds a year) constitutes about 30 percent of the nation's total, and it's recreational saltwater fishing is some of the best in the nation. The marsh serves as the nursery for most of the species landed. The total annual economic-effect loss to fisheries in the year 2050 is estimated to be over \$700 million.

4. Wetlands and barrier islands absorb storm surges and blunt the force of high winds, saving lives and property. Marsh loss will force widespread relocation; the economic and cultural costs could be in the billions of dollars.

A plan, titled "Coast 2050", has been formulated to restore Louisiana's coast. It was formulated by five federal and seven state agencies after a series of 65 public hearings and workshops. The purpose of the plan is "...to sustain a coastal ecosystem that supports and protects the environment, economy and culture of southern Louisiana, and that contributes greatly to the economy and well-being of the nation." The main strategies of the plan include watershed management such as river diversions, hydrological repairs, and barrier island

restoration. For example, the Mississippi River Gulf Outlet (a man-made navigation channel) must be closed; funneling vast amounts of sediments into the deep waters of the Gulf must stop; new river deltas must be formed; river water must be moved farther east and west to support marshes there; and seasonally operated locks should be installed in some navigation channels to reduce salinity stress on marsh grasses. The cost estimate for all these measures is \$14 billion over 20 years, but left unchecked, the future land loss would risk many lives and over \$100 billion in infrastructure and resources.

In this short note I have barely scratched the surface of the problem, its costs, and the solutions. The complete "No Time to Lose" report can be read on the Coalition's website www.crcl.org, as can the details of "Coast 2050" on the website www.lacoast.gov.

Dr. Herke is a board member of the Coalition to Restore Coastal Louisiana (CRCL). He is also a retired fishery scientist who spent over 30 years studying the role of Louisiana's coastal marsh as a nursery for fishes, shrimps, and blue crabs.

Sailing Ships of Ancient Ireland

By Daphne Mould

*"Hearts of oak are our ships,
Jolly tars are our men;
We always are ready;
Steady, boys, steady."*

DAVID GARRICK wrote those verses for a song about the British Navy in 1759, but they could equally apply to the sailormen of Bronze Age Ireland; to the Irish, who Viking fashion, went raiding on the coasts of Wales and carried off, among many others, the young Patrick; and to the Irish saints, who did get some brief toehold on Iceland.

And their vessels were strongly built of good Irish oak. And yet, even in the year 2000, the August Smithsonian Institution of Washington, repeats in its monumental volume on "Vikings: The North Atlantic Saga", that the Irish went avoyaging in "frail skin boats". "A frail skin boat" against the fury that the North Atlantic can throw at you, the sudden storms and whirlpools of the Hebrides, and moreover carrying heavy loads, captured slaves from Wales and tin from Cornwall: the very idea is a nonsense. Furthermore, very recent archaeological discoveries in England have turned up remains of Bronze Age timber and sea going vessels, let alone the much later, literary record of St. Adamnan in his "Life" of St. Colmcille of Iona, where he lists the many types of ships they had, and what they built them of: oak and pine.

We can, I think, be quite sure that one man only has ever taken a skin boat from Ireland to Iceland, then trans-Atlantic. That man is Tim Severin in his "St. Brendan", in the 1970s, based on that mediaeval best selling novel "The Voyage of St. Brendan".

This book was written in the 10th century by an Irishman living abroad, like Joyce, who would also compose an Odyssey. Brendan of Clonfert, died AD 578, and had indeed been a traveller, visiting his friend, Colmcille, in the Hebrides. So he was a good choice for the book's hero, but the book belongs to the ancient, and pre-Christian, tradition of immrama, voyage romances in which both real and imaginary happenings are linked by a journey. Homer's "Odyssey" is the most famous of this form of fiction. "Star Trek" the most recent. So the Brendan voyage uses events well known at the time: submarine volcanic eruptions (the island of demon smiths), icebergs and whales - whilst Homer seems to have been very well informed about the actual sea routes he set his hero sailing along. Brendan is described going off in a big skin boat, and in one version, failing to find the Land of Promise. St. Ita, his foster mother, like a wise woman, tells him he'll never get there in a ship in whose making "blood has been spilt" (the skin boat), so he builds anew in wood and succeeds.



Photos: © Daphne Mould

The Bantry pillar stone, now much weathered, which depicts a wooden double ended vessel with the steering oar on the wrong side. It possibly dates from as early as the 8th century. The vessel could have stepped a mast.

But the Brendan romance together with the writings and expertise of the Aran and Blasket islanders in curraghs, has spawned the myth of the "frail skin boat" able to go anywhere. Yet the Blasket islanders had wooden boats which were seized in lieu of rent, and in desperation began to make and sail curraghs. True, the skin boat is ancient, but it is an inshore, short haul one. The Eskimo kayak is sewn by his wife, in seal skin, to fit her man, and they have as well the big, rectangular umiak, for cargo. But it must be brought ashore and dried after two days in the water. The curragh of the Irish western isles is not so much a proud survival but a product of extreme poverty. The trees were gone from the islands, wood cost money but old flour bags were free. With a little light wood, canvas and tar, the islanders built vessels that could go afishing and keep communities alive. At a price, as an old Aran man told J.M. Synge: "A man who is not afraid of the sea will soon be drowned, for he will be going out on a day he shouldn't. But we do be afraid of the sea, and we do only be drowned now and again".

And so far as the real boat built of skin, the ancient Irish would have had another problem. Their herds were quite small, and leather was wanted for a multitude of other uses. You could not have had skins enough to



The steering oar on a Viking ship. This vessel in AD 2000 followed the old Icelandic route - Iceland-Greenland-Newfoundland-USA, arriving New York October 5th 2000 to celebrate the thousand years since their first landing in the New World. Definite Viking remains are now known there. The builder and captain of the ship was Icelander Gunnar Marel Eggertsson.



Small, sail and oar powered vessels in the Icelandic Maritime Museum. Some early Irish vessels could have looked much the same.

build many boats. But Ireland was then densely wooded, and with oaks, the shipwright's favourite, and they had the tools to fell them and split them into planks.

I was sitting on the slopes of Mount Gabriel in west Cork among the Bronze Age copper mines there, and surrounded by derry (doire - oak wood) place names where the trees once grew, thinking on these things. Below was the sea, the highway to all the rest of the world. Copper ore is widely distributed, but copper is a soft metal and to make it into an axe or a sword, you need to add tin and make hard bronze. And tin is much scarcer; for a large part of the ancient world to be got only from Cornwall. The Cornish tinsmen were sitting not on a gold mine but what was just as good, a tin mine. They did not need to go hawking it around, customers came for it. So the Irish must have built strong boats of wood, able to carry a load of trade goods and bring back the tin, and gone to fetch what they needed.

And the actual evidence is now coming in. In the last ten years or so, in England, fragments of Bronze Age wooden ships have turned up in construction works in slob lands and the like. The fragment known as the Dover ship (from the place of its discovery) is 60 feet long and so finely crafted, using both bronze and flint tools, that archaeologists wonder how beautiful their houses and furniture may have been.

And the Irish saints? Adamnan was born 27 years after Colmcille died (AD 597) and did himself

become abbot of Iona. So when he wrote about Colmcille, he wrote first hand of the world both lived in. People have tended to read him for the saint's history and the story on land, but read it as a sea person and through Adamnan's careful Latin comes the thunder of Hebridean seas, the whirlpools of Corrieveckan, the ever changing weather, the news brought in by vessels from overseas. And he has a whole litany of ships, large and small, with their own special names, just as we have today. And the pretty picture of a couple of Irish saints in a frail skin boat vanishes before these big, heavy vessels with their oars and sails and what is more, crewed by "jolly tars", the navigators. Jolly tars who sometimes needed to get a saint or two out of their way. For one of Adamnan's stories tells of a bad storm, and Colmcille trying to help bail and being told to go for'ard and pray: in other words get out of the way. Which he did and the storm abated though whether as a result of his prayers is another question.

They were careful to have a full crew. One party setting off from Iona to Ireland was one man short, and only left when Colmcille said the weather was settled enough to go short handed, and the man who catches your prow when you arrive will be the new crew member. For ships then mostly ran up on the shore, someone grabbed the prow and the rest hauled her up above high tide mark. There were then no built piers, harbours or marinas!

Adamnan calls the big ships navis and the small ones, little ships, navicula. Among the smaller ones are barca, (whence our barque), capallus (punt), and alnus. Alnus, as the name implies is built of alder wood, and appears in the Latin poet, Virgil's writings. Alders can grow quite large and their wood is so wet that it absorbs no more and so has been used for clogs and wooden water pipes before people learned to cast iron ones. (Such alder, old water pipes are on show in Kinsale museum). Adamnan writes of towing home timber behind "xii curucis". This seems a Latinisation of Gaelic currach - but that can mean just boat, not necessarily a skin one. It is doubtful skin boats would make good tugs for heavy loads, and these vessels were obviously large, for they were rowing in a calm and prayed to Colmcille, rather testily, to get them a wind. The wind arrived, and they heaved on the ropes, raised the yards and set the sails: Adamnan indicates rather massive gear, and bears the crossed yard on the mast as the sign of the cross.

One Cormac went looking for a hermitage in the north, and a south wind sent him scudding on and on and on. Eventually it veered to the north and he came safely home. But he was attacked by a crowd of strange beasts, which bit at the oars and scratched at the leather cover of his ship. It is likely he imagined them. People have taken the mention of a leather cover as meaning a skin boat but Adamnan tells us Cormac's vessel was a navis tecta, a ship with a roof, a decked ship. Cormac would need shelter to survive such a trip and the leather could be a cover to waterproof the deck. Far worse to have the creatures scratching and biting overhead than alongside!

It is often said the Irish knew nothing much of ships and the sea until the Norse arrived, and gave many marine terms to Gaelic. But Viking ships were very "much top of the range", the best the world had yet seen. How natural to add the Norse names to one's vocabulary: just as computer speak has invaded modern English together with many other new words from new inventions and improvements.

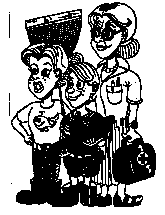
Sadly we have no pictures of these early vessels bar the carving, often reproduced, on the Bantry pillar stone, whose artist was not a seaman. Often taken for a curragh, it appears to be a wooden four-oared vessel with a massive steering oar. Four oared curraghs do not need a steering oar. And this oar is on the wrong side of the vessel, the larboard/port side not the starboard (steering board) one. Starboard is the right side when you stand facing forward. The Viking ships used a steering oar too, the rudder came a little later. It works perfectly well, but you do sit centrally with your right hand on the oar.

Yet the many surviving small sail and rowing boats which have worked right up to our own time in northern waters, may not be all that different. All had to be strong, well balanced, able to take both the battering of the sea, and of the shore when they were hauled up out of the water.



Captain Cockle and the Loch Ness Monster

Abridged in four parts - Episode Two - The Monster!



By John Joyce

THE story so far – Captain Cockle, retired submarine captain and inventor of the Cormorant – an amazing submarine that can not only fly, but also shrink to the size of a sausage at the touch of a button, had flown to Scotland with his wife Dr Catherine Cockle, and their grandchildren Jenny and William to sort out a row between fish farmer Alistair McTavish and filmmaker Professor Potts over who is polluting Loch Ness. In the middle of the night, while everyone else is out at a public meeting, Jenny and William are attacked by something from the dark waters of the loch . . .

When Captain Cockle and McTavish got back to the fish farm, the water was full of thousands of small, silvery salmon, all darting and splashing the floodlights – outside the nets!

“My fish!” cried McTavish. “They’re loose!”

“It was the monster!” insisted Jenny and William. But Captain Cockle could see the red shape of ROVER – his little miniature submarine – with its propeller bound up in one of the nets like a ladybird in a spider’s web, and a big, gaping hole.

The rest of the night was spent trying to recapture as many fish as possible, so that when the morning came – as wet and drizzly as only Scottish mornings can be – everyone was very tired.

But Captain Cockle had promised to take Professor Potts and three other peo-

ple from the public meeting the night before out under the Loch to see where the pollution was coming from. As it turned out, everyone was to blame. There was some pollution coming from MacTavish’s fish farm all right, but there was also pollution from the drains of the local hotel, run-off from the silage pits of the dairy farm, and even sewage from the septic tank of the local angler’s house. Everyone had to clean up their act!

But most worrying of all was the strange “Ticka, ticka, ticka – ticka, tick, tick!” noise that seemed to follow the Cormorant about where ever it went, all over the loch.

Then suddenly, towards the end of the voyage, something huge and fast rushed past the Cormorant, almost colliding with it, and sending everyone in a spin all over the control room.

Perhaps there was a monster there, after all?

The next day, the whole of Loch Ness was crawling with newspaper reporters and television crews who had come to catch a glimpse of the monster. Professor Potts was in his element, giving interviews and zipping up and down the loch in a rubber boat. He had even forgiven Alistair McTavish for “polluting the loch” – as he put it. The only ones who seemed to be nervous about the monster hunt were Captain Cockle and his crew.

“What will they do with the monster once they find it?” asked Jenny.

“They’ll kill it, stuff it and put it in the British Museum,” said McTavish.

“But that’s cruel,” said Jenny. “If the Loch Ness Monster has survived for all these millions of years it’s not fair to kill it off now. It’ll become extinct.”

And so Captain Cockle, with Dr Cockle, Jenny, William and McTavish, set off on a monster hunt of their own in the submarine Cormorant.

After a long search, they found a round tunnel in the side of the loch, hidden beneath an overhanging rock face. The tunnel floor seemed to reach up into the rock but, unlike the rocks around the outside – which were covered in mud – it was swept clean.

“It looks as if something big has been using that tunnel to get in and out,” said Captain Cockle. “We could use ROVER to see inside. I don’t think it’s safe to shrink the Cormorant and go inside ourselves when there may be something big and dangerous about.”

So Captain Cockle launched the little robot submarine, and it slowly worked its way up the tunnel, lighting its way with its searchlights and taking video pictures as it went, until suddenly it broke through the surface of the water into a huge cave.

“It’s a huge pocket of air!” said Captain Cockle. And then, on the video screen, they saw an amazing sight. On a little beach at the far side of the cave were three huge leathery shapes that coiled and twisted into life as ROVER’s light played on them. One of the monsters seemed to take up the entire beach, while two smaller ones blinked sleepily in the light. “There’s a whole family of them,” said

Catherine Cockle. “A mother and two babies.”

“But where’s the father gone,” asked Captain Cockle.

There was a swirling rush of bubbles on the screen and flashes of rock as the father of the monster family grabbed the little machine and shook it too and fro. Then he let it go, and there was a brief glimpse of the monster family lumbering into the water, before ROVER rushed back down the tunnel to the safety of the Cormorant.

“Do you really think it’s a good idea to bring ROVER back?” asked Dr Cockle. “Won’t the monsters just follow it?”

“Oh dear!” said Captain Cockle.

Then, in the lights of the Cormorant, they could all see a huge crocodile head on a long snake-like neck slide out of the tunnel and race towards them. There was a bone-shaking “Thud!”

And then the Cormorant was under attack by a whole family of Loch Ness Monsters!

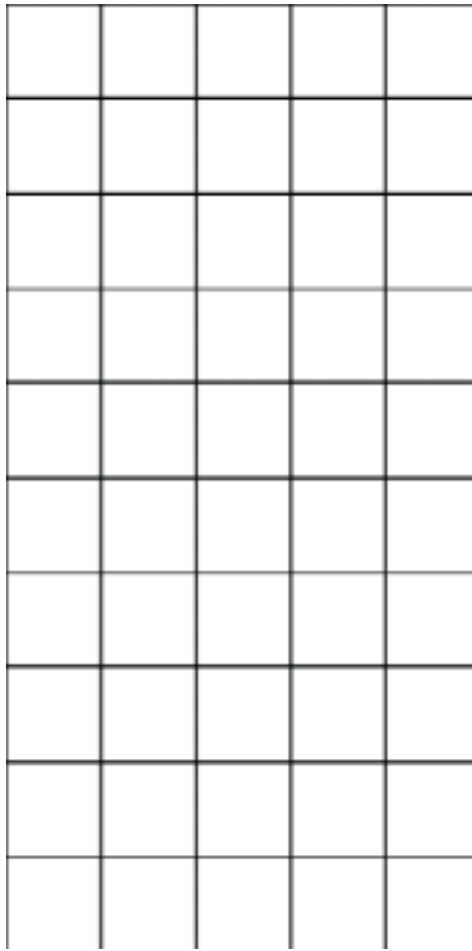
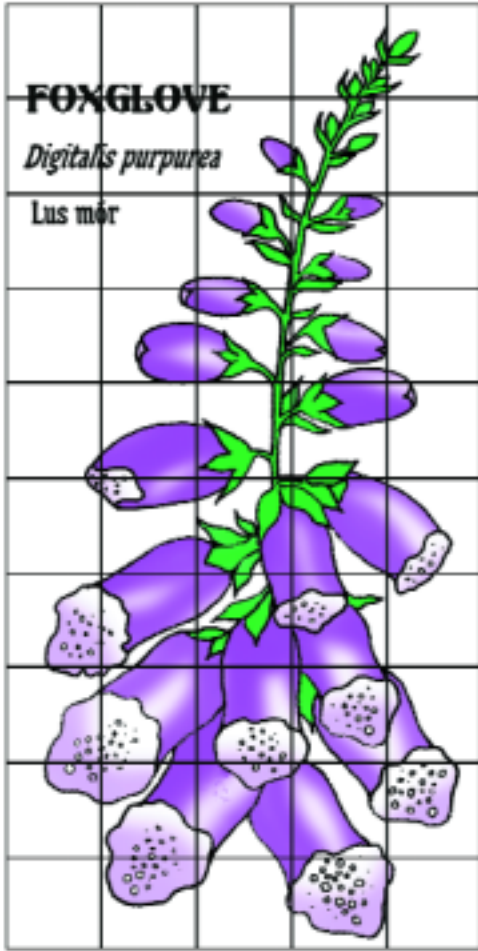
Will Captain Cockle and his crew end up as Monster Munches?

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

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

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

A FOXY FLOWER



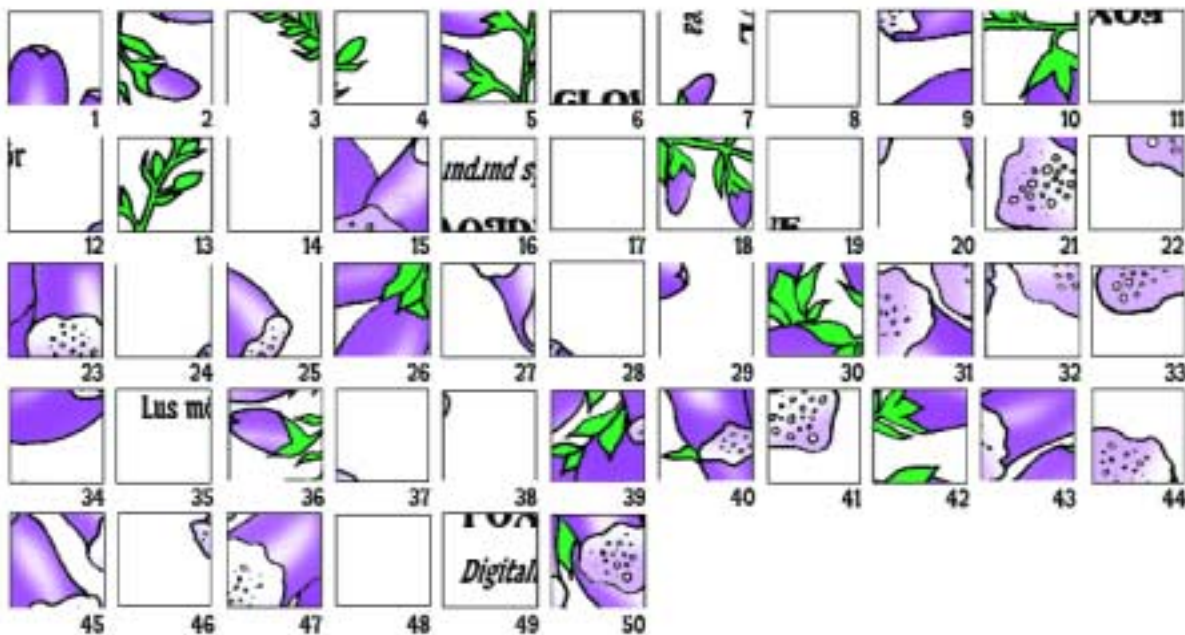
The Foxglove

The Foxglove is a biennial plant, which means it takes two years to complete its life cycle, producing seeds in the second year. It is extremely poisonous, especially the seeds, and has also been given the unfortunate name of "Dead Man's Bells". It has been used in medicine to slow down the heart-beat. A stately plant it is widespread in woods and on heath and banks.

Here you have a chance to make your own jigsaw! You can cut out the pieces (make sure you have permission to use the scissors) and place each piece in its proper box. If you don't want to cut the pieces then you could place the appropriate piece number in its box. The first number is in place to start you off.

Or if you feel like being creative draw the picture into the box square by square and then colour it in!

Answers on page 29



More than a Foxglove
 How many new words of two or more letters can you make out of "foxglove"? We can find 23 words - can you do any better? *Answers on page 28*

Forbairt na Gaeltachta...

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2. **Telephone:** 01-8882001 or 1890 200 191 (local).
3. **Fax:** 01-8883946.
4. **E-mail:** info@enfo.ie
5. **Website:** www.enfo.ie
6. **Visit:** The drop-in centre at 17, St Andrew Street, Dublin 2 (off Dame Street) and see the exhibition, visit the children's corner, see environmental videos and access the library's database and internet facilities.
7. **Check out:** The Enfo information stands at your Local Authority office or County/City Library.

Current and Forthcoming Exhibitions at ENFO

| | | |
|---|-------------------------------------|--------------------|
| Ecological Footprints | Sustainable Ireland | 22nd April-1st May |
| Wild boglands and Wildlife Gardening Exhibition | Irish Peatland Conservation Council | 3rd May-31st May |



Photo © BIM

Boxy Fish Cakes

Children can make this snappy and scrumptious dish that everyone can enjoy! Any fish like cod, whiting, salmon or trout can be used. Crab is also great.

You need:

- 225g/½lb fish of your choice, skinned & finely chopped
- 3 large potatoes
- Salt & pepper
- Olive oil

Sauce for young people:

Choice of ketchup, mayonnaise or chutney.

Sauce for grown ups:

- 4 tbsp of natural yoghurt
 - 2 gherkins
 - 2 chives or scallions
 - 1 tsp capers
- finely chopped and mix well together

Method:

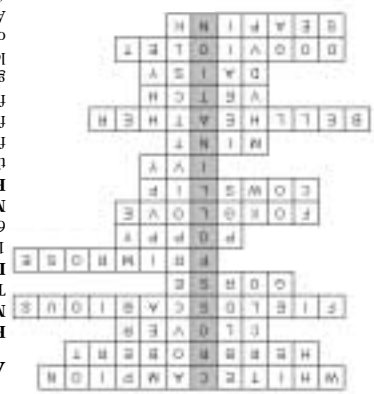
Peel and grate potatoes on large side of grater onto clean tea towel. Wring out well. Add to fish and season well. Spoon onto hot oiled pan, pressing down lightly with fish slice. Cook for 3 minutes on each side.

Serve with your favourite sauce, chips and buttered peas.



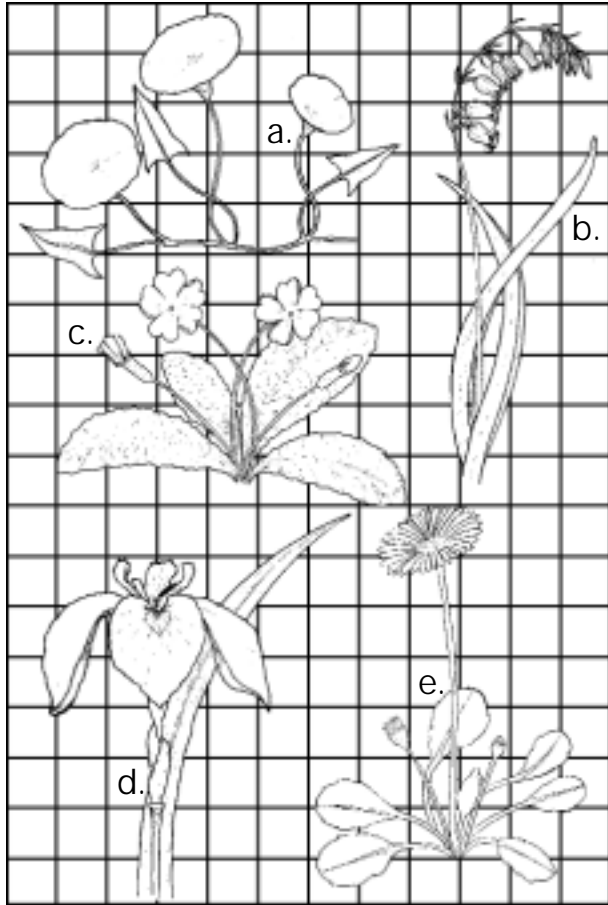
| | | | | |
|----|----|----|----|----|
| 17 | 33 | 20 | 21 | 38 |
| 22 | 31 | 15 | 45 | 41 |
| 32 | 47 | 23 | 50 | 27 |
| 44 | 43 | 39 | 40 | 46 |
| 24 | 9 | 30 | 26 | 25 |
| 28 | 34 | 10 | 42 | 29 |
| 48 | 1 | 5 | 36 | 37 |
| 35 | 12 | 2 | 18 | 8 |
| 49 | 16 | 7 | 13 | 14 |
| 11 | 6 | 19 | 3 | 4 |

(see right) **Flower Power:**
 A Foxy Flower:
 ogfe, ox, vex, vole
 logo, loo, love, of,
 goff, goof, leg, log,
 fool, fox, glove, fog,
 floe, flog, foe, fog,
 found, ego, elf, flex,
 the words we have
 Foxglove: These are
 More than a
 6e; 7h; 8b
 1.f; 2.c; 3.a; 4.d; 5.g;
 Legs, Legs, Legs!
 Thrift
 Flower Count: a Field Bindweed
 Meadow Yellow; Foxglove; Herb Robert;



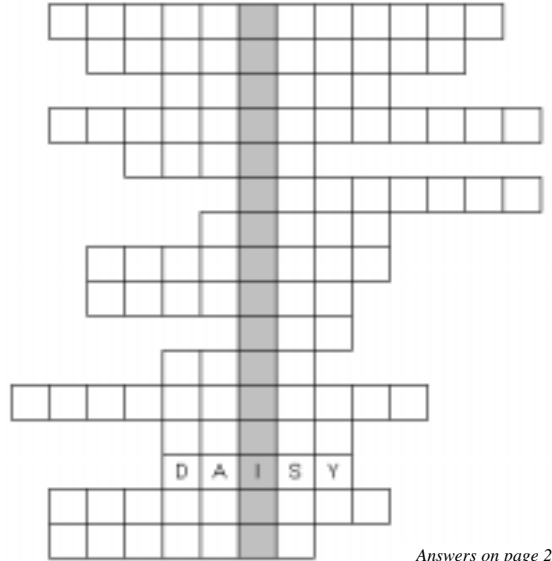
ANSWERS TO PUZZLES

Flower Power



Try to fit the flowers listed below into the boxes on the right to reveal a word (in the grey boxes) that is connected with the reproduction of plants.

- ivy
- mint
- daisy
- gorse
- poppy
- vetch
- clover
- cowslip
- seapink
- foxglove
- primrose
- dog violet
- herb robert
- bell heather
- white campion
- field scabious



Answers on page 28

Flower Count

Can you figure out which flower is covering the most squares?
Is it: a. Field Bindweed; b. Bluebell; c. Primrose; d. Yellow Flag; e. Daisy

Answer on page 28

Why not colour in the flowers when you've finished or re-draw the flowers using the grids as a guide?

Mellow Yellow

Can you pick out the three flowers that are NOT yellow?
Answers on page 28

| | |
|---------------------|------------------|
| Bird's-foot Trefoil | Lady's Bedstraw |
| Buttercup | Lesser Celandine |
| Cowslip | Primrose |
| Dandelion | Silverweed |
| Foxglove | Thrift |
| Herb Robert | Yellow Flag |

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PRESIDENT'S AWARDS

Presentation of Gold

By Noreen McCarthy

MY sister Breda and myself participated in the President's Gold Award Challenge - Gaisce Award, which is Ireland's most prestigious Award. Breda is the Receptionist in the Munster Arms Hotel, Bandon, and I work in O'Leary Insurances Ltd., 6/7 South Mall, Cork.

Gaisce is the national challenge award from the President of Ireland to young people of between 15-24 years of age. The purpose of the award is to encourage young people to set and achieve a demanding challenge for themselves in each of four different areas of activity. I registered in March 1995 at the age of nineteen. Denise Dalton of 23 Aughanteeroe, Gort Road, Ennis, Co. Clare is my President's Award Leader. She introduced the Gaisce Award to me. There are different types of Award - Bronze, Silver and Gold. I decided to go for the Gold, which is a very demanding challenge over approximately two years. There are four different areas of activity in the Award. They are as follows: Community Involvement, Personal Skills, Physical Recreation, An Adventurous Activity.

I have completed my Award and on the 14th February I received my Gold Medal from the President, Mrs. Mary McAleese in Áras An Uachtaráin. Fifty six people from all over Ireland received their Gold Medals. Last Thursday I was on Open House, live on TV with two other awardees talking about Gaisce. This is a great award for young people to achieve and set out challenges for themselves. One would learn a lot from it also and feel proud of oneself at the end of the challenge.

For the Community Involvement I looked after an autistic boy, Neil Dalton, for my Personal Skills I have completed a Diploma In Integrated Computer Applications with Distinction in Sherries Business College in Cork, for my Physical Recreation I am a member of the Bandon Karate Club and for the Adventurous Activity we cycled all the way from Mizen Head to Malin Head which took six days to complete.



Noreen McCarthy, Bandon, with another Gold Award recipient, Brian O'Donovan, Luck, Co. Dublin.

A total of eight cyclists including Breda and myself took part in the cycle. Breda and I were the only ones from Cork, the rest are from Dublin and Galway. This cycle was an ideal opportunity for fundraising, so we decided to donate any monies raised to a registered charity, namely G.O.A.L. We raised over £10,000, which was donated towards the Mozambique fund.

We made arrangements for a civic reception with the Lord Mayor in each city we passed through in addition to press releases and photographs with local newspapers. We also met the Lord Mayor of Derry for a civic reception in the Guild Hall, Derry on 16/09/00. These were the toughest six days of my life. We had to cycle through rain and wind. The best thing about the cycle was that we had massages every night. The masseur of the Irish Cycling Team, Garda John Hammond came with us. He also drove the van and handed out the food and minerals to us. Sergeant Jim Keagan drove the Garda mini bus in front of us on the roads and through the roundabouts. Garda Ken Burns organised the cycle. The other cyclists were Niamh Rushe, Alan Sheridan, Stephen Peers and Detective Liam Hogan. Breda and I never knew these guys beforehand so we got to know each other very well.

Further further information please contact:

Mr. John T. Murphy, The President's Award - Gaisce, The State Apartments, Dublin Castle, Dublin 2. Tel: (01) 475 8746 Mobile: 08-254 7430.

Remarks by President McAleese at the Presentation of Gold President's Awards - Gaisce at Áras an Uachtaráin, Wednesday 14th February 2001

Is breá liom bheith anseo i bhur measc ag an ocaid seo, agus ba mhaith liom mo bhuíochas a chur in iúl díbh as an chuireadh agus as fáilte fíorchaoin.

Let me begin by saying how delighted I am to welcome you to the Áras today and pay tribute to all fifty-six Gold Award recipients.

Today is a special day for all of us - a day when we invoke the name of St. Valentine to tell those who have a special place in our hearts, how important they are to us. The participants in the President's Award, Gaisce, have a very special place in my heart and give me great joy and hope for the future.

There is something very reassuring and heartening in the dedication which so many young people give to participating in The President's Award. Each story is so different, yet each has the capacity to show us the endurance, fortitude, adaptability, creativity and generosity of the young people of Ireland. So, I wish each one of you well and congratulate you warmly on this St. Valentine's Day.

There is no law that says you have to undertake the President's Award. The drive comes from inside the self, it comes from a curiosity about what kind of person you are and what kind of person you could become if you set yourself challenges, if you stretched yourself to the limits, if you did things which were hugely demanding, precisely because you did not have to do them. Now you have done them, you see yourself differently, others see you differently because here is someone who uses the gifts of life to the full and here is someone whose effort has been tested, measured and found to be first-class, worthy of gold.

This visit brings to an end the programme, which led to today's award. No accident or coincidence brought you here but your own sheer enthusiasm and your determination. Your Award Leaders have gently guided and they have made a huge difference to your self-belief but it is you and not they who earned the Gold Award. They take great pride in what you have accomplished and you I know are grateful for the supportive role they played in getting you to this special day. Among the President's Award Leaders are people who are former President's Awardees, so perhaps among today's crop of Gold winners there will be some who will in turn become mentors, accompanying another young person on that great adventure into the self.

As ambassadors for the Award you are uniquely placed to tell others how rewarding is the decision to join the President's Awards programme and to stay with it. You can bear testimony to how worthwhile it is to make space despite the many other demands on time from friends, school or work or social life!

I also want to congratulate your Award Leaders, your families and your friends. Little is achieved in life exclusively by isolated effort and it is important to acknowledge those who enabled and empowered us along the way. Their support has contributed to an environment in which you have been able to realise this dream and release your own potential.

The President's Award scheme is a very effective way of revealing your own potential to yourself, harnessing it, putting it at the service of yourself and of your community. Every human being has potential but not everyone knows the joy of fulfilling it to the fullest extent possible. You allowed yourselves to be stretched to your emotional, intellectual, and physical limits. Now instilled into each of you is a high degree of perseverance, self-discipline, of leadership ability and, most importantly, caring skills. These are unbuyable gifts for any person, essential gifts for a decent civic society. A decent society does not happen by accident. People have to make it happen and keep on making it happen day in and day out. The more people committing to these awards the better the future we all have to look forward to.

The President's Award itself is making changes to meet new demands and to reach new horizons. It's building bridges and links to other award schemes, and working to include more and more young people within the scheme.

In the past year we have had over 8,000 young people at Bronze, Silver and Gold level participating in the Award. The fifty-six Gold Awardees present is the highest number we have had in any one year. That too did not happen by accident but rather thanks to the efforts of Award Leaders all over the country, the staff of the President's Awards and the Board under the formidably effective leadership of Mary White.

Today is your special day and our way of saying thank you and well done to everyone, to return the hospitality I received from the President's Award only last week in Monaghan. I hope you will have a most enjoyable time this afternoon and that you enjoy the entertainment we have provided for you. I would like to thank our harpist, Una Cassidy who played for you in the front hall. I hope you will bring home with you very happy memories of this day of celebration in the Áras.

Go raibh maith agaibh go léir.



Noreen McCarthy, Bandon, receiving her Gold President's Award from President Mary McAleese. In the background is John Murphy, Chief Executive of the

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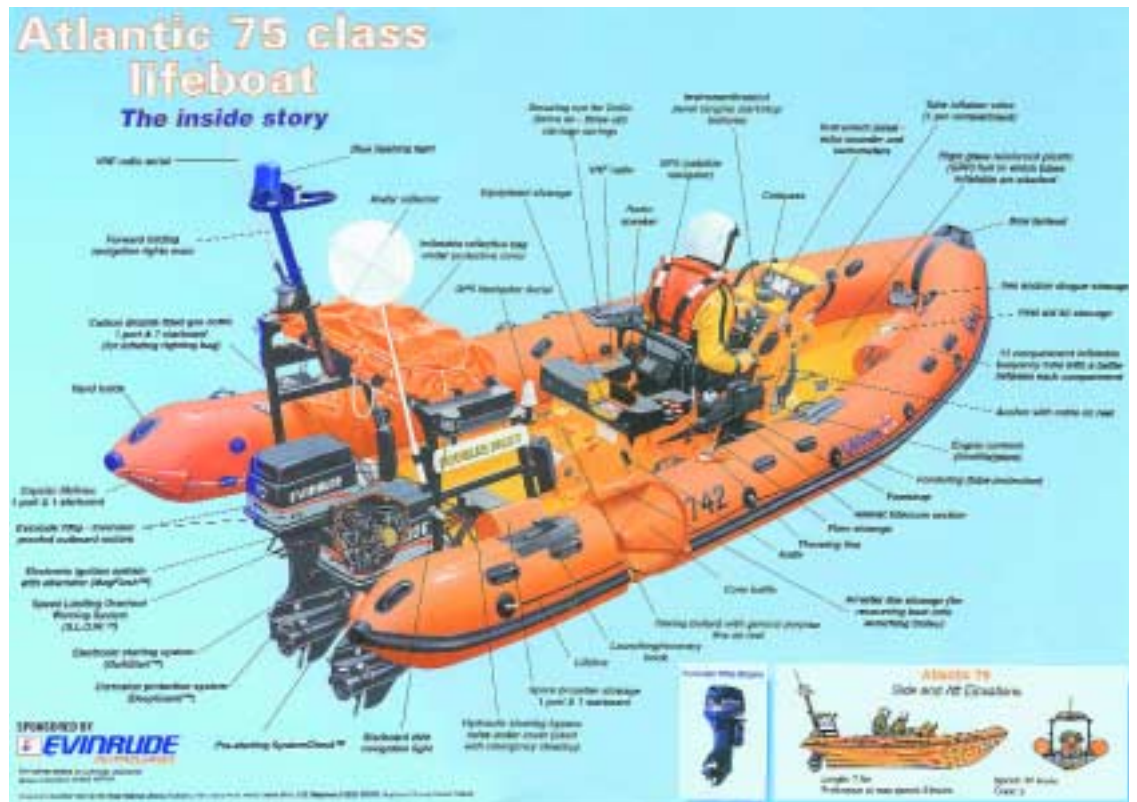
"Storm Force News"

The 'Atlantic 75' is the fastest lifeboat in the RNLI fleet, with a top speed of 32 knots (approx. 37mph). Since its introduction in 1993, the '75', which can operate in daylight and darkness, has already proved to be efficient in offering a speedy rescue service close to shore. This new design of lifeboat was developed at the RNLI's Inshore Lifeboat Centre (ILC) at Cowes, and has been based on the highly successful 'Atlantic 21', which she is gradually replacing.

The aim with the design was to produce a slightly larger craft, which could maintain higher speeds in quite rough seas, while giving the crew improved protection and an easier ride. The name comes from her length of nearly 7.5m.

Each boat must be extremely tough and built to very high standards, because these lifeboats will receive a lot of battering during their lifetime, including beach recoveries and dumping surf. The crew and survivors also need to be as safe as possible aboard in the worst conditions.

Join "Storm Force", the RNLI's club for young people, and you will be sent an exciting members' pack filled with lots of goodies. Four times a year you will receive the action packed *Storm Force News* magazine full of exciting stories, paintings, ideas or jokes to Storm Force headquarters. To join just send your name and address, with a cheque/P.O. for £5.00 to Storm Force HQ, RNLI, 15 Windsor Terrace, Dun Laoghaire, Co. Dublin. (*The illustration on the right has been reproduced from "Storm Force News".*)



"I'm green & I'm proud"



Edward W. Delaney

ESB Environmental Photography Awards

In association with the Irish Professional Photographers Association

Journey into Arcadia

By John Akeroyd

John Akeroyd describes a train journey made in Spring 2000

A SUNNY Mediterranean March day, and I was about to fulfil an ambition. The Corinth-Patras express had rattled, with glimpses of holiday beach, hotel and highway, past olive groves, pollarded mulberries and suburban Bougainvillea. It had deposited me at the junction, and an hour later I was boarding the miniature diesel train to Kalávríta, high in the foothills of Mt Chelmós. I had botanized the peaks extensively in July but never

seen the area in spring; nor its famous 75-cm gauge cog-railway.

Almost immediately the tiny branch line took us off into a narrow gorge, past beds of giant reeds, winter-worn wild Oleander thickets, gnarled leafless Oriental Planes and, looking up, precipices and rocky slopes dotted with pines. The gorge rose higher. The railway track curved and wound its way ever up past fierce waters rushing from the Chelmós



The ancient monastery of Mega Spileo, built into the cliffs of the gorge, surrounded by cypress trees and orchards.



A fine native Plane (*Platanus orientalis*) towers over the cog-railway station at the Zachlorou halt.

heights, pouring between huge mossy boulders. Pines and scrub were festooned with a thorny tangle of Smilax, a climbing member of the lily family that had flowered in autumn and now bore clusters of tawny-red berries. The sun still shone, in intervals between clouds.

Suddenly, brilliant spring flowers – big bold splashes of colour – began to show. Clumps of bright greenish-yellow *Euphorbia characias*, huge patches of purple Honesty, tall stems of palest pink Valerian, and open grassy spaces dotted with nodding heads of pinkish-purple anemones. Sulphur-yellow Cleopatra butterflies fluttered purposefully amongst the flowers. *Djug-djug-a-djug* throbbed the little diesel engine, its cogs engaging a line of ratchets along the middle of the track! The torrent below foamed and roared more violently. Trees and shrubs became denser, especially a fringe of native Oriental Plane alongside the river, the slopes steeper, the crags more beetling. Purplish-violet *Aubrieta deltoides* – good old rockery Aubrieta – formed cushions on lineside rocks. An early lizard scuttled away. Looking up, high above the top of the gorge, buzzards circled.

The ancients knew the central Peloponnese, the country just south of here, as Arcadia. It remains a *nomós* or prefecture of modern Greece. Greeks and Romans adopted the name of this leafy countryside to symbolise the bucolic ideal. It is hardly surprising. On a spring day, the landscape visibly greening, the cool waters rushing white over the rocks, and the songbirds chattering among the planes, here is indeed an earthly paradise, if still with a chill mountain wind.

So began a happy two days in and around Kalávríta and the lower slopes of Chelmós. But the following morning I couldn't resist a more leisurely poke around the gorge. Thus, disembarking joyously at the 'halfway halt'

station, I wandered for a while along the toy railway track with its miniature points and sidings. Later, after an enjoyable morning climbing to the monastery built into an adjacent crag – where an ancient monk showed me a venerable black icon attributed to St Luke himself – I eagerly returned to the sheltered green gorge. Ivy festooned the planes, the river banks were purple with Honesty and even trackside ballast was home to violets, giving off their exotic scent that is so much the spirit of awakening spring. They formed carpets too near the river, among fallen brown plane leaves. All the Easters of childhood came flooding back.

At the station, the electricity had failed in the café. It didn't matter, for there was salad, oil, country bread, sharp white sheep's cheese and cool beer. I sat out under the planes in a reverie. A blackbird sang. The couple who owned the café were busily sorting and cleaning *hórta*, wild greens from the nearby stony mountain slopes. Hard to identify, late winter's leafy rosettes, they were *radikia ton vounón* – dandelions of the mountains – to them, of no botanical worth but a bounteous natural harvest. These bitter greens of Lent are a living link with the ancient hunter-gatherers, the warriors, shepherds and sages of Homeric Greece, and those generations of country people who have made these mountains their home for millennia. They are a famine food, a penance of a season of fasting, and yet a culinary feast in themselves, stewed and liberally doused (no epicurean 'drizzling' here!) with olive oil and lemon juice. They are an inspiring image of a past and future sustainable Mediterranean countryside.

The afternoon train returned and reluctantly I headed back up to Kalávríta. Gradually the gorge flattened out and we were among meadows, arable fields and streams fringed by willows and reeds. I dozed, not far off the terminus, awak-

ing as the driver sounded his horn. There on the lineside bank glowed a small crowd of *Crocus chrysanthus*, shaded and invisible in the morning but showing fully open buff-yellow throats in the afternoon sun.

Early next morning and for a very modest fare, I took the daily bus (my tourist-class hotel having assured me no such service exists) south to Trípolis. The road winds through green willow valleys and forgotten villages, orchards and meadows, emerging after two hours on the great flat plateau in which the city stands. Here I was delighted to see the compound bluish leaves and pale yellow pyramidal flower-clusters of *Leontice (Leontice leontopetalum)* persisting amidst young corn and fodder legumes. It is an ancient weed, one fast decreasing in the face of sprays and deep ploughing. This odd herbaceous member of the familiar shrubby berberis family arises from a great buried tuber. Bladder-like fruits replace the handsome flowers and eventually the stalk detaches at the base so the whole plant disperses in gusts of wind – a true tumbleweed, betraying its pre-agricultural links with the steppes of Anatolia and Central Asia. We raced past and on through new white suburbs to the ancient settlement, now mostly modern town, of Trípolis. An elm, red-flushed with tiny flowers, lent a rural touch to the street-corner bus station.

That evening, far to the south, I drank my beer and ate overpriced fish to a background of festive harbour lights and international disco thud. I had come full circle, from Arcadia back to the Greece the tour operators prefer you to see.

Dr John Akeroyd has travelled in Greece for 30 years, studying the flora and enjoying the countryside and people.

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