



SHERKIN COMMENT

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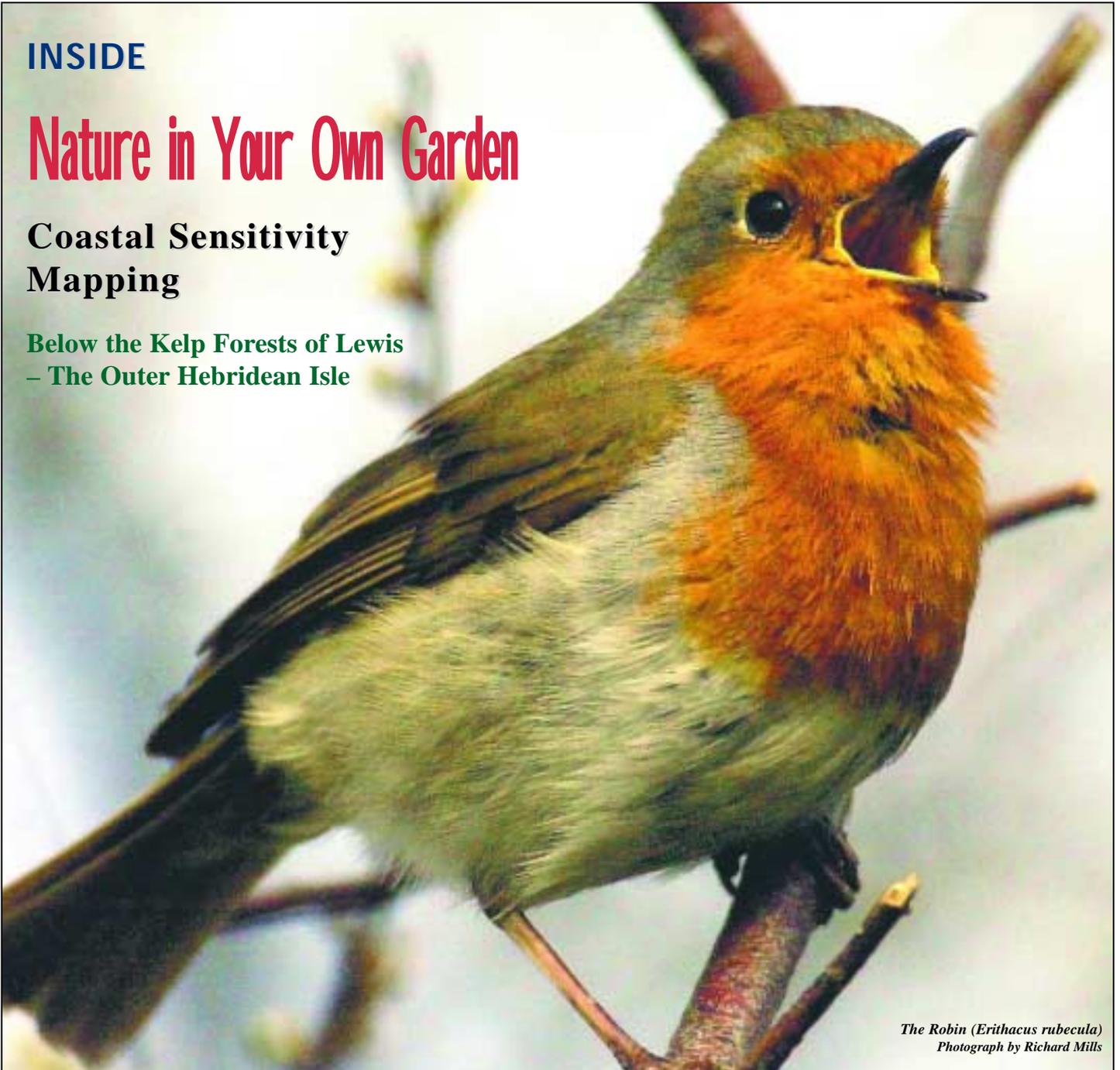
2004

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*The Robin (Erithacus rubecula)
Photograph by Richard Mills*

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Editorial

Improving Our Environment

By Matt Murphy



THE EPA recently published its annual report for 2003. It is gratifying to read the continuing progress being made by this organisation since it was established in 1992. The environmental practices and standards in Ireland in the 70s and 80s and early 90s were in many areas, non-existent. Ireland did not have a watchdog with teeth that could take the necessary steps to protect our environment. Under the leadership of the late Bill McCumisky and now under Dr. Mary Kelly, this new organisation, with statutory duties and powers under the Environmental Protection Act, has brought about major changes in Ireland's environmental attitudes, some of which include:

- 601 Integration Pollution Control Licences have been issued
- 167 Waste Management Licences
- periodic reports on the state of the environment
- promotion and funding of environmental research
- promoting environmentally sound practices

Drafted a national allocation plan for greenhouse gas emissions and establish a National Competent Authority for the issuing of trading permits and allowances to those covered by the scheme.

On presenting their Annual Report, the EPA's Director General, Dr. Mary Kelly said: "2003 was a year of unprecedented change within the EPA. The establishment of the Office of Environmental Enforcement, set up last October, has taken 16 prosecutions since its establishment and a further 18 are scheduled in 2004. The Office has been quick to avail of new powers granted to the EPA last year and has served a proposed direction and direction to one local authority and a proposed direction to a second local authority for failure to perform their statutory environmental functions adequately."

"We are now focusing our efforts on ensuring that environmental legislation is complied with and that the scourge of illegal dumping, which has dogged our environment for far too long, is tackled

decisively. Our environment and human health are much too valuable assets to allow this to go unchecked. Our resources, powers and expertise will concentrate on stamping out illegal activity and bringing offenders to justice."

She stressed, "The environment is no longer an easy target. In addition to fines, which have increased from IR£10 m to €15 m, the clean-up costs must be exacted from perpetrators. Our experience to date shows that these can run into the millions."

Some other important items from the report:

- Urgent need to update and implement the Regional Waste Management Plans
- Illegal waste activity requires immediate investigative and remedial action
- 8.5% of drinking water supplied from group water schemes - impacting 12,325 households - is below acceptable quality standards.
- Climate change threatens water supplies in the East of Ireland and increases risk of seasonal flooding in the West.
- Waste generation is outstripping recycling efforts.

A disturbing figure in the report is the number of staff at the EPA. There has been only an increase of four people between 2002 and 2003. In 2002 the figure was 245 and only 249 in 2003. Surely

with its new major responsibility, the Office of Environmental Enforcement, there must be a realistic increase in staff numbers to manage and police. A special case must be made so that the current staff embargo in the public service can be set aside.

It is very disturbing that the EPA rarely if ever gets recognition for its major achievements in such a short period of 12 years. Regrettably there are some that continue to criticise as with the recent appointment of the EPA Director, Ms. Laura Burke. This criticism was because of her position in the private sector, where she had responsibility for waste management projects, including proposed incineration developments. Her expertise should be looked on as a very positive asset to have in the EPA.

This criticism could have much wider implications. One must pose the question, is it being suggested that no one employed in the private sector can apply for a job in the public sector e.g. engineers normally begin their career with private firms many who undertake work for local authorities. Should their integrity now be questioned? Would the same logic exclude everyone who has worked in the area of environmental care? It is important to state that in the appointment of Ms. Laura Burke, and the other EPA Director Mr. Dara Lynott, that these appointments were made from candidates selected by an independent statutory committee whose members are individuals of the highest integrity.

The two new directors have been assigned the following responsibilities:

- Ms. Burke - Director, Office of Communications and Corporate Services.
- Mr. Lynott - Director, Office of Environmental Enforcement. He has held the position of Program manager of the office since September 2003.

The EPA is to be commended on implementing its brief, impartially and effectively. Let us laud the achievements of the dedicated staff of the EPA that continue to bring major improvements to our environment. It is hoped that the EPA will be adequately resourced to meet current and future challenges.

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Seabird 2000

By Oscar Merne

REGULAR readers of SHERKIN COMMENT may have noticed that many of my articles have been about Ireland's breeding seabirds, with emphasis on their numbers, distribution and conservation status. Much of what I have written was based on survey and census data which I and a small band of other seabird enthusiasts had collected over the last thirty-five years or so. Prior to 1969/70 we had very little good quality systematic information on our breeding seabirds – mostly miscellaneous and often non-quantitative and anecdotal reports in the literature going back to the mid-19th century. Then, in 1969 and 1970, the Seabird Group (of Britain and Ireland) organised the first comprehensive survey and

census of all breeding seabirds on the coasts of these islands, called *Operation Seafarer*. This provided for the first time a picture of where all our seabird colonies were located and the numbers of each species occurring in these colonies. It also provided a baseline against which we could measure future trends in our seabird populations. The results were published in a book entitled *The Seabirds of Britain and Ireland*, edited by Cramp, Bourne and Saunders, and published by Collins in 1974.

By the mid-1980s in was deemed desirable to carry out a repeat survey and census (called the *Seabird Colony Register*), and the results were published as *The Status of Seabirds in Britain and Ireland*, edited by Lloyd, Tasker and Partridge, and published by Poyser in 1991. This second survey and census highlighted some major changes in

seabird numbers, with some species increasing and others decreasing, and also some distributional changes. By now, data from these two surveys and censuses was being used by the authorities in Britain and Ireland as a primary source of information for identifying important colonies for conservation designations – such as the network of Special Protection Areas for birds under the EU Birds Directive.

The most recently completed survey and census of our seabirds was carried out between 1998 and 2002, and, being centred on the millennium, was called *Seabird 2000*. The results have just been published in a book entitled *Seabird Populations of Britain and Ireland. Results of the Seabird 2000 Census (1998-2002)*, edited by Mitchell, Newton, Ratcliffe and Dunn and published by Poyser.

This new book is the

biggest (over 500 pages) and best in the series, building on the information from the previous surveys and adding much new information on the breeding biology and ecology of the twenty-five seabird species which nest in these islands. There is more information now available on numbers and distribution of these seabirds elsewhere – throughout the rest of Europe, in the North Atlantic, and, indeed globally. This enables us to look at our populations in a truly international context. Another major advance since the earlier works was the development of new and much more reliable censusing methods for estimating numbers of the nocturnal petrels and shearwaters, so that now, for the first time, we have reliable quantitative data on the breeding populations of Storm and Leach's Petrels and Manx Shearwaters.

In this short article it is not possible to summarise all the information collected during the five-year survey period and presented in this large book with numerous maps, tables, diagrams and text. So I am simply giving below a selection of the more interesting facts, which are of particular relevance to us here in Ireland.

Fulmars began to colonise Ireland in 1911 and we now have a breeding population of 39,000 pairs all around our rocky coasts. There has been a doubling in numbers in the last thirty years, and Ireland now has 1% of the North Atlantic population. The most important Irish colony is on the Cliffs of Moher, with just over 3,000 pairs.

Our Manx Shearwater population, at 37,000 pairs, represents 11% of the world population, most of which is concentrated in Britain and Ireland. The majority of our birds are found on the islands off the Kerry coast.

We have about 99,000 pairs of Storm Petrels, 27,000 of which are on Inishtooskert in the Blasket Islands. Ireland holds 80% of the British and

Irish population and is surpassed globally only by the Faeroe Islands.

Our Gannet population, at 32,750 pairs, constitutes 8.4% of the world population. The largest colony, by far, is the one on Little Skellig, off the Kerry coast, which has 28,800 pairs and appears to be completely full. There has been a 36% increase in numbers over thirty years, and new colonies have been founded on Ireland's Eye and Clare Island, bringing the Irish total to five (Bull Rock and Great Saltee are the other two).

Cormorants were regarded as pests and bounties were paid for shot birds until the species was protected by the 1976 Wildlife Act. Since then the population has increased by 143% to 5,211 pairs, 38% of the British and Irish total.

Herring Gulls, which I highlighted in a recent SHERKIN COMMENT article, have crashed alarmingly, from 60,000 to 6,120 pairs over thirty years. The decline continues and this summer we found only 310 pairs on Lambay Island, where there were 1,800 pairs recorded for Seabird 2000.



Seabird 2000 reports that the Auks, which include the Puffins, are all doing well.



The Roseate Tern population has risen 155% in the last fifteen years.



The Irish Gannet population, at 32,750 pairs, constitutes 8.4% of the world population.

With the help of a great deal of conservation effort four of our five tern species are doing well. Sandwich Terns, at 3,700 pairs are up 68% and now make up 5% of the European population. The decline in Roseate Terns was halted and the population has risen 155% in the last fifteen years, to a total of 738 – 93.4% of the British and Irish population. Common and Arctic Terns have both increased by over 50% to 4,189 and 3,502 pairs respectively. The Little Tern is our rarest breeding seabird, with only 206 pairs recorded for Seabird 2000.

Our auks (Razorbills, Guillemots, Black Guillemots and Puffins) are all doing well, particularly the Guillemots, which have increased by 181% in spite of large-scale mortality in several major oil spills over the last thirty years. Our Guillemot population is 236,654 individuals, making it by far the most numerous seabird in Ireland. Our breeding birds represent 8.2% of the North Atlantic population. Rathlin Island and Lambay together support 155,000 birds, packed tightly along twenty kilometres of cliffs.

Two species of seabirds have recently begun to colonise Ireland: the Mediterranean Gull, which has spread northwards through western Europe, and the Great Skua, which has spread southwards from the Scottish Northern Isles.

Oscar Merne retired earlier this year as head of the Bird Research Section of the National Parks & Wildlife Service, Department of the Environment, Heritage and Local Government.



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Ecological Engineering and the Restoration of Lakes

By Brian Moss

MANY freshwater habitats and not a few coastal ones have been much damaged because of the foolish belief that natural resources have value only when they are being exploited for profit. Lakes have been developed along their shorelines, polluted with the excess nutrients of profligate land management, and acidified by atmospheric wastes. River channels and floodplains, fens, bogs and coastal marshes have been variously drained for agriculture or housing development, re-formed in concrete and laid to wind-blown dry wastes of crumbling peat. Many people perceive this to be necessary and desirable. Engineers take pride in the quality of their concrete, the simplicity of their channels, as farmers do in the straightness of their plough furrows. In human terms that is understandable; life is short and individual comfort paramount. But for the functioning, into the future, of natural systems in protecting downstream lands from floods, in maintaining high quality raw water supplies, in defending coasts from the hazards of storms, and in providing the bases for the world's essential carbon and nitrogen cycles, straight lines and simplicity are anathema. There is a natural order, but it comes from a far more complex theory than a simple geometry book.

Where major damage has occurred, restoration of the value of a habitat means rebuilding the natural structure. But re-creating the stage does not necessarily produce the play. The actors may have gone elsewhere. Restoring the play is the subtler job of the ecological engineer. Nowhere is this better shown than in how the diverse systems of shallow lakes are restored.

Plants naturally dominate shallow lakes. There are labyrinths of fringing swamps and underwater swards which provide an architecture for the lives of large numbers of other creatures. There are microscopic algae, snails, mayflies, dragonflies and other invertebrates and a community of fish that includes not only those that feed on small animals but those, the piscivores, that feed on other fish. There are plant-eating birds, the ducks and coots, piscivores like cormorants, herons and terns and mammals like otters. This complex world has checks and balances that maintain the overlying water clear and allow enough light to penetrate for the plants to continue to grow. Snails and mayflies graze the algae which would otherwise encrust the plants and, within the plant structure, find refuge from fish that otherwise reduce their numbers. Small crustaceans, especially the water fleas, also live in the shadowy weed beds by day, hidden from the fish, but

move out by night to graze algae which would otherwise make the water murky. The plants themselves may secrete poisons that inhibit the algae and they remove nitrogen compounds that would otherwise fuel much algal growth.

All this changes if the plants are damaged, especially when the supply of nutrients, phosphates and nitrogen compounds, washed in to the lake increases, a process called eutrophication. The plants might be damaged by deliberate cutting, by herbicides or by overgrazing by introduced birds like the Canada goose or fish like the common carp. They might be similarly disadvantaged if something happens to the water fleas that keep the water clear: a leaking of pesticides from the land or heavy metals or trace organic toxins from sewage effluent, for example. Sometimes they may disappear as a result of hurricane damage (in places like Florida) or a rise in summer water level, an increasing possibility in these days of climate change. When these things happen, the system flips rapidly to one which has no plants and 'pea soup' water, turbid with algae but with much-reduced diversity of everything else. The water may even have toxic algal blooms.

The ecological engineer must then try to bring back the structure of the system by means that are biologically

quite drastic. The water flea populations have to be husbanded to clear the water so that the plants can grow again. To do this, the predators of the water fleas, fish that hunt them down easily in the absence of the refuges provided by the plants, must be removed. This can be done either by netting them out, or less easily and more expensively by boosting the numbers of piscivores, like pike. Usually the former is done, the process being called biomanipulation. The results are usually quickly apparent; the water clears as the water fleas multiply and graze the algae. But the process is not then complete. Plants may have to be re-introduced and carefully protected from damage by birds until they have become well-established. Then a new fish community, which must always exclude exotic species and must always include piscivores, has to be put back if the system is to become self-sustaining.

If there has been severe eutrophication, nutrients must be controlled for at high nutrient levels it is much easier for the switches that remove the plants, like herbicides, pesticides or grazing, to be effective. Nutrient control is becoming increasingly common, especially with the advent of the European Waste Water Treatment Directive, but eutrophication is still a huge problem as farmlands,

fertilised for decades, now start to leak out increasing amounts of nutrients. Many restorations of shallow lakes have been only temporarily successful because of our inability to control these nutrients or of attempts to control only phosphates when nitrates must also be tackled.

In the future, the EU Water Framework Directive will need the services of many more ecological engineers in restoring the good ecological quality the Directive requires. It is something of an irony that, at a time when the demand should be great, the fashions of biological science are turning more towards areas that are seen to be financially profitable, such as biotechnology, and too few trained ecologists are being produced. It seems that Society too has innate mechanisms, like those that maintain plant-dominated shallow lakes, to maintain the status quo. But it is a self-reinforcing cycle, which we must somehow break for the future stability of our environment and our own security.

Prof. Brian Moss, University of Liverpool, UK. "A guide to the restoration of nutrient-enriched shallow lakes" B. Moss, J. Madgwick and G. Phillips, Environment Agency, Broads Authority, LIFE, 1996. ISBN 0 948119 29 2 Price: £5.00 www.broads-authority.gov.uk

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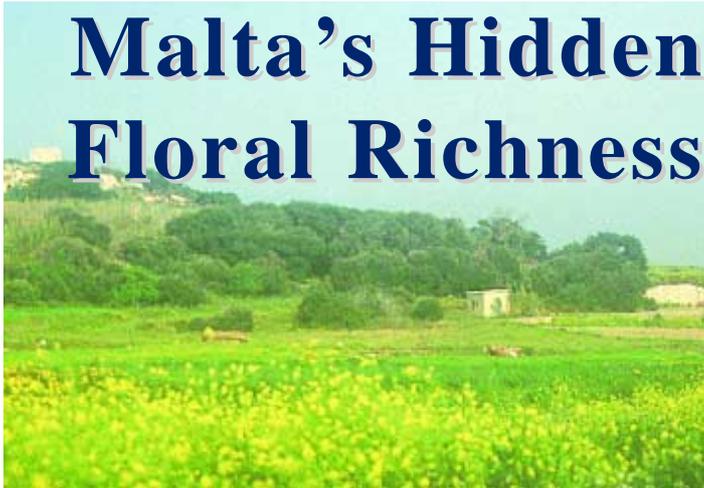
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Malta's Hidden Floral Richness



A few ancient olives survive, some over 1000 years old.

By John Akeroyd

In March I realised a long-awaited wish to visit Malta. Unprepossessingly arid, rocky and windswept, Malta has an unenviable reputation for shooting and or trapping of wild birds, especially on migration. Nevertheless, in spring it is a magical place that retains good vegetation and a flora of about 1000 species, despite barren landscapes, invading Acacia and other aliens, one of the world's densest populations and ever-expanding suburbs and hotels. Some places are a carpet of wildflowers – golden-yellow Crown Daisy (*Chrysanthemum coronarium*), blue Borage (*Borago officinalis*) and crimson-red Sulla (*Hedysarum coronarium*). More significant are relict stands of woodland and extensive low open Mediterranean scrub or garigue; and a special flora of some 20 unique endemics, especially on coastal cliffs and screes.

Malta, which joined the EU on 1 May 2004, lies at a historical and ecological crossroads. The archipelago – Malta (the main island on which stands the capital Valetta), Gozo, Comino, plus islets and stacks – lies 90 km south of Sicily. It has a Mediterranean climate of winter rain and hot dry summers, and bio-geographical and cultural links with both Italy and North Africa. The language derives from Arabic or similar languages, but with elements from successive invaders – Carthaginians and Romans to medieval Arabs, Normans and Spanish – who coveted Malta's natural harbours and strategic position. From 1530 the Knights of St John held the islands, repelling a huge Turkish-Algerian army in the Great Siege of 1565. Later (1814–1964) Britain held Malta, which endured a second famous siege during World War II.

The islands are of limestone, with some clay and sand, and thin well-drained soils. Classical writers noted a green landscape, but by the 15th century it was treeless. Today woodland occurs mainly in steep valleys or wadis. Introduced species dominate and many common Mediterranean trees are rare or absent, but Carob (*Ceratonia siliqua*), Terebinth (*Pistacia terebintha*), and some gnarled 1000-year old olives and oaks survive, along with cypress-like Sandarac Gum Tree or Alerce (*Tetraclinis articulata*), otherwise found in North Africa and near Cartagena in Spain.

Tourism has damaged the coasts, especially sand-dunes. Hunters have exterminated jackdaw, barn owl, peregrine and other breeding birds – their small stone huts and cleared patches are everywhere in garigue. Conversely, reduction of sheep and goat numbers in recent years has allowed garigue to regenerate,

the shrubs now forming tall hummocks. They include Mediterranean Heath (*Erica multiflora*), with purplish-pink flowers, Maltese Spurge (*Euphorbia melitensis*), covered in honey-scented yellowish flowers and members of the mint family – blue-flowered Shrubby Germander (*Teucrium frutescens*), Prasium (*Prasium majus*), like a shrubby white-flowered dead-nettle, and Shrubby Thyme (*Coridothymus capitatus*), tinting the summer landscape purple. Other plants include orchids such as pyramidal orchid *Anacamptis urvillea* and bee orchid *Ophrys melitensis*, both early-flowering endemics, and annuals, especially clovers, bird's-foot trefoils (*Lotus*) and other pea-flowers.

Endemics on cliffs and rocks include an everlasting-flower (*Helichrysum melitensis*), with silvery-grey leaves and orange-yellow flowers, a mauve-flowered wild stock, *Matthiola incana* subsp.

melitensis and the purple-flowered knapweed (*Palaecyanus crassifolius*) that is Malta's national flower. One of the most distinctive, grey-shrubby *Cremnophytum lanfrancoi*, was described only in 1987. Cultivated plants have proved to be virus-infected, and *Palaecyanus* sets little seed, but botanists have propagated these and other plants in a small but active re-introduction programme.

Scientists from the Malta Environment and Planning Authority (MEPA) are locating and mapping Special Areas of Conservation (SACs) for the EU's Natura 2000 network of European habitats. In September 2003 Malta announced 31 sites of international importance as protected areas, including all of Comino. Environmental awareness only came in the 1990s, and some sites are degraded or intermixed with development, but what remains – a considerable area – is now scheduled and thus technically protected by EU law.

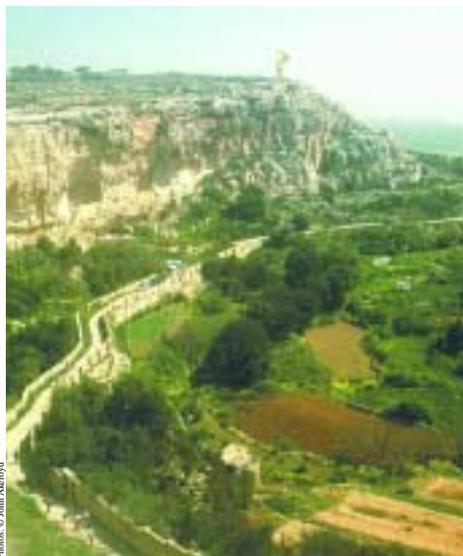
Dr John Akeroyd has travelled in the Mediterranean region for 30 years. He has been working on botanical surveys at Sherkin Marine Station since 1990.



Shrubby Germander (*Teucrium frutescens*) forming characteristic hummocky growth.



Plant-rich garigue or low scrub covers land in Malta that is not built-up or cultivated.



Photos: © John Akeroyd

Dingli cliffs, in SW Malta, shelter rare endemic plants.



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Coastal Sensitivity Mapping

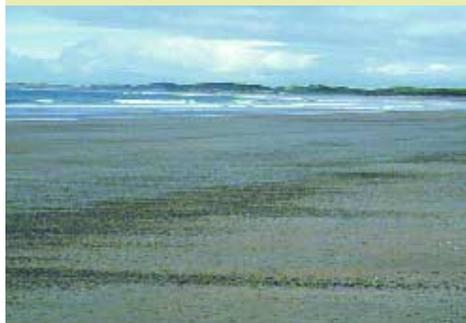
By Jenifer Baker



ESI 1: Mizen Head, Co. Cork.



ESI 2: An exposed shore in South Africa.



ESI 3: Fine-grained sand beach near Fermoyle, Dingle Peninsula, Co. Kerry.

COASTAL sensitivity maps show the locations of different resources, and indicate their vulnerability. Such maps are probably best known for their role in oil spill response, as an aid to deciding on priorities for protection and clean-up, but may also be relevant when considering a wide range of coastal issues. Map-users have a variety of needs and in the oil pollution context these relate to different categories of spill and scale of operation, ranging from small localised spills (say 10-20 tonnes) to massive pollution of thousands of tonnes with the

potential for causing considerable damage over a wide area. It follows that uses of maps range from the localised (for planning practical site-specific shore protection and clean-up), to the regional (for strategic planning for major accidents). For example, the Dale Flats map (Milford Haven, west Wales) is localised and includes both environmental information and logistical information such as shoreline access points. The map showing part of the coastline of South Africa is more suitable for strategic decision-making, and shows colour-coded shoreline sensitivities, using six categories for the least sensitive

Shoreline types

(green) to the most (red). Both maps have various wildlife and fisheries symbols, and in the South African example these come with a four-point system of indicating seasonality. Both maps are from coastal atlases.

As exemplified by the South African map, shorelines may be classified using an environmental sensitivity index (ESI). There are a variety of such indexes adapted for different needs. The original one was published by Erich Gundlach and Miles Hayes in 1978 and arranges shoreline types on a 10-point scale. Basic principles are that sensitivity to oil increases with increasing shelter of the shore from wave action, penetration of oil into the sediments, natural oil retention times on the shore, and biological productivity of shore organism. Photographs illustrating these principles are presented here. An ESI is a convenient way of summarising information on basic shore types, but needs to be supplemented with information on wildlife and human use of the coast as described below.

there are likely to be significant concentrations of individuals, at least at some times of the year. Examples are seabird colonies, estuaries important for migrating shorebirds, and seal breeding areas. Locations important for endangered species should be highlighted, because in these cases there may be the risk that a bad spill could seriously deplete the total population of a species.

Human use

Both fishing and other socio-economic activities need to be considered. The following are examples of features, which it is useful to include on sensitivity maps:

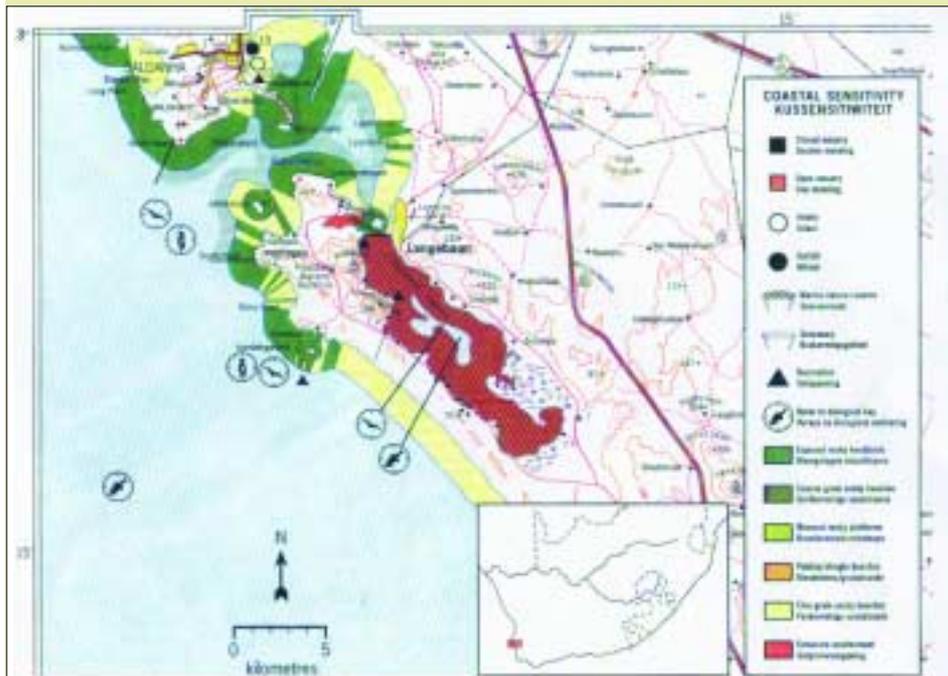
- nearshore shallow water fishing areas, e.g. for fin-fish, crabs, lobsters, shrimps or other species;
- shellfish beds in the intertidal zone or nearshore shallow water;
- fish and crustacean nursery areas;
- aquaculture facilities for fish, molluscs, or crustaceans;
- boat facilities such as harbours, marinas, moorings, and slipways;
- industrial facilities, for example cooling water intakes for power stations;
- recreational resources such as amenity beaches and water sport areas.

Wildlife

Maps should show the areas of greatest sensitivity for wildlife species, such as feeding and breeding areas where



ESI 4: Coarse-grained sand on the Patagonian coast, Chile.



A regional map of part of the South African coastline, used for strategic planning for major accidents.



A localised map of the Dale Flats (Milford Haven, west Wales) for planning practical site-specific shore protection and clean-up.



ESI 6: Pebble and boulder beaches with high permeability in south Korea.



ESI 8: Sheltered rocky shore in Bantry Bay, Co. Cork.



ESI 9: Sheltered tidal flats in Korea.

Sensitivity of Shoreline Types to Oil Pollution

Shore classification using a 10-point environmental sensitivity index (ESI), with Irish and international examples. ESI 1 is least sensitive, ESI 10 is most sensitive.

Recovery times are generally rapid on exposed headlands such as Mizen Head (ESI 1), and also on exposed wave-cut platforms like this shore in South Africa (ESI 2), because natural cleaning by wave action is rapid and effective.

A gently sloping fine-grained sand beach (ESI 3) near Fermoy, Dingle Peninsula. On such beaches biological productivity is low,

and oil does not usually penetrate deeply, facilitating mechanical removal.

Oil penetration may be deeper, and clean-up more difficult, in more steeply sloping shores of medium to coarse grained sand (ESI 4) such as this one on the Patagonian coast, Chile. The use of this particular shore by penguins during the breeding season would need to be taken into account as well as the shore ESI rating.

ESI 5 (*photograph not available*) beaches of mixed sand and coarser sediments (gravel, pebbles and boulders), have medium permeability to oil, and usually low biological productivity. Shores of ESI 6 include a range of pebble and

boulder beaches with high permeability. The photograph shows such a beach in south Korea, where oil penetrated very deeply. Clean-up involved excavation, mechanical pebble-washing, and eventual replacement of cleaned pebbles.

Exposed tidal flats of compacted sediments, with higher biological productivity than the preceding shores, are ESI 7 (*photograph not available*). Sheltered rocky shores (ESI 8) typically have high biological productivity, being covered by seaweeds which provide a home for winkles and many other species. This example is in Bantry Bay. Sheltered tidal flats (ESI 9) such as this shellfish bed in Korea are also very productive, and are more sen-

sitive than sheltered rocky shores because they may be retained in the sediments for a long time.

The most vulnerable shores (ESI 10) include saltmarshes and mangroves. This example for a saltmarsh is from Prince William Sound, Alaska. The extreme shelter from wave action means that such areas act as oil traps, often with severe consequences for the flora and fauna.

Further information

This article is based upon a report produced for the International Maritime Organization (IMO) and the International Petroleum Industry Environmental Conservation Association (IPIECA).



ESI 10: Saltmarshes and mangroves in Prince William Sound, Alaska.

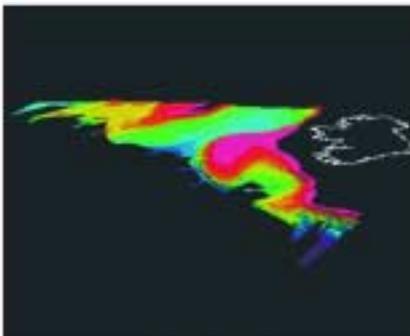
For further information visit www.ipieca.org

Dr. Jenifer Baker has worked all round the world as an

environmental scientist, specialising in oil spill response, and is currently a theological student.

National Seabed Survey

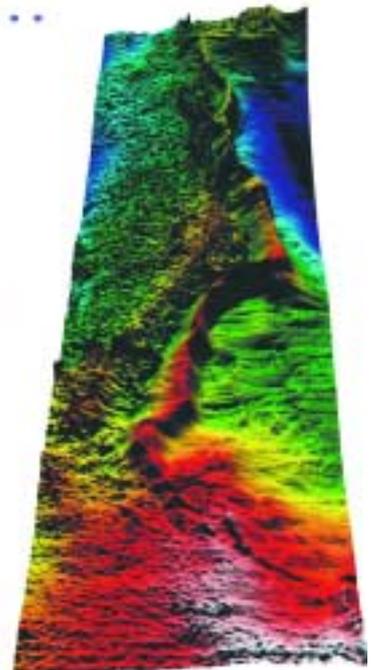
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The Come Back Pony

By Daphne Pochin Mould

THE National Library in Dublin has a beautifully handwritten manuscript copy of Charles O'Brien's (unpublished) "A View of the State of Agriculture in the County of Kerry, Anon 1800". The county had its own distinctive breed of sheep, cattle and horses. "The small Kerry sheep is still to be found in many parts of this county, they are shorn twice a year producing 2½ to 5 lbs of wool annually; the mutton of this kind is held to be of the best flavour".

"The natural breed of black cattle in this country was all remarkably small, but very good for the pail, the smallest fed on good ground paying the farmer as much as our heaviest cattle in dairy."

"The Kerry Horse has been as remarkable as the Kerry cow; but that beautiful and useful animal has been as much injured as the cow by a mixture with the larger breed, it is to be found in its native state in the mountains above the lake of Killarney and towards the river Kenmare."

In 1800, Kerry sheep could be bought for £20 a score (20), Kerry cows from £6 to £10 each and Kerry horses £8.10s to £12. At the same time, a labourer in the country got 6½ pennies a day, women three pence.

The Kerry sheep is long gone, the Kerry cow happily still with us, producing its splendid creamy milk, but the horse? From 1756 Charles Smith's "Ancient and Present State of Kerry" it was "an excellent breed, they climb over the most rugged rocks... and so light, as they skim over waving bogs and morasses without sinking... strong and durable... so hardy as to stand abroad all winter and will browse on heath, furze and other shrubs: add to this their gait is ambling, which is extremely easy."

By the mid 1800's, they were still around mostly uncared for and over-worked. Some were brought up to be fattened up and sold as Irish beef. (Not an Irish joke, horse meat does taste a bit like beef.) And then silence... Whereas in the adjacent island of Britain there are many distinctive native breeds of hardy ponies, from the very small Shetland to the

sturdy Highlander, to the Welsh mountain ponies, to the semi-wild herds of New Forest, Exmoor and Dartmoor (all breeds in their own right), Ireland was left with just one such - the graceful, usually cream coloured, Connemara. Of course, Ireland had ponies, mounts to carry the tourists up Mangerton in Victorian times, and through the Gap of Dunloe as they still do, but they were and are a very mixed assembly with no pretensions to the status of a breed.

Enter John Mulvihill of Ballinleave, Glenbeigh, Kerry, and of the Red Fox Inn, on the ring of Kerry road. During the last years of the 20th century, John came upon some very beautiful well built ponies up in the Kerry hills and bought them. Later, one had an injury to its leg and was rushed to Bettyville Veterinary Hospital in Kanturk, Co. Cork, and Daniel Hutch, vet with a great knowledge of horse. "Good God, John, what a beautiful pony, what breed is he?" exclaimed Mr. Hutch. "Breed"? Had John Mulvihill a genuine breed in his stables, had he in fact the last remnants of the Kerry horse? Horse breeds can be identified by blood typing and today by DNA analysis. John Flynn of Wetherbys and the Irish Equine Centre was the expert to call upon and the results, first of blood typing and then the new DNA process replacing it, showed that the animals John had were really different and distinctive, new to equine science but likely to be very old. The little Kerry Horse, which we now call the Kerry Bog Pony, had come back.

"He belongs to Kerry and especially to its more isolated and inaccessible parts where he thrives. He is the very soul of sure-footedness and reliability like his human counterpart he'll eat almost anything. He now takes his place among the true strains of the Equine World and may be justifiably venerated like the Kerry Cow, the Kerry Blue, the Kerry Diamond, the shy Kerry Lily of Kernane and the Kerry Set" (John B. Keane). Today Kerry Bog Pony numbers, with careful breeding, are nudging up towards 200. A pair of them are in the USA and they have produced two fillies. There is a Kerry Bog Pony Society and a number of enthusiastic owners.

On 31 July 2004, at the Red Fox Inn, the first



The stallion "Flashy Fox" - founding father of the restored breed of the Kerry Bog Pony.

full length account on the story was launched: "Breaking the Silence". The author, Mary Denis Reidy, is an American of Irish parents, and has been living in Ireland for the past six years. Most of the book is a brief look, through American eyes, at the history of Ireland, with occasional glimpses of the horses' part in it. The donkey and its origins are included, but not that work horse of armies, the mule (Horse mother, donkey father) or the jennet (donkey mother, horse father) which in Kerry not so long ago was the smart little animal to run in a small cart. The last section of the book covers the discovery of the surviving Kerry ponies and subsequent developments. Many readers will regret that no attempt was made, after their mention, to explain how

blood line and now DNA, actually work. Of DNA genotyping: "The alleles were identified using three distinct technologies, namely Allo-Immuno Red Cell Typing, Biochemical Protein Polymorphisms and DNA Dinucleotide Microsatelitic fragment analysis". But most of us do not know what an allele is, and a page or two explaining the genetics and the test methods, in simple language, is very possible to do and would add greatly to the interest of the story of the breed.

Mary Denis Reidy: "Breaking the Silence". M&R Publishing, Caragh Bridge, Glenbeigh, Co. Kerry. 2004. Price €14.99 ISBN: 095409901X



Kerry cow and calves at Muckross Farm, Co. Kerry.



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More Dust Collectors?

By Michael Ludwig

SEVENTY percent of the earth's surface is covered with water. Those ocean waters create and moderate our weather, provide food, produce a variety of natural goods and even provide natural security barriers. Clearly, the oceans sustain life on the earth. How we use and abuse these water masses has received varying degrees of attention and, occasionally, evaluations, laws and actions intended to address those practices. More often than not we are offered a weighty document full of deliberations by learned individuals that government lacks the will to implement. Another review and evaluation of how the United States manages its oceanic resources is the product of a two and a half-year study by the U.S. Commission on Ocean Policy (see <http://oceancommission.gov/>). The Commission on Ocean Policy (see <http://www.pewoceans.org/>). Both groups used a prior effort's (the "Stratton Commission") investigative format for their findings and recommendations.

Perhaps most damning, but in a positive manner, are the new report's discussions of the health of our fishery resources. These discussions are damning because they point out the continuing problems and threats to oceanic resources and promising, because they found solutions to those problems. The investigations identify three main threats to ocean health. The first threat are pollution releases from agricultural and residential developments that cause the deterioration of estuaries and nearshore habitats such as wetlands. High impact farming and construction in the coastal zone are disrupting and overwhelming the natural processes needed to sustain healthy ecosystems. A second and more familiar problem is the over-exploitation of fish stocks. In less than 50 years, mechanised fishing has decimated ocean fisheries once thought to be inexhaustible. Today, we have a 90 percent depletion of species such as giant tuna and swordfish, and many other commercially valuable species are imperiled. The third problem is "bureaucratic chaos". The commissions found that the existing system for managing use of the oceans and adjacent coasts is fragmented and not up to the challenges we now face. The present day ocean policies are a patchwork of 140 laws administered by dozens of agencies, none of which possess a comprehensive overview of the situation.

The Oceans Commission Report calls for government to restructure its approach to ocean management to reverse the ongoing coastal resources degradation. With more than half the US population now residing within the coastal zone (the area directly influenced by and influencing coastal waters) and the nation's growing reliance on seafood, the Commission found that "our oceans and coastal watersheds are in serious trouble." With the inefficient and dispersive nature of regulatory authority and the lack of a unified integration of local, state and federal objectives, the Commission's Chairman, Admiral James D. Watkins called the existing system "a Byzantine patchwork ... that is simply not up to the task" of preventing degradation. The report calls for a streamlining

"Globally we are seeing resource depletions. Without attention and action, we could see the end of aquatic resource harvesting in our lifetimes."

of the permitting process and that there be a fair economic return to the public for allowing use of our oceans.

More than thirty years ago the Stratton Commission (named for its Chairman) while focusing on the problems associated with foreign vessels harvesting our coastal resources, found many of the same problems and offered similar solutions. However, in the years following the issuance of that report, the US did little to actually correct the problems. Without the institutional will to implement the recommendations, the report became an unpleasant reminder of unfulfilled needs and was assigned to the farthest and least used area of the library. In fact, few remember the earlier *Stratton Report*. Where did the earlier report go? My copy holds a door open.

The Oceans Commission report places blame for many of the resource depletion problems at the door of our regional Fishery Management Councils which were created, specifically, to control harvesting. Calling them as a system plagued by an inability to invoke necessary restrictions and, on occasion, possessing a disregard for scientific advice while routinely acting in immediate self-interest, the Commission calls for restructuring the Councils and their responsibilities. The recommendations also include sweeping changes in the composition of the management boards and that scientific evidence be used as the sole device for setting harvest quotes. To support the restructured councils, the Commission recommends creating a new, national ocean policy that would improve decision-making by seeking high quality and readily accessible resource information.

The proposed National Framework structure would include a position in the Executive Office of the President; a national council chaired by that assistant to the President and composed of the agencies having resources or responsibilities in or along the oceans. Because of the national / global nature of the resource issues, the use of ecosystem-based management programs is recommended by the Commission. Ecosystem-based management utilises the relationship among all ecosystem components (including humans) to understand and manage resources. This wide-ranging overview would be used to leverage a more streamlined and focused regulatory process that would be less redundant and more appreciative of the environmental consequences of regulatory decisions.

These changes are proposed with the supporting evidence that over the last two decades the conditions within the Coastal zone and adjacent waters have deteriorated and the goals of existing legislation are not being met. The report finds that our oceans are in a state of undesirable decline, partially because the federal investment in oceanic research has diminished by almost 50 percent causing a decline in research and the capability to undertake that research and partly because existing legislation is not being enforced. To reverse these trends, the Commission urges the refocusing of attention and funding.

At the heart of the recommendations is a

strong message that education is failing to impart an understanding and commitment to oceanic issues and solutions. To reverse this situation, the Commission recommends a national curriculum on the oceans be developed to engage students of all ages while improving math and science skills. That educational focus would promote, in turn, educational opportunities and a stewardship ethic, however, without the education of our present leaders, any action is unlikely to occur.

Will the US do more than add these reports to the pile of their predecessors? Perhaps "yes". These two tomes provide scientific evidence that our oceans are in biological decline and the fishing industry is suffering from resource declines. And, the public is willing to accept some responsibility and take some actions to reverse the trends. Both reports provide reasonable paths to a resource restoration. However, the path to success is littered with prior attempts and those exhaustive and worthy assessments also drew attention and even a flurry of action only to fall by the wayside where they now gather dust. In the present situation several bills inspired by the reports have recently been introduced in Congress. There is not enough time left for Congress to pass them



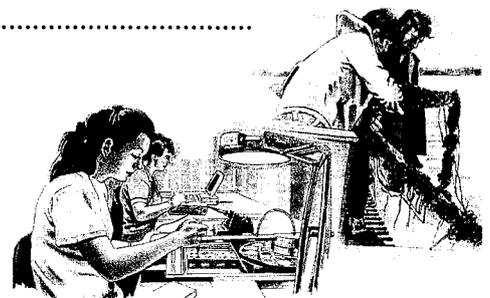
this year, but their very existence should provide momentum heading into next year. And, who knows, they may even persuade a presidential candidate or two to talk seriously about a matter that deserves far more prominence than it now has. But is an American effort enough? Globally we are seeing resource depletions. Without attention and action, we could see the end of aquatic resource harvesting in our lifetimes. It falls to the public to call attention to the plight of our oceans so that our leaders hear and react or two more, well-intentioned reports will collect the dust of complacency.

Michael Ludwig, National Marine Fisheries Service, Milford, CT 06460-6499, USA.

Forbairt na Gaeltachta...

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The restored Palm House

masterpiece in wrought Iron, was completed in September 1995. As well as winning the prestigious European Medal for Restoration – the Europa Nostra Award – the pride and public acclaim at the OPW’s magnificent achievement gave added impetus to the management plan. In 1996 the 18th Century Director’s residence was restored, followed by the construction of two major new buildings, the Herbarium/Library building in 1998 and the Visitor Centre in 2000. In addition many smaller projects, including an alpine house, a range of propagation houses and new teaching facilities have been added to the Gardens.



Orchid: *Cattleya hybrid*

On the 31st May, An Taoiseach, Mr. Bertie Ahern, TD, officially opened the restored Palm House complex. The central house, one of the tallest glasshouses in Europe, was built in 1884, replacing a much-reviled former house that lasted just 25 years, and had succumbed to storm damage the year before. The replacement building was prefabricated in the Scottish town of Paisley by James Boyd & Son. Shipped to Dublin in pieces, it was assembled on site in just 6 months, being opened on the 1st October 1884.

restoration has already been recognised, when it received an Irish Architecture Award from the Royal Institute of the Architects of Ireland.

These magnificent glasshouses are a wonderful and important part of our garden, and play a vital role in our central mission – that of growing, understanding and communicating the importance of plants. All of us who work here in the Gardens are the latest custodians of a collection now nearly 209 years old. Unlike a

By Matthew Jebb

Opening of the Restored

THE National Botanic Gardens, Glasnevin has recently come back under the administration of the Office of Public Works (Oifig na nOibreacha Poiblí). When the OPW first took over the running of the National Botanic Gardens, in 1992, the Architectural Branch undertook a complete inventory and report of its historical buildings. At the same time it established a team of Administrators and Architects from OPW and the Director and staff of the Gardens to draft a Management Plan. The Plan was

completed and launched in October 1992 by the then Minister for Finance, Bertie Ahern T.D. and the Minister for Heritage Affairs in OPW, Noel Treacy T.D.

In the intervening years, regular visitors to the Gardens have been constantly amazed at the on-going works. The efficiency and alacrity with which that plan was put into action

and has been carried through is a great tribute to the vision and dedication of the OPW, its team of Architects, and the former Director of the Botanic Gardens, Mr. Donal Synnott.

For the past 11 years the Gardens have more often been a building site than the quiet, tranquil setting we see today. The first of these projects, the Curvilinear Range, Richard Turner’s

It is unusual in structure being placed against a massive south facing wall, which has an elegant building on the north side. Constructed from wood and iron, the building measures 80 feet in width, 100 feet from rear wall to front, and towers 65 feet high. The sides are constructed from teak bound with wrought iron. Inside a walkway encircles the dome twenty-five feet above the ground, while outside a gallery provides spectacular views over the Gardens.

In 1884 the building had cost a mere £800. One hundred and twenty years later it has cost more than €14 million to restore and rebuild in a project that has taken almost two years. The restoration of the Victorian ironwork was a highly specialised project, but OPW architect Ciaran O’Connor and his colleague Gerard Harvey used techniques developed during the Curvilinear house project in the 1990s. The quality of the

museum or art gallery the exhibits in our care need nurturing – nearly all have arrived here as seeds or seedlings. Skill, expertise and dedication have turned these tiny ideas into striking, beautiful and in some cases venerable shrubs and trees.

The tropical jungle of palms, cycads, bananas and bamboo that had enthralled visitors for more than 100 years had to be cleared away. Anything we could move was taken to other, smaller glasshouses. But some of the tallest palms, already approaching the end of their lives, had to be sacrificed. However, we want to give the palm house and its atmosphere back to the public. Having restored the Palm house it will be important that maximum use is made of this exhibition area – more than simply replanting a collection of tropical plants. The new displays will be designed with education about, and conservation of, tropical floras as the central theme.



Scaffolding in place to begin restoration



EPA National Waste Prevention Programme

The need to reverse the trend of increasing waste generation poses a significant challenge.

The National Waste Prevention Programme, set up within the EPA in April 2004, is developing new approaches to waste and has the potential to prevent or minimise the amounts of waste arising.

To find out more about the National Waste Prevention Programme and how it can help your business log on to

<http://www.epa.ie/TechnicalGuidanceandAdvice/NationalWastePreventionProgramme>



ENVIRONMENTAL PROTECTION AGENCY An Ghníomhaireacht um Chaomhú Comhsháil

The Mission of Botanic Gardens in the 21st Century

Agendas for botanic gardens are increasingly being promoted and guided by networks of gardens and by international conventions such as the Convention on Biological Diversity (CBD), which Ireland ratified in 1996, and the Global Strategy for Plant Conservation, which was launched in 2002. The Global Strategy is one of the few United Nation Environment Programme projects with clear verifiable targets for understanding, conserving, and promoting education and awareness about plant diversity.

Gardens are seen as ideal places in which to promote public awareness of global threats to biodiversity such as deforestation, introduction of alien species, and unsustainable development, as well as centres for research into understanding, evaluating and conserving this biodiversity. While the National Botanic Gardens will continue to serve local and national needs it must also play its part in serving the international community by promoting a wider understanding of the vital importance of plants in the world and by



Replanting the Flowering House

Palm House

working actively to understand and protect them.

Of course a botanic garden must be sensitive to its visiting public. Not every visitor will want to be educated or enlightened or stimulated. Many will come to relax, to stroll and sit, talk and think or simply be surrounded by plants, familiar and unfamiliar, in an atmosphere of peace and quiet. Over its two hundred years Glasnevin has acquired a certain character and atmosphere, but it has also changed with the times, and with care can continue to do so.

Matthew Jebb, Ainnmeoir Plandai (Taxonomist), National Botanic Gardens, Glasnevin, Dublin 9, Ireland.
 The National Botanic Gardens are open from 9 a.m. to 6 p.m., Monday to Saturday and 10 a.m. to 6 p.m. on Sundays.



Celosia cv.



New displays will be educational and conservational in theme.



Putting the orchids back

CALCIUM

Element of Construction

By Anthony Toole

AS Blake observed, "Great things are done when men and mountains meet." What the poet did not add, though he might just have been able to, was that without the metal calcium neither the men nor a significant number of the mountains would stand, let alone meet.

Calcium is the fifth most abundant element in the earth's crust. Among metals, only aluminium and iron are more plentiful. It is found almost everywhere: in rocks, bones and teeth and in the shells of sea creatures. Its compounds are used as building materials, in agriculture and in the extraction of metals from their ores. They help prevent the pollution that leads to acid rain and counteract some of the effects of that rain. Yet few people are even aware of what it looks like.

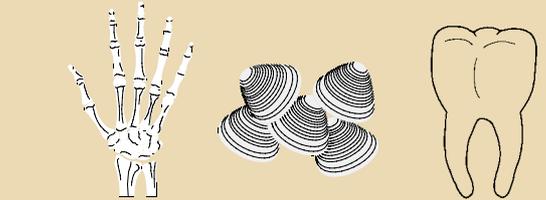
In the late 18th century, when the French scientist, Lavoisier, attempted to bring order into chemistry, he was hampered by the fact that fewer than thirty elements (less than a third of the total) had been discovered. To his classification of these into gases, metals and non-metals, he added a fourth group which he called 'earths'. Substances in this group, which included lime, magnesium and alumina, were later shown to be not elements, but oxides of elements, which were so strongly combined that they could not be separated using the techniques then available.

In 1808, Humphrey Davy isolated tiny quantities of calcium by passing an electric current through molten lime, though it was not until the 20th century that significant amounts could be obtained. Nowadays, some 120 million tonnes of lime are produced annually together with 2000 tonnes of calcium metal.

The metal itself has a density slightly more than half that of aluminium. It is sometimes alloyed with aluminium, copper or lead, and is used in the extraction of zirconium, thorium, lanthanum and cerium as well as several rare metals. It is very reactive, and rapidly becomes coated with a layer of white calcium oxide when it is exposed to air. If it comes into contact with water, it reacts quickly, releasing bubbles of hydrogen and forming a solution of calcium hydroxide known as lime water.

Calcium occurs most commonly in rocks as calcium carbonate. This is mainly found in chalk and limestone but is also present as aragonite in mother-of-pearl and in coral and when mixed with magnesium carbonate forms the mineral dolomite.

Where these sedimentary rocks were subjected to the high pressures and temperatures of volcanic activity they



have changed into the metamorphic rock, marble. Other minerals, such as gypsum and anhydrite, are made of calcium sulphate and were formed by the evaporation of waters in which they were dissolved.

Deposits of calcium carbonate are almost unlimited in their availability, and are extensively quarried. Some is used directly to build houses and roads. Most is heated in kilns to temperatures in excess of 900 °C, when it decomposes into carbon dioxide and quicklime (calcium oxide). When water is added to quicklime a vigorous reaction occurs in which calcium hydroxide (slaked lime) is produced.

Both quicklime and slaked lime are alkaline. Quicklime is therefore used in industrial chimneys to remove acidic gases like sulphur dioxide and nitrogen dioxide from smoke. Slaked lime is scattered onto fields to neutralise acids that build up in soil. Sometimes, powdered limestone is added to lakes in which the pH has fallen as a result of acid rain.

Mixing calcium oxide with sand makes mortar, a building material that has been in use for more than 2000 years. When water is added to this, the calcium hydroxide produced slowly absorbs carbon dioxide from the air to make hard, interlocking crystals of calcium carbonate. The sand is an inert filler that adds strength to the mortar. Cement is a similar material made by heating limestone with clay.

Calcium carbonate does not normally dissolve in water. However, rain water contains carbon dioxide, which renders it acidic, and therefore able to react with limestone. Where the rain forms pools it dissolves the rock until, over many centuries, small depressions deepen into cracks, known as grikes, which are a common feature of the limestone pavements found in areas like the Burren. Further action over geological time scales, as the water trickles through underground fissures, hollows out caves in the limestone. At the same time, water dripping from the roofs of these caves slowly evaporates, depositing its dissolved salts as stalactites and stalagmites, which given enough time, would grow to refill the cave.

The calcium present in water that has flowed over limestone reacts chemically with soap, making wash-

ing very difficult. The water is referred to as 'hard'. Despite this disadvantage, hard water is good to drink, being a rich source of the calcium that is essential to nearly all living creatures.

The average human body contains about 1.2 kg of calcium. Approximately 1% of this is employed for tasks such as control of blood acidity, cell division, hormone release and in the electrical activity of nerves. The other 99% is present as calcium phosphate in the bones. As well as providing the body's support structure, bones act as a reservoir of calcium, from which the metal can be released into the blood to maintain the levels needed for these necessary functions to continue.

Despite their strength and durability, bones consist of living tissue in which, just like the rest of the body, material is being built up and broken down continually. Cells known as osteoblasts extract calcium from the blood and deposit it onto bone surfaces. At the same time, other cells, osteoclasts dissolve bone and return the calcium to the blood. This recycling is essential for preserving the balance of the metal throughout the body. The daily deposition of calcium onto new bone is about 400 mg, and an intake of 800 mg per day in the adult diet is recommended, with about 1200 mg for teenagers, in whom bone growth is more rapid. Milk, cheese and eggs are rich sources of calcium, as are broccoli and the bones present in canned fish.

From middle age onwards, calcium deposition slows down, leading to the bone weakening condition, osteoporosis. Though this is more serious in women, it also affects men. Diet, exercise and in some cases drugs, can be used to slow down the process.

Osteoporosis is a progressive and serious problem faced by astronauts. The longer the time spent in space, the greater is the bone loss. This makes research into the condition, by scientists working on the international space station, relevant not just to the tiny number of interplanetary travellers of the future, but to the vast majority of people who will forever remain earthbound.

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

Below the Kelp Forests of Lewis

The Outer Hebridean Isle



Main Photo: Jewel Anemones are abundant on the exposed rocky walls found in many areas around Lewis. *Inset top:* A common Lobster emerges from his lair - a convenient cave under a massive boulder. *Inset Middle:* Urchins and starfish graze on the fine animal growth coating much of the rocky surfaces. *Inset lower right:* A curious seal cautiously swim towards the divers before disappearing at high speed

By Paul Kay

THE Outer Hebridean Isle of Lewis is as remote an area of Britain as it is now possible to get. The island remains still largely unspoilt and has a wealth of attractions for those who enjoy seeing its ancient artefacts (the stone circles at Callanish and restored traditional black houses), walking on its deserted white sand beaches or just enjoying the peace and quiet such a place affords. The island's west coast faces the open Atlantic with only a few small islands like St Kilda and isolated Rockall further offshore.

Much of the western coast consists of steep rocky cliffs that drop away into the sea, where lazy Atlantic swells collide with their bases before swirling away to allow the inevitable endless repetition of this process. In many places these cliffs have been eroded and worn and are convoluted



A large Edible Crab snugles securely onto a ledge on a rock wall.

and intersected by deep gullies, caves and arches which extend underwater.

The marine environment around the west coast of Lewis reflects its very exposed position with an abundance of all

the plants and creatures associated with such areas. Kelp plants are dominant on the shallow rock underwater, forming thick forest swaths. These forests, formed by many, many kelp plants, are an

amazing spectacle for scuba divers; they sway and flutter in perpetual motion, with an occasional fish darting through their waving fronds. Kelp forests equate to nothing above water although sometimes they do appear vaguely similar to dense rain forests in appearance.

Below the kelp forests of Lewis are some of the most beautifully colourful and luxuriant scenes that it is possible

to see underwater. The profuse encrusting life includes sponges, soft corals and innumerable anemones, many of which occur as brilliant sheets of colour, the identity of which only becomes clear as they are examined closely. Many vertical rock faces are entirely covered in one species: sometimes each individual is similar in colour to its neighbours, or perhaps vast numbers of two colour morphs collide and produce a garish discordant clash.

In fact, every square centimetre of solid surface is almost entirely coated with life. Some is quite minute, requiring careful study to pick out. Ghost shrimps are spindly insect-like creatures most of which are less than 1 cm high, but what they lack in size, they make up for in numbers – a close examination shows that they are all over the encrusted rock surfaces. Larger creatures such as the grazing urchins and scavenging starfish are far



A stunningly colourful cushionstar shares a rock surface with some *Sagartia* anemone.

more obvious, and some starfish too, are so brightly coloured that they almost seem unreal.

Crabs and lobsters can be spotted hiding in the crevices within the bedrock or under the many boulders. These animals warily watch the visitors who peer at them – for we are strange air-belching creatures that have invaded their kingdom. Some are bolder than others and will cautiously creep forwards for a better look, rapidly retreating upon sudden movements or an excessive gush of air.

And apart from the beautiful scenery and fascinating if largely immobile life below the sea (strangely there are not that many fish here), it is possible for visiting divers to have encounters with animals normally considered rare or at least unusual. Imagine looking up and seeing a 3m shark less than 2m above your head – fortunately a completely benign basking shark – or feeling your fin tugged and finding a playful seal hanging onto it - watching birds swim underwater - or maybe finding an angler fish with its lure, so well camouflaged that it is almost impossible to clearly define. All are more than possible (although not commonplace), and it is a privilege for the few who visit Lewis, and who are prepared to dive here, to be able experience firsthand.

In summer the clear Atlantic water reaches temperatures of 15C and visibility can exceed 20 meters underwater (which is actually very good indeed!). But the lure of the Hebridean

Islands is not to everyone's taste. To dive safely here requires far more (heavy) equipment than it does in say the Red Sea – drysuit, a bail-out system and location equipment (buoys and flags) – and few operators run boats in the area – so there are only a few who travel to the island intent on discovering its underwater wonders.

Murdo MacDonald is one skipper who does take scuba divers as well as bird and whale watchers and even kayakers. Once he fished for crab and lobster as far afield as St Kilda itself. Now he runs a charter 'live-aboard' boat, the MV 'Cuma', which was originally built as a research vessel for Liverpool University. During the summer season, she now plies the waters around Lewis, operating out to St Kilda and the Flannan Isles. It is to be hoped that islanders like Murdo continue to operate their vessels (with their inevitable warmth and hospitality) allowing visitors to glimpse the wonders to be seen around the Hebridean Isle of Lewis.

Paul Kay BSc FRPS is a professional photographer, specialising in marine wildlife photography and the sale of underwater photographic equipment. Stock Underwater Photography www.marinewildlife.co.uk. Suppliers of Seacam Silver Underwater Photo Equipment www.underseacameras.co. Tel. 0044 1248 681361 or 0044 7702 411614.



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The Wild Salmon Crisis

SERIOUS concerns have been expressed that catches of wild salmon are low this year and that stocks are in a state of crisis. Matt Murphy spoke to John O'Connor, Chief Executive of the Central Fisheries Board and asked him about this. The Central Fisheries Board is the State Agency with responsibility for advising the Minister on salmon policy. John has considerable experience of the whole inland fisheries sector and was responsible for that brief when he worked in the Department of the Marine, before taking up his current position with the Central Fisheries Board.



John O'Connor, Chief Executive Central Fisheries Board

MATT MURPHY (MM): It looks like a bad salmon season this year. What has gone wrong?

JOHN O'CONNOR (JOC): We had a very good spring run in many of the traditional spring rivers such as the Moy, Corrib and Blackwater. Our grilse (a young salmon after its first return from the sea) angling season was generally disappointing although good catches were experienced in some rivers such as the Corrib.

The commercial catch was down. The quota was 162,000 fish and it looks like the catch will be in the region of 145,000 to 150,000 fish; a drop of between 9% and 14%. This in itself is not significant, however, when you look at the trend over, say, the last 3 years, since the introduction of tags and quotas you see a drop in the commercial catch from 206,000 in 2002 to 168,000 in 2003 to 145,000 / 150,000 this year. In addition, the quota was not reached in any of these three years. It is this trend which shows about a 30% drop in three years that most concerns my Board.

MM: Why is this happening?

JOC: We cannot say with certainty what is happening. We have a lot of data on salmon stocks in individual rivers over a long time period ranging from habitat to juvenile stocks, to returns to the rivers. This data points to good juvenile production in many catchments. However, returns to the coast have been poor in

recent years notwithstanding reduced exploitation in the commercial fishery since the introduction of a suite of conservation measures in 1997.

MM: Are you saying the problem is at sea?

JOC: While we are aware that water quality is an issue particularly in the east and southeast of the country, there is no doubt that poor marine survival is the single biggest issue affecting salmon returns to the coast in recent years.

MM: How is this reflected in salmon stocks around the country?

JOC: Provisional estimates suggest that the total number of salmon spawning exceeded the required national conservation limit in 2003. However, the number of spawners has been below the conservation limit for 13 of the previous 15 years and it is known that of the 17 salmon Fishery Districts only 8 have been consistently above their individual conservation limit requirements since 1997.

MM: What action should now be taken?

JOC: While we must continue to look at all elements of the fishery I consider we should concentrate our minds on two particular issues - the indiscriminate exploitation of mixed stocks off our coast and the marine environment. The latest advice from ICES (International Council for the Exploration of the Sea) recommends reducing overall exploitation in mixed stock

fisheries to the lowest possible level to increase the probability of meeting conservation limits. ICES recommends that the exploitation of grilse should be confined to river stocks which are shown to be above conservation limits. There is no doubt that the way forward is through exploitation on a single catchment basis. This is a fundamental plank of the Common Fisheries Policy for all sea species and all other salmon producing nations have embraced or are in the process of embracing this. Moving to single catchment management should not be confused with ceasing all commercial exploitation or indeed ending drift netting. My Board has proposed the development of a number of suitable models to address this.

MM: There is a lot of area to be covered in the marine environment. How do you propose this be done?

JOC: I agree the area to be covered is extensive but this is being done for sea species for years. Ideally it should be addressed by the international salmon community and I am aware this is being advanced by NASCO (North Atlantic Salmon Conservation Organization). However, to date NASCO has been unable to find the necessary funding. They have identified a number of prioritised specific tasks or research projects such as examining the by-catch of salmon post smolts in the pelagic fisheries in the Norwegian Sea.

My Board is not confident that the necessary research programme is likely to be advanced in a timely manner under the NASCO model. We would propose that Ireland take the initiative here and lead the international effort. We are particularly fortunate at having two new state of the art research vessels in the Marine Institute. The Central Fisheries Board would be strongly of the view that funding should be provided to the Marine Institute to undertake priority research work at sea to examine the issue of poor marine survival of salmon. We are also very fortunate in Ire-

land in having some of the best salmon scientists in the world. I am aware that the Marine Institute is convening a meeting of international salmon scientists shortly; but we need action now.

MM: What about buy outs and setaside?

JOC: This can be a very emotive subject. My Board's view is that these options should be examined in a dispassionate way by fisheries management. I hear a lot of talk about the cost of a buyout or setaside but little about the value of such an approach. I am aware from meetings and other contacts with the industry that many would welcome an opportunity to exit the fishery if reasonable 'compensation' was available. On the other hand I am also aware that some fishermen do not wish to be bought out. Neither position is unreasonable. Our job as managers is to develop suitable models to accommodate both positions and advance the conservation and economic/socio economic imperatives. My Board would be strongly of the view that just because there is no exchequer funding earmarked for such a scheme at present that we should now simply drop the idea. Surely it is not beyond us all involved in the sector to look at this issue in an imaginative way and develop a number of viable options. Such consideration would look at the value and funding options.

MM: As the body charged with advising the Minister on salmon management policy in Ireland, have you advised the Minister and, if so, what advice have you given him?

JOC: My Board's position is very clear. In 2003 the CFB, with the support of the Minister John Browne, TD, engaged the services of independent economic consultants to consider and quantify the economic / socio economic importance of wild salmon in Ireland and set out options / models on how both segments of the industry could be sustainably managed from an economic / socio economic perspective in the future. The report (Indecon) was published in April 2003 and my Board accepted its recommendations.

The Board then submitted it to the Minister and asked that he implement its recommendations. The Minister then asked that we enter into public consultation to establish people's views on the report and, in particular, identify areas of agreement between the conflicting interests. Following these extensive consultations, I travelled to all the fisheries and met groups of anglers and fishermen in each region (we also got in the region of 500 written responses) and submitted the findings, which were independently assessed, to the Minister.

As a first step, the Board would focus on the following two initiatives which it is satisfied are non-threatening if properly communicated and advanced. Firstly, a decision by the Minister that he accepts, in principle, that salmon should be managed on a single stock basis. My Board is willing to advance the development of a plan for its implementation in consultation with all relevant stakeholders, including coastal communities, and revert to him with proposals for its introduction within a predetermined timeframe; and, secondly, that the Minister announce that he is willing to consider the introduction of voluntary buy out and / or set aside schemes. Again, my Board is willing to develop a number of models of such schemes for the Minister's consideration. These models would also be advanced in consultation with the relevant stakeholders, particularly those that might be directly impacted on by such schemes. Sourcing of funding to meet the cost of these schemes would form part of the task.

MM: You haven't mentioned the anglers and management of the rivers yet!

JOC: There is no doubt that the conservation and economic / socio economic imperatives cannot be advanced satisfactorily without addressing management of our angling waters. Ownership and title to many of our fisheries are far from clear and this must be addressed. Also, if additional salmon are allowed upriver to spawn and to support local and tourist angling we must ensure we have the necessary strategies and structures in place to deliver this. This represents a significant challenge.

MM: Is Minister Brown doing a good job?

JOC: Well, Civil and Public

Servants do not comment on the performance of individual Ministers or, indeed, of Governments.

What I would say is that the Central and Regional Fisheries Boards have made a number of recommendations in recent years relating particularly to annual salmon quotas and increasing license duties for commercial and angling licenses and our recommendations have been accepted by the Minister and the senior civil servants. You cannot ask for any more. I am also encouraged that the Minister has recently introduced the idea of catch and release of salmon in the Irish context. The Minister has now embraced the recommendation of our scientists and the Fisheries Boards' management that salmon exploitation should be based on first meeting stock conservation limits. We expect to meet, or, at least move very close to meeting, our national conservation limits next year. This is an incredible achievement and represents best practice to anyone managing other fish species. The Minister, the National Salmon Commission, its scientific committee and the senior Civil Servants must all be congratulated, along with the Fisheries Boards, in effecting these significant advances in such a short timeframe.

MM: Finally on salmon, is the tags and quotas scheme working?

JOC: In a word, yes. I consider that the greatest credit for its success must go to the Regional Fisheries Boards with support from my Board. I am strongly of the view that the level of success of any piece of legislation is predicated on the quality of its implementation and enforcement. Ireland is particularly fortunate to have such a committed and competent body of people around the country in the Fisheries Boards who are responsible for the management, protection and conservation of wild salmon. Little wonder that other jurisdictions look with envy on our fisheries management model.

I couldn't end a discussion like this on salmon management with you Matt, without reference to the international context.

Sometimes, and this is entirely understandable, we can be too self critical of our salmon management effort. I think we need to see our wild salmon resource against a

background where, in global terms, we have one of the largest stocks and we are trying to manage this in a sustainable way while some other countries have effectively lost their stocks and are now trying to re-establish them. We all need to understand and appreciate recent significant developments in Ireland such as our extensive programme of instream development over the past ten years. We have led the international research effort through developments such as the "Wetted Area Report" and our work on salmon genetics. Again in the area of salmon conservation and management initiatives such as the tags and quotas Ireland has taken an imaginative and progressive approach to ensure that our salmon stocks are continually managed in a sustainable manner.

MM: I cannot end without raising the sea trout issue.

JOC: Unfortunately I have no good news on sea trout. Poor lice management in a number of salmon farms, close to important sea trout rivers, particularly during the critical February to May period, is effectively killing off sea trout stocks in these rivers.

MM: Can the problem be resolved?

JOC: Yes. I am satisfied that both industries can be sustainably managed into the future. We know that where lice levels on salmon farms are well managed during the critical period I mentioned, then sea trout stocks will recover and thrive. We have evidence to support this.

MM: Why do you think lice levels are not properly controlled in some farms?

JOC: I don't know. It is not my responsibility. It has been suggested to me that the cost of treatment is expensive and some farmers are reluctant to treat, as profit margins are tight. This may or may not be the case. If it is, my Board would support the subsidisation of treatments. It is also suggested that sufficient punitive action is not taken against persistent offenders and this has led over the last 15 years or so to the collapse of some sea trout stocks and continued conflict between both industries which has not benefited the well managed salmon farms or the wild fisheries. All we want is healthy and natural wild sea trout and wild salmon.

John O'Connor, Chief Executive, Central Fisheries Board, Mobhi Road, Glasnevin, Dublin 9. www.cfb.ie

Key Issues in Planning and Environmental Law

All you ever wanted to know about planning but did not know who to ask.

A review by Patrick Sweetman

A NUMBER of Irish legal texts on planning and environmental law have been published in recent years. For the practising solicitor, planning consultant, architect, engineer, surveyor, local authority planning official, or other professional involved in the area of planning or environmental law, this is the book which should always be close to hand. However, the real achievement of John Gore Grimes was to produce a legal text which is readily accessible to anybody with an interest in planning or environmental law. Its style is clear and accessible, avoiding legalese or technical jargon, and is of invaluable assistance to professional and lay person alike.

The book is structured like an encyclopaedia. It is not necessary to know what the relevant legislation is, or what section of which legislation applies (although the book will answer this question for you if you need it). Rather if one has a question, one consults the book under the relevant heading. Thus, the first heading is "Abandonment of Planning Permission" and the second, "Abandonment of Use". These issues are dealt with by reference to relevant case law but in a clear and concise fashion and with appropriate cross-referencing.

The book covers a huge spectrum of planning and environmental law from the highly technical to the very practical.

Do you want to know what the local authority enforcement procedure is? Look it up under "enforcement" and it is all there.

Do you want to know how long a planning permission lasts? You will find the answer under "duration or life of a planning permission".

All of the new concepts introduced by the Planning and Development Act 2000 are covered, including:

- **Social and affordable housing** whereby developers are required to make a proportion of a development site available to the

local authority as social housing or to the public as affordable housing, or to enter into an alternative arrangement with the local authority in lieu;

- **Fun-fairs** and the regulation thereof;

- **Quarries**, including the requirement by operators of quarries to register the quarry, and the power of the local authority to require submission of an application for planning permission, even in respect of an existing quarry;

- **Development contribution schemes** whereby each local authority was required to draw up a scheme setting out what the financial contributions are in its administrative area. These are payments to be made as contributions to infrastructure, and included as conditions of a grant of planning permission;

- **Strategic development zones** which involved the planning authority drawing up a planning scheme. Once adopted, the scheme sets the planning framework for the particular area and such that no appeal against planning permissions granted in accordance with that scheme will lie to An Bord Pleanála;

- **Taking in charge of estates** by local authorities which addresses a problem where local authorities have in the past been reluctant to take estates in charge.

One of the difficult aspects of planning law has been the extent to which the Planning Acts extend to development on the foreshore. This book contains a succinct statement of the current law and deals also with aquaculture and foreshore licences and leases.

The book goes through the step by step procedures required for making a planning application, and the notice requirements both on site and in the newspapers. It discusses also the types of condition which a planning authority can impose and those conditions which are not valid and therefore open to challenge. As such this book is indispensable both for resi-

dents' associations and other groups interested in monitoring the planning process, as well as individuals making planning applications.

The book also addresses in detail the new provisions dealing with material contraventions of the development plan as introduced by the Planning and Development Act 2000 and Exempted Development being works which can be carried out without the need to obtain planning permission.

In this book John Gore-Grimes has drawn on his many years of experience as a solicitor acting for developers, and his intimate knowledge not only of the technical aspects of planning and environmental law, but also the practical application of the law. This knowledge has been honed by his many years lecturing as part of the Law Society of Ire-



land's Continuing Education Programme and subsequently Continuing Professional Development Programme. We are fortunate indeed that John has been prepared to put such a considerable amount of his time and effort into collating his vast experience and knowledge and making it generally available.

Patrick Sweetman is a well known Planning Lawyer and works with Matheson Ormsby

Prentice. Patrick has himself contributed to a Planning Law Book written by Eamon Galligan S.C. He also lectures extensively on Planning Law throughout Ireland.

"Key Issues in Planning and Environmental Law" by John Gore-Grimes. Published by Butterworths

(www.butterworths.ie) ISBN: 1 85475 2545 Price: €110.00

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Nature in Your Own Garden

By Richard Mills

AS a wildlife photographer, I naturally spend a lot of time out in the field. Over the years, that field has meant many places and many climates in far corners of the world, as I struggle to capture yet again with my lens the magic of some rare or unusual creature. It's a wonderful feeling when, after days or weeks of searching, I finally manage to achieve my goal and know that at last I have a picture (or preferably a dozen pictures) of whatever species has been stubbornly avoiding me for far too long.

And yet, despite the excitement of far-away places, I never cease to be amazed and delighted at the range and variety of wildlife opportunities I can discover far closer to home. To be precise, at home, in my own garden. Every one of us can find such opportunities if we take the trouble to open our eyes a little wider, study the habitat a little better, and - most important of all in this over-rushed, over-stressed age - develop a little patience. Every season brings its own images, each one immensely rewarding,

and all the more satisfactory somehow for being discovered on your own home patch. A mistle thrush feeding on rowan berries, perhaps - if you don't have such a tree in your garden, why not plant one, and watch the birds flock to it as the berries redden in autumn. And while you're at it, put in a few more shrubs and bushes that produce

winter food for birds, and ensure photo opportunities all year round.

If you live anywhere near open fields, you are bound to find rabbits in your garden. Yes, they do tend to nibble young shoots and flowers, but that's a small price to pay, in my book anyway, for the delightful images they present as they pose unselfconsciously. Perhaps, if you are lucky, you may even discover a young fox cub trotting casually across the lawn. At that age they don't have the experience to fear mankind, and may even approach for titbits.



Above: Mistle thrush feeding on rowan berries.



Left: House sparrow on gutter.



Right: Fox cub.



House sparrow carrying hair for nest material.



Bat in house.



Left: Goldcrest



Right: Hedgehog

If the dogs start barking wildly late in the evening, it's fairly certain that the hedgehog is on his nightly constitutional in search of slugs and beetles. I have found that the installation of lights with a sensor makes watching these unpredictable visitors far easier; and they get used to the sudden floodlighting surprisingly quickly. The dogs have other uses too: when they moult, the loose hair is put up into thorn bushes for the birds to pull out when nesting. To see a sparrow taking off with a cloud of fluffy hair, destined for a nest under the eaves, is a sight to behold.

A pond, even a tiny one, may well bring in frogs, and will also be much in demand as a bird bath. I have often noticed that different species tend to congregate on different days to make their ablutions, and wonder if there is some kind of woodland or garden roster for bathing times, so regular is the arrangement. Once I have ascertained the likely times, I set up a hide beforehand, or even position the car so that I can shoot from the window, and get some great shots that way.

There is always wildlife in the garden, whether it be a greenfinch and a sparrow confronting each other on the peanut holder, butterflies congregating on buddleia blooms, or a poplar moth sunning itself on a tree trunk. In the nesting season, leave a shed open and you may find a robin or wren nesting in the most unusual places. Magpies build earlier, to take advantage of a handy takeaway food supply from later nesting birds; starlings will fight compulsively for no other reason than survival of the fittest.

Take time to look at nature in your own garden. You will be surprised how much is there.

Richard Mills is a photographer with the Evening Echo, Cork.



Magpie nest building.



Above: Rabbits playing in the garden.



Right: Poplar moth resting on a tree.

Below: Goldfinch and House Sparrow feeding.



Planning in the Uplands

By Pat Ewen

LAND use (and other kinds of) planning in Ireland has tended to diminish in coherence the further out one moves from centres of population. Various agencies adopt different areas and starting points. We amass lots of detailed information but are less inclined to take an overview either in space or time. This is particularly evident in the mountains and hills of Ireland.

There is actually very little "upland" in Ireland. We have a mere 240 square kilometres of land above 600 metres altitude and less than 5% of our land area is above the 300 metre contour which is the approximate upper level of human habitation.

We have traditionally held mountain places in pretty low esteem in this country and our changing society at the beginning of the 21st century has resulted in a generally urbanised consumer society throughout the whole island. We have for the most part greater affluence, more leisure time and vastly improved mobility compared to the immediately preceding generations. Simultaneously agriculture is undergoing significant intensification in its use of land and our rapidly growing urban populations are increasing the level of exploitation of a variety of rural (and frequently upland) resources. The size and scale of some of these activities threatens the continuance of our upland landscape and environment in its traditionally perceived form.

This brief article looks at a number of the more intensive uses, which are changing our mountain areas.

Agriculture by its increasingly intensive use of land has changed former symbiotic relationship between farmer and environment. Agriculture should be looked at more as an industrial activity taking place in a rural setting. Monoculture, over use of fertilisers and erosion caused by overstocking of grazing herds are significant factors for retrograde change as is increasing mechanisation and the construction of agricultural roads and large farm buildings. Modern farming is, in general, operating much more intensively in larger but fewer units and directly employing far fewer people than before. The impact on the landscape is much greater now and less environmentally friendly.

Extractive Industries are frequently located in upland areas and have a disproportionately large adverse impact on the landscape when assessed against local benefit. Extractive operations can include underground mining for precious metals or minerals, turf extraction, open cast mining and, of most significance at present, quarrying for rock, gravel, sand and other aggregates for use in the building and road construction industries.

"One-off" rural housing is probably the most talked about, most serious, most potentially disastrous planning issue current in Ireland today. Unless planned with great sensitivity such development has a particularly intrusive impact on

upland landscape. It seems that we still feel a need to impose ourselves on the natural landscape by importing (frequently) an alien piece of suburbia onto the hillside. We often ignore existing natural features such as hedges, walls, microtopography, indigenous vegetation and any established settlement pattern in the vicinity, much of which we feel the need to erase at the start. One-off housing consumes landscape rapidly.

Commercial forestry also impacts heavily on the mountain environment. It is generally an alien monoculture, artificial in form and sterile in substance. Forest roads allow vehicles to penetrate further into the hills and the declared public amenity is minimal. Modern forestry, which is a major user of the Irish uplands, cloaks itself in a kind of green eco-desirability but is in fact strongly unfriendly to the environment and employs very few people as well.

Other high impact users of the landscape of the hills and mountains include communication masts (all of which seem to require both road access and an overground power connection) and energy producers.

In the upland context this latter category includes very small-scale hydro schemes which radically alter the ecology of minor mountain lakes and streams, and wind farms which are likely to become a major intrusion into the upland landscape. Apart from the visual impact (which will become more apparent as the number of farms increases and the initial novelty factor wears off), access roads, service



buildings and power connections to the National Grid are needed.

The upland uses that I have been discussing all have a disproportionately large impact on the scarce landscape resource compared to the benefits (especially local benefits) resulting. On the other hand use of the mountains for recreation and tourism is a considerably more sustainable one for which, in our rapidly urbanising society, there is an increasing demand. Moreover, such use, if properly planned and managed, can have a very significant benefit to local communities.

Two widely held beliefs, both of which are false, are that (a) there is a very large amount of upland landscape and that we should not be overly concerned if we "use up" significant amounts of it, and (b) that mountain landscape is very robust and is impervious to human activity (especially mechanised activity) and can easily regenerate and renew itself. In Ireland there is probably only about 3% or less of the land area remaining as unaltered mountain landscape and by its nature this ecology is very fragile and susceptible to damage which heals only slowly if at all.

As a society we owe support to the small communities who live in or at the margins of our uplands. Their relatively remote location sets them at a disadvantage compared to urban dwellers. Using their upland environments for the high impact uses that I mentioned earlier in the name of providing development and employment is, in fact, only short term thinking which is neither sustainable nor truly supportive of these communities.

Recreation and Tourism offer, I think, some solutions but much careful thinking is required in the planning of such uses both to conserve the landscape resource and - equally importantly - to protect the integrity of local communities. We live in a very "pro-development" culture and those who call for moderation in the lust to build at all costs are fighting a very uphill struggle but a very necessary one if we are not to consume the very resource which we seek to utilise.

What is to be done? The protection of such a very scarce resource as unspoilt upland landscape, its long-term conservation and availability for sympathetic recreational use, is a legitimate and economically justifiable national aspiration. The scourge of disadvantaged communities in upland areas is a national obligation. The selling off of irreplaceable assets such as the mountains to "make a quick buck" and to absolve political consciences is wrong and will be condemned by future generations who have to suffer the consequences. We need to plan for our uplands and mountains and not treat them as bits of left over. National Parks, a National Landscape Policy, Agenda 21 thinking and even a Mountain Authority (with appropriate legislative planning and community powers) are all possible steps forward. The needs of upland communities must be clearly recognised, but balanced with the goal of providing real, lasting environmentally acceptable conservation of this unique part of the Irish heritage.

Pat Ewen is an Environmental Economist/Town and Country planner based in Co. Dublin.



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Bringing out the best in Medicine

Fr. Koyapillil Matthew, SJ (RIP)

AFTER going to press with the last issue of *Sherkin Comment* (No. 36), it was with great sadness that we learned of the sudden death from a heart attack of Fr. Matthew, who we featured in "A Lesson in Environmental Education from India". He died on 16th April 2004. I had an email from Fr. Matthew only four days earlier. I had queried the annual cost of running his centres, which seemed so low, considering what he was able to do with it. His reply shows the great humility of the man:

"Thank you for your generous write-up. Yes, the figure of 21,000 pounds sterling a year is adequate simply because I believe that every penny made available by the taxpayer in the name of conservation should be spent on that and nothing else. Matter of honesty to oneself and others. I always travel by public transport, for instance. So, please be assured that your estimate is correct. (I will get back to you on this later)." I pray Fr. Matthew's work will continue.

May he rest in peace.

Editor





Cars Wear Out – Water Runs Down Hill

By Robert S. De Santo

SINCE about 1970, there has been increasing study of the relationship between vehicular traffic and water pollution. Every vehicular movement deposits a small but certain amount of polluting residue on the travel surfaces of roads and parking areas over which the vehicle passes. The contaminants on the ground enter the ecosystem in storm water run off where their cumulative residues impact the environment and its water quality. These chronic discharges are responsible for much of the persistent degradation in surface waters that we see created through use of automobiles. Water pollution that traffic causes must be assessed and managed if water quality is to be protected for future generations.

The first step in confronting this problem is to recognise and quantify its sources. That is the objective of this article (see also The Failure of Success – Sherkin Comment Issue No. 29, and Urban Sprawl – Sherkin Comment Issue No. 30).

Cars Wear Out – Knowing the Problem

Identifying levels of chronic pollution from vehicular traffic is based on knowing: (1) the mix and pattern of traffic movements in a study area, and (2) the Average Daily Traffic (ADT) predicted in an existing or proposed land use in that study area. When combined with: (3) knowing the pollutants generated by vehicular traffic and (4) the rate of their generation, we can calculate the mass of each pollutant deposited on road and parking surfaces in that study area. This information lets us quantify the water pollution cost to society generated by that traffic in that study area. Once quantified, we can then manage, minimise, or eliminate the problem.

What Pollutants Come from Traffic?

The sources of traffic related pollutants, including pollutants blown or carried from adjacent land uses on to road and parking surfaces by traffic movement are based on scientific studies with their findings summarised in Table 1.

Table 1: Common Street and Parking Surface Pollutants and Those Calculated by This Methodology

Source of Pollution	Class of Pollutant	Pollutant Concentrations Calculated
Clutch/Brake Wear	Asbestos*, lead, chromium, copper, nickel	Asbestos BOD
Roadway Wear & Local Soils	Chlorides, sulfates	Chloride Chromium COD
Deicing Compounds	Chlorides, sulfate, cyanide and bromide	Copper Grease
Tire Wear	Rubber, lead, zinc, Asbestos, cadmium	Kjeldahl - N Magnetic Fraction
Vehicular Leaks/Spills (Not Oil)	Grease, petroleum, n-paraffin, lead	Nickel Nitrate - N Nitrite - N n-Paraffins
Oil	Zinc, alkanes, polynuclear/benzene series, naphthenes	Petroleum Rubber
Wear of Asphalt	Phenolic compounds	Total Phosphate - P Volatile solids
Moving Parts Wear	Copper, nickel, chromium, manganese	Zinc

* When asbestos fibres were recognized several years ago as being carcinogenic, its use of in brake pads has declined. It is generally being replaced by copper and other materials. As brake pads wear, their constituents are abraded and settle in the form of fine dust on the vehicle chassis and road surfaces.

The most recent studies of storm water run off from parking areas show that impervious (paved) surfaces directly affect the water quality of a watershed by generating suspended solids, trace metals including cadmium (Cd), chromium (Cr), copper (Cu), iron (Fe), nickel (Ni), lead (Pb), and zinc (Zn), in both dissolved and particulate-bound phases, in addition to 25 polycyclic (i.e. polynuclear) aromatic hydrocarbons (PAHs). These same studies show that the highest mean concentrations of metals in surface runoff include iron (810 micrograms/litre [$\mu\text{g/L}$]), zinc (620 $\mu\text{g/L}$), copper (40 $\mu\text{g/L}$), and lead (40 $\mu\text{g/L}$).

Once these vehicular traffic pollution sources are identified, the next step in quantifying their impact on water pollution is to use a mathematical model to estimate their masses. This was first done in the United States by Donald G. Shaheen and other, in the 1970's. That pioneering work is as relevant today as it was then, since vehicular pollution today in Ireland and elsewhere is identical in form and follows the same pathways as was first recognised in the 1970s. Cars wear out and water flows down hill - only the mass of pollution has increased, not its mode of generation or its pathways of contamination. Changes in materials such as the substitution of copper for asbestos in brake linings, does not affect the pathway of these pollutants - they move with storm water run off. It only affects their toxic ecological impacts - copper is far more toxic to water quality than is asbestos.

Pollution Shocks

When it starts to rain, pollutants are washed off roads and parking areas in high concentration. This early stage of runoff is generally referred to as the "first flush." It is that initial and high concentration of pollution in each and every rain event that must be managed in order to prevent chronic first flush pollutant shocks from compromising water quality. As the rain continues, concentrations decrease in the run off while the accumulation of pollution in the receiving waters and its bottom sediments increases. The repeated shock of traffic gener-

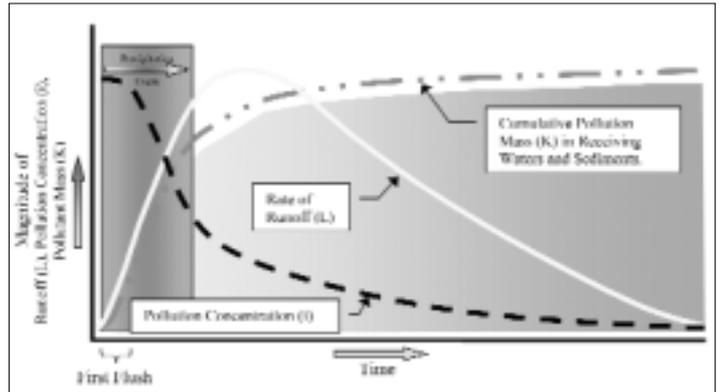


Figure 1: The relationship between the rate of run off (L), the concentration of pollutants in the runoff (i), and the cumulative mass (K) of pollutant entering the watershed.

ated contaminants in first flush pollution is present in every rain event. Every time it rains, receiving waters are impacted and degraded by these cumulative impacts.

How Much Pollution Does a Car Drop on the Road?

Pollution due to vehicular traffic is directly proportional to the number of axles that pass over a length of roadway and parking areas. The pollution deposited on the travel surfaces is directly related to the number of axles on each vehicle that deposit contaminants on the paved surface over which they roll. The number of axles on the average vehicle is estimated based on data from the Department of Transportation in the United States where the mix of vehicles in 1999 on Urban Streets was found to be Passenger Vehicles (two axles) 62.3%, Buses (two axles) 0.2%, Vans, Pick Up Trucks, and SUVs (two axles) 33.5%, Single Use Trucks (three axles) 2.0%, and Combination Trucks (five axles) 2.1%. This results in an average number of axles per vehicle of 2.09. That is, we assume that each vehicle generating pollution in our study area has an average of 2.09 axles on each hypothetical vehicle that enters and leaves.

How Much Pollution is Generated by Each Axle?

The rate at which pollutants are generated has been determined by empirical observation during which traffic has been counted and their residues have been collected and analysed for several pollutants to find their deposition rates per axle. Bear in mind that these masses of pollutants do not include the contribution that traffic makes to air pollution.

How Does Traffic Pollution Enter the Watershed?

Traffic generated contaminants ultimately move by precipitation that strikes the parking and road surfaces and enters the drainage system. In fact, studies in the mid 1970s found that

90% of the sediments and their associated pollutants are washed off travel surfaces by the first half-inch of rain. This relationship between the rate of run off (L), the concentration of pollutants in the runoff (i), and the cumulative mass (K) of pollutant entering the watershed, is illustrated in Figure 1.

Pollutant Concentration in Run Off is the Key

Knowing the mass of pollutants deposited on travel surfaces and their rate of removal in run off does not complete our understanding of the problem and its solution. We must also know what concentration of pollution will impact water quality in the watershed. That is, we must know the pollution levels for each pollutant that actually exists, not just the average concentration. Average concentration is rarely lower than that of the individual, first flush concentration. Therefore, average concentrations are very misleading.

The Solution is a Treatment Train

Environmental stewardship includes proper planning and the use of a combination, or "treatment train," of Best Management Practices (BMP) to treat and renovate storm water run off. This is both possible and practical by using two strategies - primary treatment to remove sediments and their adsorbed pollutants, such as copper and zinc, and secondary treatment to "polish" the run off and reduce its volume by infiltration into the ground and transpiration into the air. BMPs are available in a data base of performance criteria for: 1) detention basins, 2) grass filter strips, 3) media filters, 4) porous pavement, 5) retention ponds, 6) percolation trenches and dry wells, 7) wetland channels and swales, 8) wetland basins, and 9) hydrodynamic devices (see <http://www.bmpdatabase.org>).

Robert S. De Santo, Ph.D. is founding Director of the Institute of Environmental Stewardship, LLC, 16B Center Street, Waterford, Connecticut 06385-1804, USA.

By Claire McAteer & Matthew Parkes

Carlow, Clare & Sligo Lead the Way

THE Geological Survey of Ireland established the Irish Geological Heritage (IGH) Programme in 1998 to identify and select sites that best represent the geological heritage of Ireland for designation as Natural Heritage Areas (NHA). As well as selecting the best sites the IGH programme also aims to identify sites of national or local importance, which are classed as County Geological Sites although these will not receive the statutory protection of NHA sites.

Geology is now recognised as an intrinsic part of natural heritage in three separate pieces of legislation: the Planning and Development Act 2000, Planning and Development Regulations 2001, the Heritage Act 1995 and the Wildlife (Amendment) Act 2000. The Heritage Act and the Planning Regulations, in particular, place responsibility upon Local Authorities to ensure that geological heritage is adequately addressed within heritage plans as well as integrated into revised County Development Plans.

Local Authorities are critical partners in protecting, through their inclusion in the planning system, those County Geological Sites which fall within their county limits. Through public consultations and councillors there is also welcome democratic participation or ownership of the county's geology. The listing of these sites within the County Development Plan provides protection against potentially damaging developments that normally require planning permission such as building, quarrying, landfilling and forestry. It is important to note, however, that management issues for the majority of geological sites differ from those of ecological sites and in some cases development may even enhance the geological understanding



Photos: © Geological Survey of Ireland

Ballymoon esker, Co. Carlow.

of a site by exposing more rock sections – for example in a quarry extension. Consultation at the earliest stages can identify any issues relevant to an individual site or proposed development.

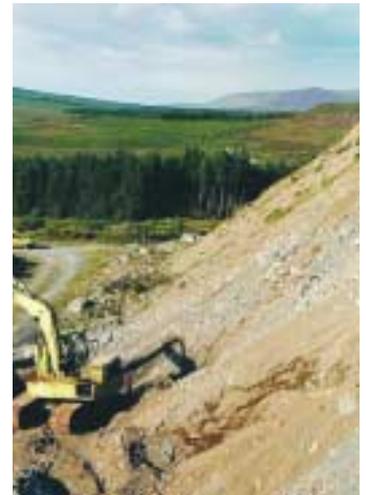
There are two broad types of geological sites. Most are small and discrete and almost all are quite robust requiring few restrictions in order to protect the scientific interest. They could be old or active quarries, natural exposures or coastal sections. They usually have a specific interest such as fossils, minerals or are a representative section of a particular stratigraphical sequence of rocks. The other types of site tend to be larger areas that represent a geomorphological interest, i.e. landscapes that illustrate the processes which formed them.

“A lack of awareness in the past has led to the loss of important geological sites throughout the country.”

As geodiversity is the foundation for much biodiversity, they often correlate with existing SACs (Special Areas of Conservation) or NHAs.

The Irish Geological Heritage Programme has encouraged Local Authorities to provide funding to facilitate the temporary employment of a contract geologist to complete a geological heritage inventory and management plan for the sites of importance within their counties. Sligo County Council was the first county to commission such an audit with the help of the Heritage Council. Twenty-six sites were identified in all and a brief synopsis of the geology of each site was provided. Carlow County Council along with support from the Heritage Council and Stone Developments Ltd. funded a report on the geological heritage sites in Carlow. Only six sites were identified here as Carlow is a small county and the geology is very poorly exposed. Another audit, part-financed by Clare County Council and the Heritage Council, is currently underway.

The reports are written in such a manner as to be accessible to a non-geologist. They contain page-long site reports outlining the importance of the site, the reasons behind its inclusion as a County Geological Site and a management plan. A brief geological history of the county is also included as are geological conservation issues and maps indicating the location of the sites. Depending on the geology of the county the report might have many site reports such as in County Clare, or few as is the case in Carlow. Each report is tailored to meet the specific needs of the Local Authority in question and may address other aspects identified in their



Orraine in Sligo is also a sand and gravel resource.

Heritage Plans. In Sligo plans to publish an even simpler illustrated booklet version are being finalised.

County Geological Sites are the optimal way of addressing the responsibility of each authority under the Planning and Development Act 2000 to protect sites of geological interest. A lack of awareness in the past has led to the loss of important geological sites throughout the country. Quaternary sites are particularly vulnerable as they are generally important sand and gravel resources. The development requirement for aggregates has grown drastically in recent years placing many Quaternary (Ice Age) features under pressure of extraction. For example, Sligo has very few eskers but the two main candidates for inclusion as County Geological Sites were discounted as they have been largely removed by quarrying and bear little of their original character. It is important that nationally the very best landforms are protected as NHAs as examples for scientific research and for education but the County Geological Sites are a vital second tier.

The commissioning of geological heritage inventories by Sligo, Carlow and Clare County Councils places them at the very forefront of geological heritage within Ireland and represents a significant commitment on the part of these Local Authorities to fulfill their obligations to incorporate geology into the spectrum of responsibilities under the current legislation.

Claire McAteer and Matthew Parkes, Geological Survey of Ireland, Beggars Bush, Haddington Road, Dublin 4. www.gsi.ie



Sand Volcano at Bridges of Ross Co. Clare.

Eli Lilly S.A. - Irish Branch Pharmaceutical Manufacturers

Eli Lilly wishes “Sherkin Comment” continued success.

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Answers That Matter

Sherkin Island Marine Station News

Intertidal Mudflat Macrofauna Survey

By Charlie Perfect

THE annual survey of the intertidal mudflats on Sherkin Island has, this year, recorded a total of 67 species of macrofauna, including 14 species unrecorded in 2002. It brings the total number of species found in the marine mud on the island to an impressive 76 species

Macrofauna is the term generally applied to all small animals over 0.5mm in size. The intertidal mudflats on Sherkin Island are home to a diversity of this type of life. Most can be grouped together into the bristleworms (for example *Polydora ciliata* shown below), so called because of the stiff bristles down each side giving them the appearance of having many legs. Other groups include crustaceans such as *Sphaeroma serratum* (a relative of the woodlouse) and molluscs such as *Cerastoderma edule*, more commonly known as the Common Cockle.

Long term monitoring of the intertidal mudflats on Sherkin was initiated by the Marine Station in 1999. Since then physical and biological data has been collected each year from Kinish Harbour, a sheltered inlet on the northwest coast of the island. The results will contribute to our understanding of how the life in mudflats can change over time. Each month, sediment is collected from ten sites chosen around the harbour, reflecting the different types of muddy shore found. In monitoring work it is important that the sampling is quantitative, that is to say data from different sites or months needs to be comparable. For this reason sediment corers of a fixed area and depth are used. Cores, extracted from the shore, are sifted through a 0.5mm mesh, reducing the bulk whilst retaining all the macrofauna. These are then returned to the lab for examination. By using a paintbrush, animals can be carefully separated, picked out, identified and counted. Although their value as indicators of pollution is still debated, the number and abundance of species found does give an indication of the health of the habitat and has implications in the wider environment. Many migratory birds, for example, rely on mudflat macrofauna as an important source of food.

This survey will be continued over the coming years and it is hoped that it will contribute to the future conservation of mudflat ecosystems.

Recommended reading for anyone interested in investigating intertidal macrofauna for themselves:



The bristleworm *Polydora ciliata*

A Beginner's Guide to Ireland's Seashore.
(Sherkin Island Marine Station)
ISBN: 1-870492-96-X

Seashore of Britain and Europe
(Collins Pocket Guide)
ISBN: 0-00-219955-6



Pyramidal orchid - *Anacamptis pyramidalis*

Roaringwater Rarities

By Caroline Kingsnorth

ON the islands of Roaringwater Bay, an amazing 623 species of higher plants have been recorded. Amongst these, there are several rarities with limited distribution throughout Ireland and the British Isles.

The unique landscape, and land use of the islands has favoured some of these species, enabling them to survive when elsewhere they are threatened with extinction. Sherkin Island Marine Station began a rare plant monitoring project in 1999. The aim is to keep a record of the 15 or so rarest species in order to learn more about them for future reference.

Rock outcrops provide niches for Hairy Birdsfoot Trefoil (*Lotus subbiflorus*), Birdsfoot (*Ornithopus perpusillus*), Birdsfoot Clover (*Trifolium ornithipodioides*), and Slender Trefoil (*Trifolium micranthum*). Disturbed ground at the edges of arable fields or vegetable plots, especially potato lazy beds, provide an opening for weeds such as Sharp Leaved Fluellen (*Kickxia elatine*), Purple Ramping-Fumitory (*Fumaria purpurea*) and White Ramping-Fumitory (*Fumaria capreolata*). The coastal heathland contains Pale Dog Violet (*Viola lacteal*), and Spotted Rockrose (*Tuberaria guttata*), which is known from only three locations in Ireland and Britain. In other areas by the sea, you may often come across Musk Storksbill (*Erodium moschatum*) and Sea Storksbill (*Erodium maritimum*), which can often be found adorning the tops of walls and bare open ground. Also amongst grassland you may find Pyramidal orchid (*Anacamptis pyramidalis*) and Fiddle Dock (*Rumex pulcher*).

Unfortunately, many of these rarities are vulnerable and dependent on traditional land use. For example, 'improved' pastures contain only a fraction of the species as an unimproved meadow, but the trend is often to use the more advanced farming methods, and eradicate weed species. The decline of lazybeds has had a direct influence on the numbers of rare annuals and the reduction of grazing on the heath has led to the decline of some species that cannot compete with the more robust Gorses (*Ulex europaeus* and *U. gallii*).

If we are to protect these special plants, we must not succumb to pressures to 'improve' pastures, but sympathetically manage the habitats to allow this to remain a botanically important area.

Sargassum muticum on Sherkin Island

By Anne Marie Mahon

THIS year Sherkin Island Marine Station has initiated a monitoring programme to record the spread of *Sargassum muticum* on Sherkin Island. This is a brown seaweed which is native to Japan. There it is one of the smaller seaweeds of its family and forms part of a healthy marine ecosystem. However, outside of its natural distribution range it is an invasive species and a threat to the biodiversity of our marine habitats. The spread of this seaweed to other continents was first recorded in the 1970's in the Puget Sound of North America and on the Isle of Wight in England. Since then it has been recorded from South France to Sweden. The first Irish record came from Strangford Lough in 1995. There have been various sightings of it around the Irish coast since then. Transportation of fertile plant parts by boats and ocean currents are believed to be the main sources of its spread.

Sargassum muticum grows on the shoreline between high and low tide level, mostly in rockpools. It also occurs in the shallow sublittoral zone, where its presence is easily underestimated. *Sargassum* has many qualities which make it a stronger competitor than many of our native species. Sublittorally, it can grow up to 12m long, at a rate of 4 cm per day. As a result, it floats on the surface and out competes other species for light. With a life span of up to 4 years and an efficient reproductive strategy, many new plants settle each year in late summer. *Sargassum* also has the ability to regenerate if torn off, making it difficult to remove. One group of seaweeds outcompeted for light are the kelps. This is of particular concern as they provide a food source and habitat for many other native species.

This year, *Sargassum* was found in five locations on Sherkin island, including 31 rockpools and 2 sublittoral sites. It took up to 40% of the seaweed abundance in several rock pools and reached up to 3 metres on some sublittoral sites. This monitoring programme will take place on an annual basis, yielding interesting information on its growth rate and spread in these waters. It is important to monitor the spread annually as, if it continues, it could lead to a reduced species richness of the intertidal and sublittoral habitats where it occurs in Irish waters.



Sargassum muticum

A New Species of Dragonfly on Sherkin Island

By Christopher Barry

THE Autumn or Migrant Hawker (*Aeshna mixta* Latrielle) was first recorded in Ireland at south Wexford in 2000 and breeding was confirmed the following year at the Raven Nature Reserve. In 2002 the number of records further increased indicating an expansion of its range along the south coast as far as Clear Island'. In July 2004 a late instar nymph of the species was found in Lough Ordrree, Sherkin Island and by early September numerous adults



Autumn or Migrant Hawker (*Aeshna mixta* Latrielle) (male)

were seen across the island including copulating pairs. Such findings lead to the possibility that the species may have established itself on the island.

The Autumn Hawker is a medium sized, late-summer and autumn dragonfly that was first reported from south-east England in the 1940's as an infrequent migrant from southern Europe. The species spread rapidly, aided by the plentiful gravel pits and reservoirs created by post war gravel extraction² and by the 1990's breeding

was reported from the area south-east of a rough line from Bristol to Hull and along the South coast of Wales¹.

¹Nelson, B., Ronayne, C. & Thompson, R. 2003. Colonisation and Changing Status of Four Odonata Species, *Anax imperator*, *Anax parthenope*, *Aeshna mixta* and *Sympetrum fonscolombii*, in Ireland 2000-2002. *Irish Naturalists' Journal* 27: 266-272.

²Hammond, C. O. 1983. *The Dragonflies of Great Britain & Ireland*. 2nd Ed. Harley Books, Essex.

³McGeeny, A. 1987. In Brooks, S. Field Guide to the Dragonflies and Damselflies of Great Britain and Ireland. P.104-5 British Wildlife Publishing.

LOUVAR (*Luvarus imperialis*) in Irish & NW European Waters

By Declan T. Quigley

The louvar (*Luvarus imperialis* Rafinesque-Schmaltz, 1810) is an infrequently collected epi-meso-pelagic fish (surface to c1,000m depth) of world-wide distribution in sub-tropical and warm-temperate marine waters of both hemispheres (600N–370S). However, it has not been reported from tropical waters either side of the equator (170N–140S). Like many other strange and exotic epipelagic species such as the oar fish (*Regalecus* spp.) and the giant ocean sunfish (*Mola* spp.), the louvar has excited the imagination and moved the pen so frequently that it has spawned a subset of ichthyological literature devoted to records of its occurrence and to its external anatomy.

Adult louvar are unmistak-

able on account of their unusual body shape and distinctive colouration. The body is rounded and deep, the head rising steeply and dome-like and the mouth small, weak

and the belly silvery. The fins are scarlet, except the tail fin which is deep blue with reddish tinges. Although the louvar is considered by some ichthyologists to be distantly

related to the tunnies (Family: Scombroidei), it is morphologically and taxonomically unique, and is the only pelagic member of an otherwise shore-fish group (Order: Perciformes, which includes

9,293 species and represents the largest order of living vertebrates on earth). Although louvar are known to breed in the Mediterranean, where many of the juvenile stages have been found, relatively little is known about the species' biology. While spawning appears to occur from late spring to through the summer in the Mediterranean, age and size at first maturity is unknown. However, fecundity is known to be enormous; a 173.5cm F.L. (c125kg) mature female, found stranded on the coast of Florida on 2 June 1969, was estimated to contain 47.5 million ova. Egg production in such great quantity is a reproductive strategy characteristic of non-schooling oceanic fish (e.g. sunfish *Mola mola*).

Morphologically, adult louvar are totally different from juveniles. The latter undergo a remarkable and prolonged metamorphosis through various stages of larval development (*Hystricinella*, *Astrodermella*, *Luvarella*) which in the past were recognised (erroneously) as representing distinct species, and even genera, of fishes. Indeed, juveniles only begin to resemble adults when they reach a length of about 10-20cm.

Adult louvar appear to be solitary in nature and seem to feed mainly on jellyfishes, ctenophores, salps and other gelatinous planktonic animals. A specimen, measuring 121cm T.L. (Wt. 25.5kg), captured off the Irish coast on 5 April 1994 contained salp remains as well as a number of amphipods (*Themisto compressa*).

Between 1826 and 1976, the louvar appeared to be relatively rare in Irish and other NW European waters where a total of 16 specimens (all adults) had been recorded (France, 5; UK, 6; Ireland, 3; and Norway, 2). Most of these specimens had been found stranded and/or in apparent difficulty in inshore waters. However, following the development of the offshore pelagic fishery for tuna during the early 1990s, a significant increase in captures was recorded. Indeed, 22 specimens were recorded between 1991 and 1998 (France, 15; UK, 2; and Ireland, 5). This would suggest that the species



Photo: © Declan Quigley

Following the development of the off-shore pelagic fishery for tuna during the 1990s, a significant increase in reports of Louvar in Irish and NW European waters.

may be more frequent in its occurrence in offshore waters, particularly over the NW European continental shelf. It is interesting to note that a similar increase in reports of louvar occurred in the eastern Pacific Ocean following the development of the tuna purse seine fishery in 1950. Prior to that, the species was regarded as extremely rare in this area.

The monthly frequency occurrence of louvar in NW European waters is shown in Figure 1 (N=34). Louvar have been recorded throughout the year except during January and February with peak occurrences between July and September, coinciding with the operation of the offshore tuna fishery.

The largest reported louvar, found stranded on Redondo Beach, California, on 20 No-

vember 1932, weighed 138.6kg and measured 188.0cm T.L. The maximum and minimum size of NW European records was as follows: 70.0-170.0cm T.L. (N=19) and 15.0-76.3kg (N=13). The length-weight relationship of the NW European records is shown in Figure 2 (N=9).

The louvar represents an interesting example of a species which was hitherto regarded as rare but was subsequently discovered to be probably not infrequent when new fishing methods, species and locations were developed.

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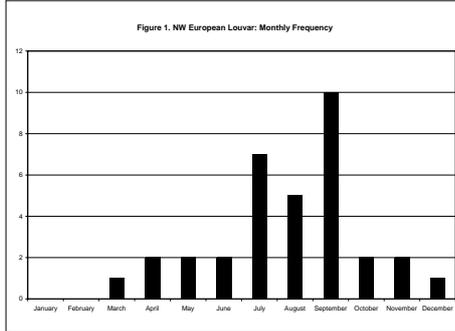


Figure 1. NW European Louvar: Monthly Frequency

and toothless. The tail fin is strong with high lobes. A small keel is present at the base of each lobe and a large fleshy keel on either the side of the tail. The back is metallic blue, the sides pink-red

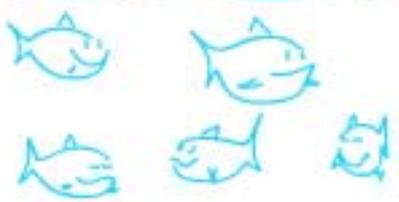
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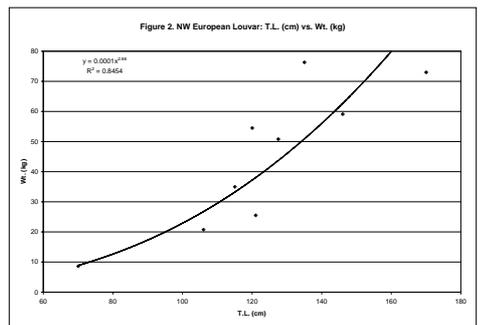


Figure 2. NW European Louvar: T.L. (cm) vs. Wt. (kg)

Office of Environmental Enforcement

By John Feehan



THE Office of Environmental Enforcement is a new Office within the EPA dedicated to the implementation and enforcement of environmental legislation in Ireland.

The core objectives of the Office of Environmental Enforcement are to bring about improved compliance with environmental legislation in Ireland and to ensure that those who flout environmental law and cause environmental pollution as a result of their actions are held to account.

The Office of Environmental Enforcement delivers enhanced enforcement in two ways. It is directly responsible for enforcing EPA licences issued to waste, industrial and other activities. It also supervises the environmental protection activities of local authorities, through auditing their performance, providing advice and guidance, and, in appropriate cases, giving binding directions. In this regard, the Office of Environmental Enforcement is a resource for members of the public who have exhausted all other avenues of complaint.

The EPA and local authorities have engaged in a significant level of environmental enforcement over the years. It is clear, nonetheless, that further impetus must be given to protecting Ireland's environment through enhanced enforcement.

Accordingly, an Office of Environmental Enforcement has been established as a distinct and dedicated unit of the EPA. This gives the necessary extra focus on enforcement, while at the same time allowing the Office of Environmental Enforcement to avail of, and build on, the EPA's wide experience and legislative powers (including enhanced powers provided for in the Protection of the Environment Act 2003).

Priorities of the Office

Initial priorities are:

- Achieve enhanced implementation and enforcement of IPPC and waste licences, building on the significant progress to date;
- Tackle, in cooperation with local authorities, the problems of illegal waste movement and unauthorised disposal;
- Establish and implement a system for auditing and reporting on local authority environmental protection performance, including:
 - * enforcement in respect of breaches of waste permits,
 - * taking action in relation to illegal dumping,
 - * implementation of waste collection permits, and,
 - * enforcement of producer responsibility initiatives (for example, in the area of packaging waste);
- Improve management of urban waste water treatment plants;
- Review the implementation by local authorities of the waste permitting system in relation to the control of waste management facilities;
- Develop in co-operation with the local authorities, a consistent approach to enforcement of environmental protection legislation;
- Provide clear guidance and support to members of the public on what to do and who to contact if they wish to report incidents of environmental pollution and failure to enforce environmental legislation;
- Develop and coordinate an enforcement network of public bodies and other organisations involved in environmental

enforcement;
 • Promote implementation by local authorities of the EU Recommendation on Minimum Criteria for Environmental Inspections.

Local authorities and other public agencies have a range of significant environmental protection functions and continue to have responsibility for enforcement in this regard.

While the Office of Environmental Enforcement is not intended to be a one-stop-shop for all issues of environmental enforcement, it has a specific role in coordinating national efforts to improve the level of compliance with environmental law and the enforcement of environmental legislation. It also has a major role, as set out above, in supervising local authority environmental performance.

In these ways, the Office of Environmental Enforcement aims to focus greater attention on the need for better enforcement of environmental protection legislation by all public bodies with enforcement responsibilities.

Interaction with other public bodies

The Office of Environmental Enforcement will build on the EPA's existing relationship with local authorities. On the one hand, the Office of Environmental Enforcement will be working with local authorities to bring about an overall improvement in the level and consistency of enforcement of environmental protection legislation in Ireland. On the other hand, the Office of Environmental Enforcement will be auditing the performance of local authorities in relation to their enforcement of such legislation. This may extend to giving specific directions to local authorities when considered necessary - and to prosecution should such directions not be complied with.

The Office of Environmental Enforcement will also work, as appropriate, with the National Bureau of Criminal Investigation, the Criminal Assets Bureau, the Office of the Director of Corporate Enforcement and other public sector bodies involved in enforcement activities.

The Office of Environmental Enforcement has established an enforcement network involving the various public bodies with enforcement responsibilities. In a further stage of its development, the Office of Environmental Enforcement will also monitor compliance by public authorities with their environmental enforcement obligations.

Structure of the Office

The Office of Environmental Enforcement is based in the EPA Headquarters in Wexford with enforcement teams in Dublin, Cork and Castlebar and is assisted by the experience and knowledge of the EPA laboratories and field staff located in Dublin, Castlebar, Cork, Kilkenny, Mallow, Monaghan, Athlone, Letterkenny and Limerick.

Contacting the Office

You can contact the Office of Environmental Enforcement during normal business hours at the following EPA Offices - Wexford, Dublin, Castlebar and Cork. Contact details are provided below:

- Office of Environmental Enforcement, South East Region - Tel: 053-60600 / Lo-Call: 1890 335599 Fax: 053-60699
- Office of Environmental Enforcement, East/North East Region - Tel: 01-2680100 Fax: 01-2680199

- Office of Environmental Enforcement, South/South West Region - Tel: 021-487 5540 Fax: 021-4875545

- Office of Environmental Enforcement, West/North West Region - Tel: 094-9021588 Fax: 094-9021934

You can also email the Office of Environmental Enforcement at - Office of Environmental oee@epa.ie

If you wish to contact the Office of Environmental Enforcement outside of normal business hours, telephone - 053 60600 or the LoCall number - 1890 335599.

When to contact the Office

Pollution incidents should be reported in the first instance to the local authority in whose area the incident occurred. If the incident concerns a facility that holds an EPA licence you should also report the incident directly to the nearest Office of Environmental Enforcement regional office. Standard complaint forms and registers listing all EPA licence holders are available on the EPA website at www.epa.ie.

If you have a query or complaint about general environmental pollution matters or about facilities under the control of local authorities, you should contact the relevant local authority in the first instance - preferably in writing where the matter is not urgent. It is good practice to keep a record of any correspondence or contact to facilitate any necessary follow up.

If a local authority fails to respond to your complaint and the environmental pollution problem persists, you should then contact the Office of Environmental Enforcement, which



Photo © EPA

will investigate your complaint. Copies of all correspondence between yourself and the local authority should be submitted along with details of your complaint. Standard forms for submission of complaints to the Office of Environmental Enforcement are available on the EPA website at www.epa.ie. To achieve maximum effectiveness, the Office of Environmental Enforcement will, as a general rule, focus on priority issues and the investigation of serious cases of environmental pollution.

Documents submitted to the Office of Environmental Enforcement are subject to the provisions of the Freedom of Information Act, 1997.

John Feehan is an Inspector in the Office of Environmental Enforcement, Inniscarra, Co Cork. www.epa.ie



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Publications of Interest



Mayday! Mayday! Heroic Air-Sea Rescues in Irish Waters

By Lorna Siggins

Gill & Macmillan Ltd
www.gillmacmillan.ie

ISBN: 0 7171 3529 2

Price: €12.99/2004

This book is about the bravest of the brave. Those pilots and crews that carry out air sea rescues in Irish Waters. One pilot Barry McMahon, when he undertook his first mission in 1963 off the Connemara coast, some 160 miles away from base on the east coast, said: "When I think of it now, we really were rookies, and I suppose I was a bit bloody mad to be taking that mission on". One has to wonder do the same thoughts pass through all air rescue crews when they take off in appalling weather conditions, heading out into the dark Atlantic to find some vessel in distress. Chapter after chapter gives nerve-racking descriptions of sea rescues from the very first days of the Irish Sea rescue services to the present day. Lorna Siggins has done these brave people proud in this book. An unforgettable read!

A Place Near Heaven A Year in West Cork

By Damien Enright

Gill & Macmillan Publishers
www.gillmacmillan.ie

ISBN: 0 7171 3689 2

Price: €12.99/2004

This book is the story of a calendar year of the natural world in West Cork. Told month by month, the author has a wonderful way of describing nature and the happenings he sees around him. It begins in January with the rare event of snow in Courtmacsherry, moving on to storms at sea and wildlife spectacles such as seals, birds, sprat and otters. February brings ravens nests, the first swallow, rain and floods, bonfires and sunsets. March has the long evening walks and includes the destruction of hedgerows. The summer months, with the climate of paradise, the Japanese hurler and horse races on the strand. Autumn, with the Irish travellers, women catching the biggest salmon and a story-telling weekend. Ending with winter tales and St. Stephen's Day goodwill. A wonderful read.

Deer of Britain and Ireland Their origins and distribution

By Peter Carne

Merlin Unwin Books
www.countrybooksdirect.com

ISBN: 1 84037 091 2

Price: €39.95/2000

There can be few animal groups with as complex a history in terms of distribution and numbers as the deer of these islands. This impressive work, the culmination of sixty years of study, charts the fortunes of the six species through twelve regions, dealing with both native and naturalised populations. Their social

and economic importance is such that their numbers have been carefully documented over the centuries, allowing the author to give a detailed account of every herd. The accompanying photographs complete the picture to give us a book that will appeal to all with an interest in the structure of our countryside.

Devil in the Mountain A search for the origin of the Andes

By Simon Lamb

Princeton University Press

ISBN N 0 691 11596 6

Price: €19.95/2004/335pp

In 1989, Oxford geologist, Simon Lamb began more than ten years' association with the Bolivian Andes. In this fascinating summary of his travels and researches, he looks at theories of mountain building and describes the difficulties of working at high altitude in remote regions. The core of the book deals with the search for the strands of evidence that gradually leads to a coherent theory explaining the height, location and distinctive shape of the Andes. The final section is more speculative, suggesting that the Earth might be considered as an organic whole, in which climate is a factor in the growth and decay of mountains.

Throughout, the author writes with humour and a light touch, and displays a rare ability to explain scientific ideas concisely, yet with great clarity. Each chapter is subdivided into shorter sections, and many end with anecdotes that could stand alone as excellent travel essays.

Devil in the Mountains should do for plate tectonics and the Andes what S. J. Gould's classic *Wonderful Life* did for palaeontology and the Burgess Shales.

Guidelines for Management Planning of Protected Areas

World Commission on Protected Areas (WCPA)

By Lee Thomas

& Julie Middleton

Best Practice Protected Area
Guidelines Series No.10

ISBN: 2-8317-0673-4

Price: €15.00 stg/2003

Management of our parks and reserves continues to reach new levels of complexity. Without this timely and substantial rethinking of past management planning processes a steep uphill struggle would have surely ensued. The values of integrating objectives with local people and stakeholders as well as the values of the people themselves are highlighted herein. At the same time protected area management moves towards longer term and broader strategies with networked regional, national and international systems as goals.

The presentation and clarity of these guidelines is an inspiration and we must hope that the management plans that emerge from it are as objective, encompassing and concise.

Medicinal Plant Conservation Bibliography (Vol 2)

By Uwe Schippmann

IUCN Publications Services
www.iucn.org/bookstore

ISBN: 1433-304x

€10.00 stg/2001

One of the major impediments to the advancement of medicinal plant conservation is the difficulty of accessing and analysing the relevant literature. The bulk of them relate to pharmacology and medicinal properties or to classical ethnobotanical research. Regrettably, information on distribution, life history, biology, population status, levels of extraction and trade, or resource management of the taxa is scarce. Therefore, information urgently needed for setting plant conservation priorities is rare and scattered.

This second volume contains 801 references, 170 of which are accompanied by a review text. A breakdown of the data on countries concerned shows a dominance of India (116 references), followed by USA (46), China (25), South Africa (25), Nepal (24) and Madagascar (20). An essential resource for the botanist interested in medicinal plants.

Field Guide to Bird Nests and Eggs of Alaska's Coastal Tundra

By Timothy D. Bowman

Alaska Sea Grant College
Program

www.uaf.edu/seagrant

ISBN: 1-56612-085-3

Price: \$25.00/2004

This well designed book has been produced specifically for field-workers, and would be a handy tool for anyone planning a birding trip to America's northwest. Under the 70 species headings, we are given a brief but useful description of bird and nest along with an excellent series of photos showing adult bird, situation of nest, clutch and close-up of eggs. For those of us in Europe, the section on shorebirds is particularly tantalising, and must be worth the price of admission alone.

Close Up on Insects A Photographers Guide

By Robert Thompson

The Guild of Master Craftsmen
Publications

www.thegmcgroup.com

ISBN: 1 86108 238 X

Price: £26.96/2003

Filled with the stunningly beautiful and striking photographs of dragonflies, butterflies and moths that we have come to expect from Thompson this book is a delightful, visual feast. Distracting as the photographs are, the text is also of the same exceptional quality in this all encompassing and thorough guide to close up photography.

In three parts, the first delivers detailed, comprehensive informa-

tion on camera systems, films, flashes, accessories, exposure, magnification and composition as well as field operating ideas and a guide to photographing abroad. In part two, Thompson couples the photographer with the naturalist to give tips and hints on finding and photographing various insect groups with very informative ecological notes on each. For those with a love of the natural world and aspiring photographers alike this is certainly a book to covet.

Dear Jim Reflections on the Beauty of Angling

By Alexander Schwab

Merlin Unwin Books
www.countrybooksdirect.com

ISBN: 1873674791

Price: £20.00/2004

Schwab has looked into the infinite depths of angling and revealed with unique and often moving clarity much of what there are not words to describe. The scope of this book is so wide and yet precise it would comfortably fit under many of the categories in any bookstore. Fresh and timeless poetry and stimulating black and white photographs add greater levels of emotion to the text. But behind what is a relaxing, educational, thought provoking and beautifully crafted book lie issues of supreme importance that we should all address at this point in time. 'There is more to fishing than catching fish'.

Cycle Touring Ireland

By Brendan Walsh

Gill & Macmillan Publishers

www.gillmacmillan.ie

ISBN 0-7171-3395-8

Price: €9.99/2004

If Ireland is to look towards a sustainable future its inhabitants are going to have to give the environment a break. 'Greener' holidays are a step in that direction and the new and updated edition of Brendan Walsh's *Cycle Touring Ireland* could be just the ticket. A 'Grand Tour' is split up into comfortable daily stages, each with its own map and refreshment stop. With routes as stunning as the Healy pass (Day 10) even the most intrepid cyclists should be satisfied. As essential as a puncture repair kit (also recommended)

Field Guide to the Moths of Great Britain & Ireland

By Paul Waring
& Martin Townsend

Illustrated by Richard Lewington
British Wildlife Publishing
enquires@britishwildlife.com

ISBN: 0 9531399 1 3

Price: £29.95 stg/2003

Ideal for both beginners and experts alike this beautifully formatted and long awaited guide book is, without question an essential purchase for anyone with an interest in moths. Beginning with a

straightforward and thorough introduction the guide moves through the various families with numerous excellent photographs of larvae. Each larger (macro) moth species known to have occurred in Ireland and Great Britain is fully described with comprehensive texts that, when coupled with Lewington's superbly detailed, full size artworks, leave little excuse for misidentification except poor eyesight.

Most importantly this compact guide is unique for its illustrations of moths in their natural resting posture allowing much easier identification and setting the guide apart in a new league of its own creation.

Birds, Scythes & Combines A history of birds and agricultural change

By Michael Shrubbs

Cambridge University Press

ISBN: 0 521 81463 4

Price: €35.00 stg/2003

Many will be aware of the lamentable state of farmland bird populations in Ireland & the UK, much of it brought about by changes in farming methods. Here is a well documented and readable account of the course of agriculture in Britain since 1750, and the associated effects on 99 species of farmland birds. This is an essential purchase for the serious ornithologist, and, with species such as Corncrake and Corn Bunting experiencing not so localised extinctions, and Skylark and Yellowhammer, to name but two, in sharp decline, perhaps we should all read this book and take stock of what is happening in the fields around us.

Living Landscapes: Heathland

By James Parry

The National Trust
www.nationaltrust.org.uk

ISBN: 0 7078 0348 9

Price: €18.99 stg/2003

In the third edition of the National Trust 'Living Landscapes' series James Parry examines the biological wealth of heathland habitats and the conundrum of their existence. Parry's illustrative text, complemented at every turn by outstanding photography and artwork, discusses the origins of heathland, revealing the intimate relationship with man that preserved and, now, threatens its existence. The final chapters turn to the natural wonders and conservation and restoration of heaths, undoubtedly rousing all readers to the social and scientific treasures of this landscape.

Moths

By Michael Majerus

New Naturalist Library

Harper Collins

ISBN: 000 220142 9

Price: €19.99 stg/2002

This book covers all aspects of moths, from their reproduction and

life histories to their behaviour, conservation, evolution and ecology in clear and simplistic detail. Bringing together much of the research since E.B. Fords *New Naturalist Moths* (first published in 1955) Majerus has undoubtedly produced a definitive text.

Chapters are well titled and full of interesting facts and case studies which make this text a gripping read whether moth enthusiast or not. Particularly interesting are the chapters on evolution and melanism with remarkably comprehensive explanations of complex topics. In all an excellent and timely book which almost makes the butterfly look boring.

Lakeland

By David Ratcliffe

New Naturalist Library

Harper Collins

ISBN: 000 711304 8

Price: €19.99 stg/2002

Expanding on a previous volume focusing on the Lake District, Ratcliffe has produced another outstanding edition to the *New Naturalist* series. From salt marsh to the limestone foothills, the comprehensive treatments of Lakeland habitats demonstrates the affinity and knowledge the author has developed since his school days. Starting from geological and landscape processes Ratcliffe offers the reader a consummate understanding of the determinates of the Cumbrian biota in its numerous habitats, leading to an insightful discussion of how we threaten and may preserve this natural treasure.

Seashore

By Peter J. Hayward

New Naturalist Library

Harper Collins

ISBN: 000 220031 7

Price: €25.00 stg/2004

Much more than a simple identification guide, Peter Hayward's *Seashore* is an in-depth portrayal of the how and why of the seashore. How seashore organisms have adapted to the unique and extreme physical and chemical conditions found in the intertidal zone and why these species behave and interact as they do. His detailed descriptions and explanations are illustrated by exquisite drawings and photographs. Also included is a thought provoking yet positive section on the impact of human activity on this complex system. A worthy addition to the *Collins New Naturalist Series*, the *Seashore* is ideal, to use the author's own words, "for the entertainment of the informed enthusiast".

The Water Crisis in the Kibera Slum

By Rosie Solbé

WE in Britain and Ireland often have more water than we know what to do with and we take access to safe water rather for granted, even using water of drinking-quality to flush the lavatory. But more than one billion people in the developing world do not have access to safe drinking water and the greatest health risk to children in the world is contaminated water. Every year between 2 and 3 million children die of diseases caught from dirty water and probably as many adults too. One group of adults who are particularly at risk are those with HIV virus or AIDS, whose immune systems are damaged and incapable of dealing with infections.

Kibera is a shanty-town on the edge of Nairobi. The township has between 700,000 and 1,000,000 inhabitants and a population density of more than 100,000 people in each square kilometre. It is the largest slum in Africa south of the Sahara desert and many of the inhabitants suffer from HIV/AIDS. The slum is an illegal settlement and even though the land belongs to the Nairobi City Council there are ancient, stinking latrines, open sewers, practically no proper drains and no rubbish collection. Roads and pathways have faeces and rubbish littering them throughout the slum. In such conditions water is highly likely to become contaminated by human sewage or from waste from domestic animals and diseases such as malaria and typhoid are common.

Water from the city reservoir is chlorinated at source and piped into Kibera to public taps, but these water sources are owned by residents in the city and are a lucrative source of income as water is sold to the inhabitants of Kibera at very high prices - about 300 times the average cost of tap-water in Britain.¹ Bottled water, where even the least expensive costs



Kibera slum, Nairobi: No water is piped directly to the slum houses, instead water has to be collected in any container which is available.

about ten times as much again, is out of the question. No water is piped directly to the slum houses, instead water has to be collected in any container which is available. The water is stored in the houses in these containers and almost inevitably becomes contaminated, even if it was clean when it was collected. Water is taken from the storage containers by dipping into it with a cup or cooking pot. Any bacteria on the container will contaminate the stored water. Chronic diarrhoea is a major problem for people with HIV/AIDS and if they dip into the water and faecal bacteria on their hands come in contact with the water in the container, the water is even more likely to be contaminated. Also, water is often in too short supply to be used for hand-washing after visiting the lavatory. Boiling drinking water is often not an option as charcoal or firewood are expensive and the people in the slum



Kibera slum, Nairobi.

live below the poverty line. Even where households can afford to boil the water, it easily becomes re-contaminated during storage in the house. Provision of such simple items as water containers with a narrow opening through which to fill them and a tap to remove water for use, would help relieve this problem. In a recent sample programme of the water in homes in Kibera slum less than 20% were found to be of good quality, 60% were "unacceptable"

"Every year between 2 and 3 million children die of diseases caught from dirty water and probably as many adults too."

and nearly 30 % were grossly polluted. Even "acceptable" water had some faecal contamination - which would render it unacceptable to most people in Britain and Ireland. Removing small samples of water from homes for analysis means removing some of a precious and expensive commodity, so frequent sampling is avoided.

People begin the day in the early hours of the morning queuing for

to go to school - too much of their day is spent trying to get enough of the essential commodity, water. These are the very people who need to be educated, so they understand the need for the proper sterilising and storage of their water supplies if things are to improve in the future. Once collected the water has to be carried home. In Britain and Ireland each person uses, on average, 120 litres each day. Even 20 litres would weigh 20 kg - almost 50 lb - a large weight for a probably undernourished girl to have to carry any distance; and that volume would have to suffice for the whole family.

Work is being done to improve matters but improvements are slow and cost money. The Intermediate Technology Development Group (ITDG) began to build modern toilets in February 2004 but the sewage cannot be allowed to flow into the already over-loaded sewers. Instead the waste is being 'digested' to produce methane and this not only saves precious water but also releases gas which can be used for cooking and for boiling and sterilising contaminated water. In the first phase, three pilot blocks of toilets will be built which will serve the needs of 300 people but many more such blocks would be needed to serve the whole population. The blocks are also planned to house bathrooms for both sexes, washing places for clothes and utensils and a kiosk where clean water can be bought at a reasonable price. In order to ensure that the lavatories are kept clean and wholesome, a meeting room will be built on the floor above them - nobody would want to gather in a meeting room above smelly toilets and the hope is that this will ensure that they are kept clean.

The use of drugs to treat AIDS is undermined by lack of basic facilities such as sterilising and storing water but work is also being done to provide vacuum flasks in which to store sterilised water to prevent re-contamination. These plans are for the future and only time will tell whether they are realistic or not.

Life without water is impossible - and given only minimal supplies of this essential commodity human beings cannot live life to the full. So next time it rains when you really want dry sunny weather remember those for whom such water would be a luxury! Truly, blessings rain on us in the "first world".

¹ Kibera 1.5p stg per litre; UK tapwater 005p stg per litre; Cheapest bottled water 17p stg per litre; Most expensive bottled water 113p stg per litre.

Dr. Rosie Solbé, St Asaph, Denbighshire, UK.



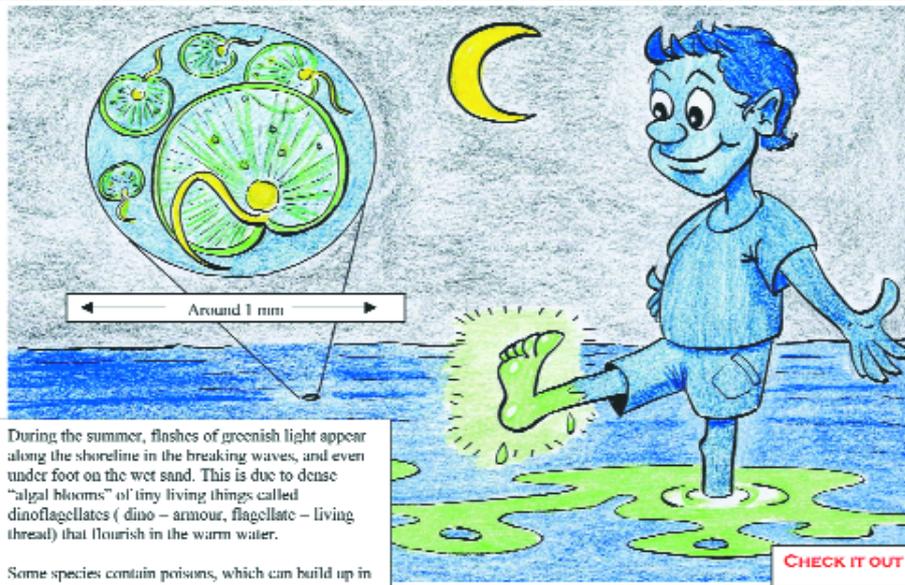
...The Project Delivery People






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Algal blooms and living light . . .



During the summer, flashes of greenish light appear along the shoreline in the breaking waves, and even under foot on the wet sand. This is due to dense "algal blooms" of tiny living things called dinoflagellates (dino – armour, flagellate – living thread) that flourish in the warm water.

Some species contain poisons, which can build up in filter-feeding shellfish, making them unsafe to eat. Others, like *Noctiluca scintillans* are completely harmless, unless their numbers are so dense that they take all the oxygen out of the water.

The greenish light comes from species like *Noctiluca*, which produce two special chemicals which, when mixed together, glow in the dark. Nobody really knows why these chemicals are produced. Some scientists think it is a defence mechanism that makes any animal eating *Noctiluca* glow in the dark also – making them an easy target for other predators.



Stop Press

While *Noctiluca* is harmless to humans, some other species of algal bloom are toxic and can cause severe food poisoning from shellfish, such as oysters, scallops and mussels that have been exposed.

The Marine Institute regularly tests both the shellfish and the waters they come from for the presence of any poisonous algal blooms and sends text messages to shellfish producers to warn them of the danger. They also maintain a "Harmful Algal Blooms Database" of all recorded blooms.

CHECK IT OUT AT: WWW.MARINE.IE

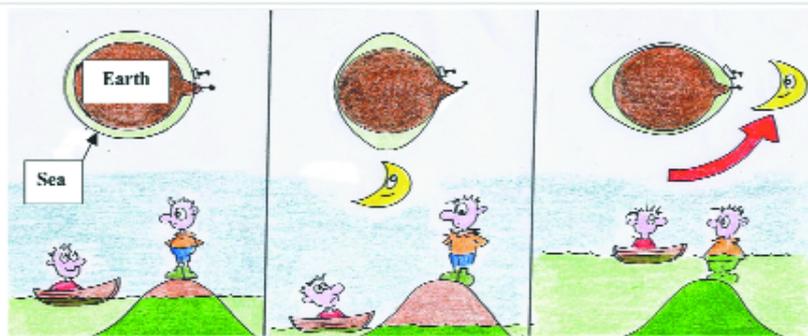
Captain Cockle's Log



Welcome aboard shipmates! Together, we'll be taking a look at the world's greatest natural resource -- the sea!

Words & pictures by John Joyce
www.cockle.com © John Joyce 2004

Why the tide comes in . . .



Tidal Power

In France, where the tides are very high and very low, there is enough power in the moving water to power a turbine and generate electricity.

At La Rance, a huge dam has been built across the tide which forces the incoming and outgoing tides through a turbine, which in turn, powers a generator giving up to 240 Megawatts of power.

No Tide

If there were no moon and no sun, the only force acting on the oceans would be the gravity of the earth.

The sea would cover the earth in a completely even coating – like the chocolate around a Malteser sweet – and there would be no high or low tides . . .

The two people in the picture, on the rock and in the boat, would always be at the same levels.

Low Tide

But because the moon is such a huge lump of rock, it has a gravity of its own, which pulls on the earth like a huge magnet.

This pulls the sea up into a bulge beneath it and also makes a bulge on the other side of the earth.

This pulls the water away from where our people are, making the boat lower than the rock.

High Tide

Then, as the moon rotates around the earth, the bulge of water moves to where our two people are and the boat rises above the rock.

High tides occur every 12 hours and twenty-five minutes, because the moon takes 24 hours and fifty minutes to completely circle the earth.

Spring tides – very low and very high tides – happen when the sun and the moon are pulling in the same direction.



Super - Crab !

The biggest crab in the world is the Japanese Spider Crab (*Macrocheira kaempferi*). It lives on the bottom of the North Pacific Ocean and has a 3.7 m (12 feet) leg span.



Check out these cool websites:

Noctiluca scintillans and algal blooms: <http://members.fortunecity.com/ancmaw/noctiluca.htm>

<http://thalassa.gso.uri.edu/Esphyto/list/taxa/nocscin/nocscint.htm>

Tides and Tidal Power: <http://www.sfigate.com/getoutside/1996/jun/tides.html>

<http://csep10.phys.utk.edu/astr161/lect/time/tides.html>

Giant Crabs: http://www.foundationtv.co.uk/brilliantcreatures/ser4/show8item6_print.html

The Beach and Shore Environment

By Declan Murphy

FOR many of us a trip to the beach means a day out or a holiday. Invariably, beaches are sunny, and fun places to visit. However they can be a bleak hostile environment during the winter months with little shelter from the weather and food can be hidden deep in the sand. Despite this, many species of bird have adapted to this environment and many thousands flock to Irish shores to spend the winter months on our beaches and estuaries.

At first glance all the different birds seem to be feeding together for the same food, but this is not the case. All shorebirds, or waders as they are often called, have different length bills and so feed on different parts of the shore. Small birds such as Ringed Plover have short bills and feed on the surface, catching sand hoppers and other creatures which live under pebbles and bits of seaweed. Other small waders with longer bills, such as Dunlin, feed with the Ringed Plover but can probe deeper with their long bills. Medium sized waders such as Redshank can wade into deeper water and also have longer bills so they can feed where the smaller birds cannot. Finally the large waders such as Godwits can feed in quite deep water and probe very deeply in the sand and so find food far beneath the reach of the others. So although it appears like a big feeding frenzy, with all the birds going after the same food, it's actually quite organised with plenty of food for everyone and no need for fighting.

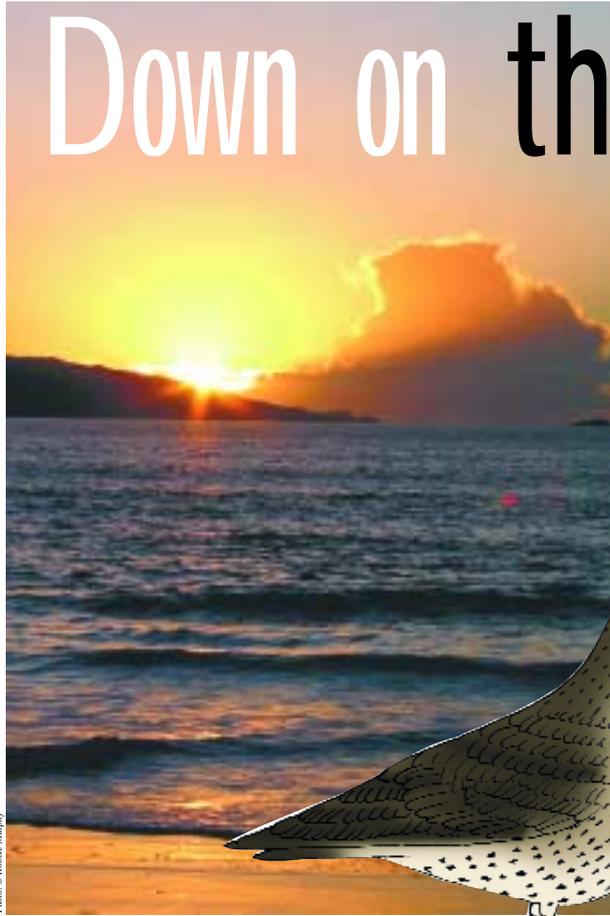


Photo © Robbie Murphy

Down on the Beach

The Curlew

Our largest wader, the Curlew is a common sight on our shores, and its 'coor-lee' can often be heard through the winter months on our estuaries and mudflats. Its long curved bill is the longest of any Irish wader, making it easy to recognise. Its plumage is grey-brown above and whiter below, with much dark brown streaking. When seen in flight they have a distinctive white rump. They also have long blue-grey legs.

Like the Oystercatcher, many of the Curlews we see are from northern breeding grounds. However a small number do breed in Ireland but there are fewer every year as their moorland breeding habitat is cut away or reclaimed.

Curlews can be seen on our beaches most months of the year but their numbers are greatest in winter. With its very long bill, the Curlew can reach worms and other creatures far beyond the reach of other shorebirds such as Oystercatchers or Redshanks. Most worms' burrows are in the shape of the letter U, and the Curlew's bill is designed to fit into these burrows. Even the deepest burrows aren't out of reach for this bird! Its long legs enable it to feed in deeper water than other birds as well. Curlews are usually seen singly or in small groups.

In Ireland the Curlew nests in open moorland and marshes, mostly in the midlands and west of Ireland. Its lovely display flight and evocative call are one of the true delights of a spring morning. It makes its nest in a tussock of grass and lays four large eggs which are greenish or olive-brown in colour, with many dark brown blotches. The first birds return to the coast in late June and can often be heard calling, high up, as they migrate across the country to the coast.

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

BirdWatch Ireland has two educational web sites, catering for learning about birds in schools. Visit the Migration web site to learn about bird migration. Visit the Working with Birds web site to learn about watching and feeding birds. Simply go to www.birdwatchireland.ie and go to the 'learn about birds' section. The following leaflets can be downloaded from the BirdWatch Ireland Website:

☞ Feeding Garden Birds

☞ Gardening for Birds

They are filled with information on foods to put out and plants to grow that will attract birds to your garden. Simply go to www.birdwatchireland.ie and click on 'downloads'. BirdWatch Ireland, Rockingham House, Newcastle, Co. Wicklow
Tel: 01-2819878 Fax: 01-2819763 Email: info@birdwatchireland.org
Website: www.birdwatchireland.ie

Bird Quiz

Despite their name, Oystercatchers don't generally feed on oysters: what do they prefer to eat?

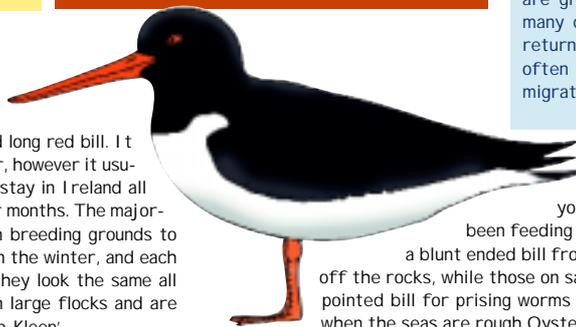
The first five correct answers drawn will each receive a copy of 'The Usborne Spotter's Guide to Birds' Answers on a postcard to 'Sherkin Comment', Sherkin Island Marine Station, Sherkin Island, Co. Cork.

The Oystercatcher

ONE of our most striking shorebirds, the Oystercatcher is easy to recognise with its black and white plumage, pink legs and long red bill. It is a large wader and can often be seen wading in the deeper water, however it usually prefers to feed along the shoreline. Some Oystercatchers stay in Ireland all year round and nest on our beaches during the spring and summer months. The majority however are winter visitors coming from their Scandinavian breeding grounds to spend the colder months with us. The plumage changes slightly in the winter, and each bird develops a small white collar around the neck, otherwise they look the same all year round. Oystercatchers are gregarious birds, often seen in large flocks and are very noisy. The most frequently heard call is a loud ringing 'Kleep-Kleep'

Although called 'oystercatcher' they don't actually feed on oysters. Their preferred food is small shellfish and worms. If you watch them on the beach you will see them probing with their long bill deep into the sand as they search for lugworms and rag worms. The tip of their bill is extremely sensitive and as soon as they touch a worm they pull it out of its sandy burrow and eat it. Often they will take it down to the water's edge to wash it first. They also use their long bill to search for cockles and clams buried deep in the sand.

On rocky shores, their feeding technique is slightly different. Here there are no worms for them to feed on so they feed on shellfish such as Limpets and Periwinkles which they 'hammer' off the rocks with their bill. They also feed on whelks, mussels



and other shellfish. If you look closely at an Oystercatcher's bill you can sometimes tell what they have been feeding upon. Those that feed on shellfish have a blunt ended bill from hitting the hard shells to knock them off the rocks, while those on sandy beaches and mudflats have a finer pointed bill for prising worms from the sand. During stormy weather when the seas are rough Oystercatchers can often be seen away from the shore on playing fields and parks where they search the soil for earthworms, much as a Blackbird does. In the breeding season they will also prey on the eggs of other ground nesting birds, such as Ringed Plover

In the spring many of the Oystercatchers move to their breeding grounds both in Ireland and further North in the Arctic tundra. They nest in a variety of coastal habitats including sandy beaches, pebble beaches, grassy headlands, rocky outcrops and coastal river beds. One pair even attempted to nest between the railway sleepers of a coastal railway line, moving away from the nest each time a train passed. The courtship is a noisy affair with the males strutting around with arched necks, calling loudly.

Seafood Chowder

WITH Dillisk and Carrageen

Want to **get rid of that old vacuum cleaner that's sitting in the press?**

reduce re use recycle

Or your broken-down washing machine?

Now you can dispose of any kind of electrical/electronic equipment in an environmentally sound way! Cork County Council, in partnership with the Environmental Protection Agency and the Clean Technology Centre, is pleased to announce that it will be accepting all waste electric and electronic equipment from private households at the Derrycormell Civic Amenity Site (Schull), Rafteran Civic Amenity Site and Troughal Landfill Civic Amenity Site.

Got a computer that is too old to be worth anything?

"ANYTHING WITH A PLUG OR BATTERY" CAN BE DROPPED OFF AT THE SITE FOR RECYCLING. For example: Washing machines & dishwashers, Telephones, Refrigerators, Cookers & microwaves, Computers, TVs & stereos, Toasters & irons, Toys, Fluorescent light tubes, Batteries etc. All equipment will be recycled by an approved waste management company* CHARGES WILL APPLY

FOR FURTHER INFORMATION PLEASE PHONE:
DERRYCORMELL CIVIC AMENITY SITE ON (028)37048
MAKROOM CIVIC AMENITY SITE ON (028)463721
ROSKINNY (KARRISHTOWN) CIVIC AMENITY SITE 021-4883936
YOUNGAL LANDFILL CIVIC AMENITY SITE ON (028)91084
CORK COUNTY COUNCIL ON (021)4285396
or email to recycle@corkccoco.ie

INGREDIENTS

- 450 g / 1 lb pollock, cod or other white fish fillets – skinned & cubed
- 225 g / 8 oz shellfish – mussels, prawns, etc.
- 110 g / 4 oz salmon – cubed
- 25 g / 1 oz butter
- 55 g / 2 oz streaky bacon – cut into strips
- 1 kilo / 2 lbs mixed vegetables – onion, leek, carrot celery, diced potatoes
- 570 ml / 1 pt water
- 7g / ¼ oz dillisk*
- 7 g / ¼ oz carrageen*
- 570 ml / 1 pt milk
- Salt and freshly milled pepper



Photo: © BIM

GARNISH

Chopped parsley and chives

METHOD

- Cook bacon strips in butter until crisp. Add all vegetables except potatoes.
- Season and cook without colour for 5 minutes.
- Add water, dillisk and carrageen and cook for 10 minutes.
- Add potatoes and milk and simmer until potatoes are soft.
- Add fish and shellfish and cook for 3-5 minutes.
- Check seasoning and serve sprinkled with parsley and chives.



Serves 4. May be served as main course.

FOR VARIETY

- Saffron Chowder** – Add a few strands of saffron and a little cream before final cooking.
- Tomato Chowder** – Add fresh or tinned tomatoes and a dessertspoon of tomato purée to vegetables.
- Green Spinach Chowder** – Add some finely chopped spinach before final cooking.

***DILLISK**

Purple reddish sea vegetable. Has highest iron content of any edible food source and is very rich in protein.

*** CARRAGEEN**

Bushy reddish-purple sea vegetable. Also known as Irish moss. Abundant around the Irish coast. Rich in calcium and other essential vitamins and minerals.

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Something Fishy

Fish have been around for about 500 million years. They were the first animals to have backbones (vertebrates). In the beginning they looked like tadpoles. Freshwater fish live in rivers and lakes while saltwater fish live in the seas and oceans. Some fish such as the salmon and eel can live in both fresh water and salt water.



A vertebrate is an animal with a backbone. Which group of vertebrates is being described in these sentences?
 (fish, amphibians, mammals, reptiles, birds)

They live on water and on land _____

They do not lay eggs _____

They breathe through gills _____

They lay their eggs on land _____

They are the only group with feathers _____

Fish use their gills to breathe by taking in oxygen from the water. Their gills are located on either side of their bodies.

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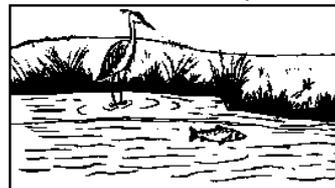
Try this!

Put your hands on each side of your head and pretend they are gills. Open your mouth – close your gills. Close your mouth – open your gills.

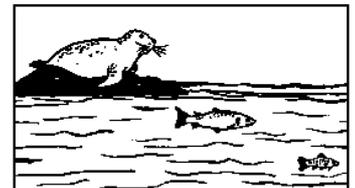


Fish may occupy many levels in the food chain throughout their lives. For example, fish eggs and fry are an important food for other fish, birds and insects. Fish such as salmon are predators. They live on freshwater insects and crustaceans in the river and on small fish and crustaceans such as shrimp in the sea. Salmon also serve as food for other animals such as heron, otter, seals, other fish and humans.

Food chains



Freshwater food chain



Saltwater food chain

Sort out these words and put them in the correct sentences.

btvrseeat _____ lgls _____

cslea _____ ecgaalmfou _____

rewrfshta _____ rodpetrsa _____

Many animals use _____ to hide from _____

Fish breathe through their _____

An animal with a backbone is called a _____

You can tell the age of a scaly fish by looking at its _____

Salmon can survive in both salt water and _____



Design a fishing game

"Go Fishing"

You will need:

A large box, thin card, scissor and ruler, glue, blue paint, sticky tape, felt pens, string, paper clips

Method:

1. Mark a line 5 cm from the end on your box. Cut along this line. You now have a shallow lake. Paint your lake blue.
2. Draw some fish, starfish and shells on thin card. Cut them out and decorate with felt pens. Make plenty.
3. Fold up a section of each paper clip and attach it with sticky tape to the mouth of each fish. Attach a clip to each shell and starfish in the same way.
4. To make rods: Tie a piece of string to one end of each stick. Now tie a paper clip to the end of each piece of string. Open the paper clips and shape them into hooks. Now you are ready to fish.

Try these variations of the game.

Give each fish a weight value – adding the values at the end of the game to see which "catch" is worth the most.

Write a fishy question on each fish. The person who catches the fish must answer the question to retain the fish – otherwise it is returned to the lake.



Here are some suggestions.

- Get one-to-one lessons from an angler. This is the best way to learn!
- Contact your Regional Fisheries Board for advice.
- Join an angling club.
- Make enquiries at a local fishing tackle shop.
- Invite a local angler in to the class to talk about his/her hobby.
- There are many good books and videos available on this topic.

Safety First!

Safety is very important when fishing. All bodies of water can be dangerous. Simple precautions taken by anglers can help to avoid accidents.

Have a go at drawing up a list of safety rules for anglers. The first one is done for you.

1. Check weather forecast to make sure conditions are safe for fishing.
2. _____
3. _____
4. _____



Earning a Bronze Award

GAI SCE is the national challenge award from the President of Ireland to youngsters of 15-25 years. Earning the award means setting a demanding challenge, sticking with it and achieving it. Participants in Gaisce are assisted and encouraged by their award leader.



Bronze Award Recipient: Paudie O'Sullivan

Paudie O'Sullivan, Farnfore, Co. Kerry attends The School of the Divine Child, Cork. Last September he took on the challenge of the Bronze Award.

In the section on Community Involvement he undertook to run the school shop for the year.

Under the heading of Personal Skill, Paudie concentrated on improving his computer skills. In doing this, he put together the booklet copied in this

paper which showed his work. The book including scanned photos was forwarded to the President Awards Committee.

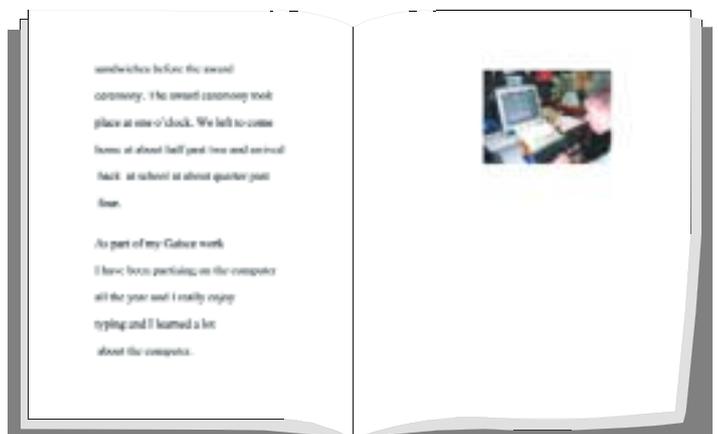
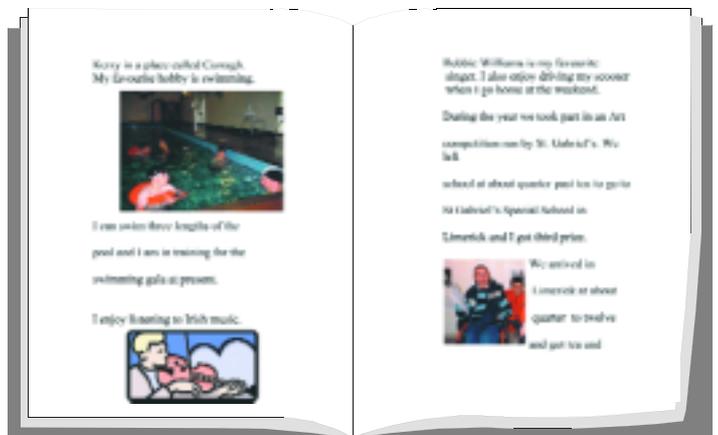
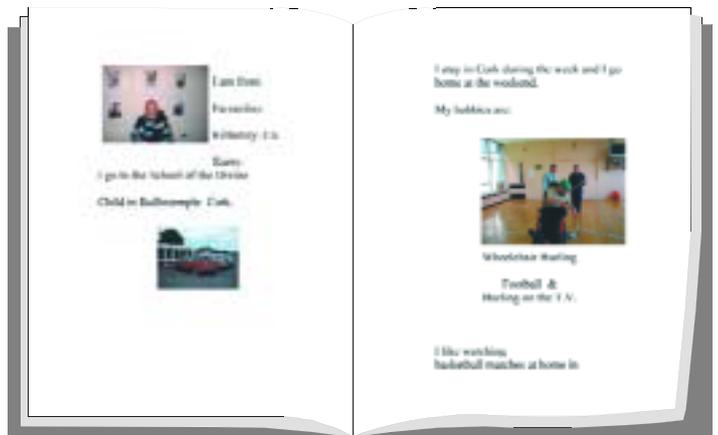
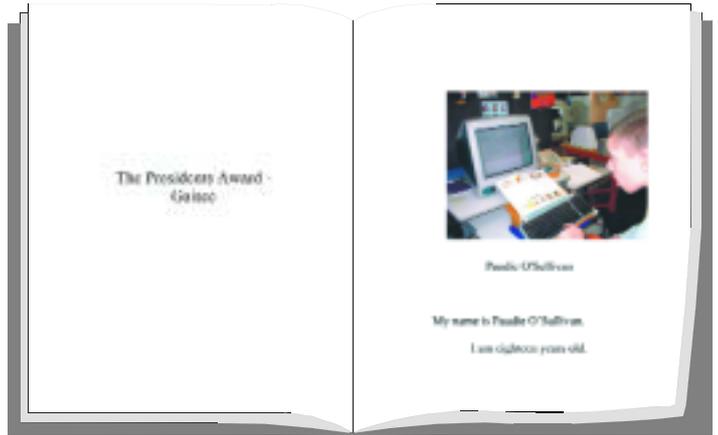
As a challenge to his Physical Skills, Paudie opted for weekly swimming. He improved so much in this area that he won medals at the year end gala beating strong opposition and winning timed events.

The adventure section saw him attend the Not-

tingham School of Sport and several other extra curricular events.

These were wonderful achievements for Paudie and are all the more special when you remember that Paudie is wheelchair bound and has a visual impairment. His family, school and pals are extremely proud of his efforts. He earned a Bronze Award for his achievements.

Catherine O'Leary, Home Economics Teacher and President Award Leader. For further information about the awards contact Mr. John Murphy, Chief Executive, The President's Award - Gaisce, Dublin Castle, Dublin 2. Tel: 01-4758746 Email: p-award.net or Website: www.p-award.net



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CORK CITY COUNCIL COMHAIRLE CATHRACH CHORCAÍ

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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 from Storm Force headquarters.

To join just send your name and address, with a cheque/P.O. for €7.50 to:
Storm Force HQ, RNLI,
15 Windsor Terrace, Dun Laoghaire,
Co. Dublin.
Tel: (01) 2845050 Fax: (01) 2845052
Email: info@rnli.org.uk
Web: www.rnli.org.uk

Ready for Action!

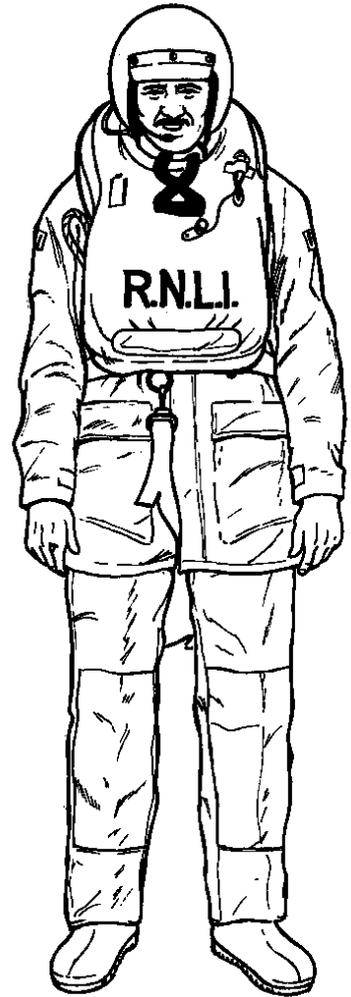
THE lifeboatmen and women are volunteers who, in addition to their everyday jobs, are ready to exchange leisure, comfort and sleep for cold, wet and fatigue in a range of situations that will test their skills, strength and nerves.

Lifeboat crews need lightweight and comfortable clothing that keeps them warm and dry. Jackets and trousers have been specially designed for the job. Many materials were tested to make sure that the clothes do the job.

Imagine standing around an outdoor swimming pool for three hours in the cold, pouring rain at night and in the dark. You are then thrown in the pool and you spend 35 minutes alone in icy, dark water.

This is what it was like for Robbie Maiden in February 1993 when he was called out to a rescue. He was on board Hartlepool's lifeboat, *The Scout*, for three hours on standby duty to a tanker. The lifeboat capsized twice and he was washed overboard by a large wave and spent the next 35 minutes in the water, before being rescued.

Here, for you to colour in, is a picture of what every lifeboat crew member wears when answering a call.



Harvesting the Sea's Renewable Resources



Generating investment, employment and market opportunities in the fishing and aquaculture industry

An Bórd Iascaigh Mhara, The Irish Sea Fisheries Board,
Crofton Road, Dun Laoghaire, Co. Dublin, Ireland.
Tel 01 284 1544. Fax 01 284 1123.
Email info@bim.ie Website www.bim.ie



Water Pollution

WHEN the astronaut Neil Armstrong looked at the earth from the moon, it looked all blue! This is because water covers more than two-third of the earth's surface. But fresh water represents less than 0.5% of the total water on the earth's surface. The rest of the water is either in the form of seawater or locked up in icecaps or soil. This is why we often hear of many areas

of the earth having water scarcity.

Worldwide, the consumption of water is doubling every 20 years – more than twice the rate of increase in population.

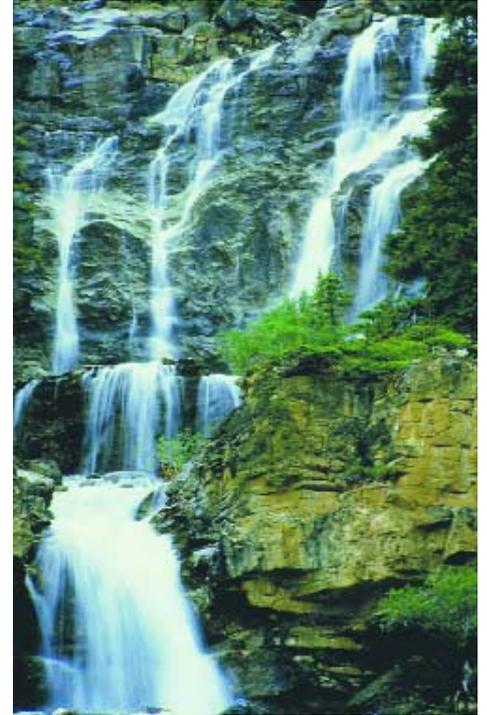
Water covers over 75% of the Earth's surface, it is without doubt the most valuable of all the Earth's natural resources. Without it there would be no life on earth: it is essential for everything and

everyone on our planet to grow and prosper. Even though we as humans recognise this fact, we disregard it by polluting our rivers, lakes, and oceans.

We are slowly but surely harming our planet to the point where organisms are dying at a very alarming rate. In addition to innocent organisms dying off, our drinking water has become greatly affected, as is

our ability to use water for recreational purposes.

In order to combat water pollution, we must understand the problems and become part of the solution. Many causes of pollution include contamination from sewage and fertilizers contain nutrients such as nitrates and phosphates. In excessive concentrations, nutrients over-stimulate the growth of aquatic plants and algae.



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Healthline Republic of Ireland 1850 404567 or Northern Ireland 0800 085 1683

Excessive growth of these types of organisms consequently clogs our waterways, use up dissolved oxygen as they decompose, and block light to deeper waters.

This, in turn, proves very harmful to aquatic organisms as it affects the respiration ability of fish and other invertebrates that reside in water.

Make up of the planet's water

Oceans	97.2%
Ice caps/glaciers	2.38%
Ground water	0.397%
Atmosphere	0.001%
Surface water	0.022%
<small>(e.g., lakes, rivers, streams, ponds)</small>	

Effects of Water Pollution

- Quality of life
- Habitat
- Drinking water
- Recreation

What Can I Do?

1. Never dump anything down a drain.
2. Recycle motor oil and other vehicle fluids.
3. Throw litter in its place.
4. Clean up after your pet.
5. Check your vehicles for leaks and repair them.
6. Reduce the amount of household hazardous wastes generated at home.
7. Take a shower instead of a bath.
8. Use environmentally safe cleaning products around the house.

9. If you need to water your lawn do it in the morning there's less evaporation (Remember rain does it naturally.)

10. Set your mowing to its highest setting this encourages grass roots to grow deeper for moisture and grass blades to hold moisture longer than with a closely clipped lawn.

11. Place a shutoff nozzle on your hose to control the flow of water so you only use what you need. Remember to turn the water off at the tap to prevent leaks.

12. Leaks are the biggest water waster around the home. A leak of one drop per second wastes 2,400 gallons of water per year! Take a few minutes to find out if you have a leak in your home.

We don't have to stop using the earth's resources but we do have to stop wasting them

Many leaflets, relating to different aspects of the environment, are available for downloading on ENFO's website. Contact details: ENFO – The Environmental Information Service, 17 St. Andrew Street, Dublin 2, Ireland.

*Tel: 1890 200191
Fax: (01) 888 2946
e-mail: info@enfo.ie
www.enfo.ie*

ENFO is a service of the Department of the Environment and Local Government.