



SHERKIN COMMENT

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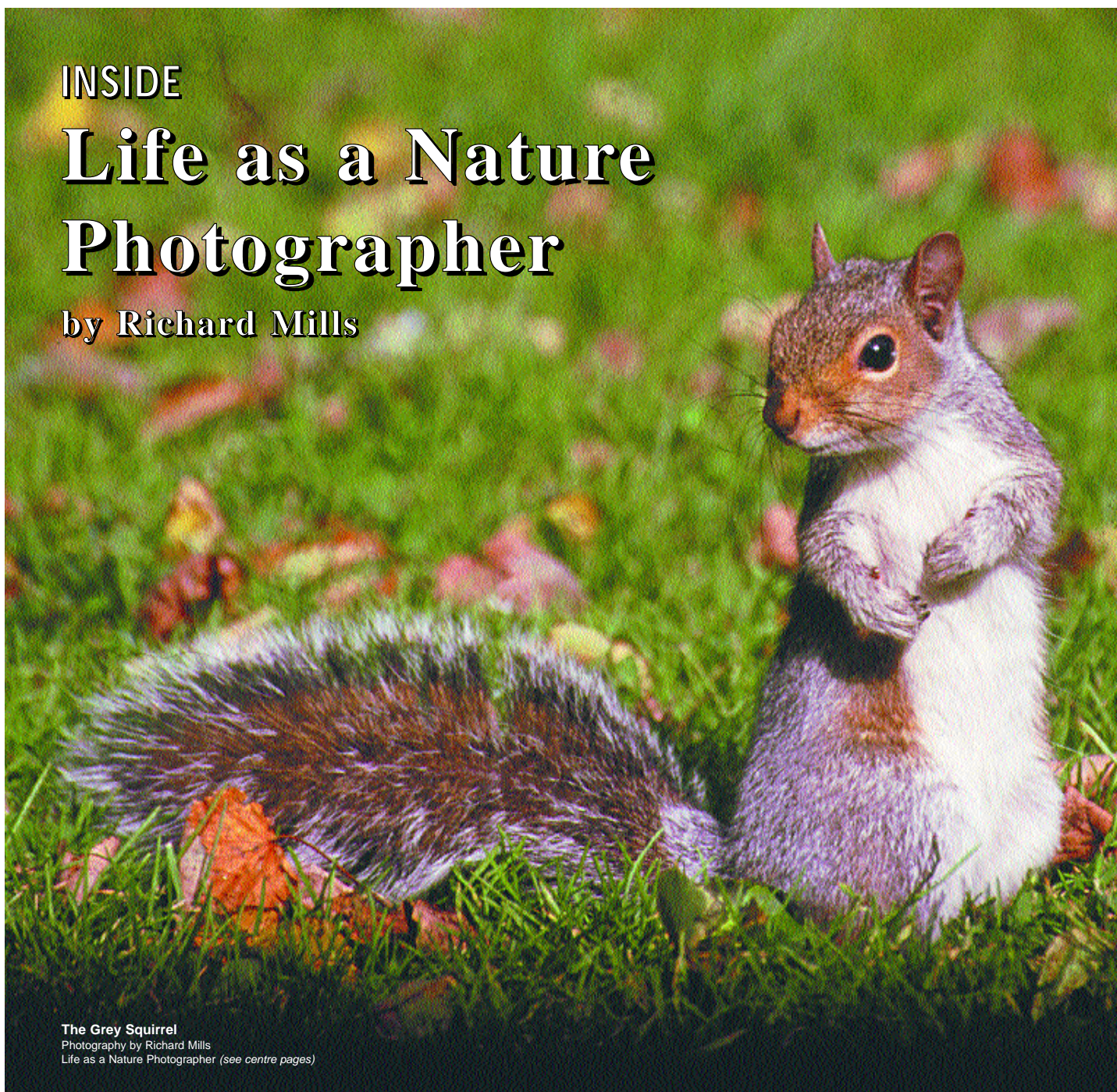
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Life as a Nature Photographer

by Richard Mills



The Grey Squirrel

Photography by Richard Mills

Life as a Nature Photographer (see centre pages)

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Editorial

Dúchas - its Achilles Heel

By Matt Murphy

DÚCHAS, the Heritage Service, is the agency responsible for the protection, preservation and maintenance of Ireland's historic and natural places. Achilles was a Greek hero with a weak spot. Dúchas could be our Achilles. Protection of Ireland's marine heritage is Dúchas' Achilles' heel. They have a most dedicated team looking after our land heritage. Thousands of national treasures, such as Killarney's National Park, Innacullin Island (Garnish Island), Glenveagh National Park, Charlesfort, The Rock of Cashel, the Phoenix Park, are but a few, and each is a gem. So why the neglect of our seas and our coastline and the life and archaeology within them?

The range of Dúchas functions include:

- Management and monitoring of over 1 million hectares (2.5 million acres) of natural areas.

- Protection and management of archaeology sites.
- Control of the National Inventory of Architectural Heritage, which involves recording and rating over 1 million structures.
- Management of 20 historical properties and gardens.
- Management of our coastal environment.
- The Botanic Gardens

Dúchas does an impressive job of taking care of our natural and built heritage on the land, especially with the meagre funding it receives and with such a huge task to fulfil. However, it must be remembered that Dúchas also has responsibility for the Marine Heritage around our coast – a ten times larger area. With this task, Dúchas has neglected its responsibilities. This situation has existed for over 80 years, since the foundation of the State. At least in the early years little or no large scale or permanent damage was being done to our unique, marine heritage. Sadly the last thirty years has seen major destruction of some of our marine treasures. Let it be clearly understood, those treasures include the animals, plants and the water itself. How can we, as a nation, pay £700,000 for a famous painting or £200,000 for the letters of some Irish literary person yet turn our back on our marine environment? There is no public outcry but exactly the

opposite - bouquets all round. Spending less than, £400,000 annually would do a fair job of protecting our marine heritage. Is it worth that? - surely a resounding yes!

We have seen losses of such heritage areas as mudflats without anyone accounting the environmental costs. These areas, it must be remembered, are essential to our coastal bird and juvenile finfish populations. Of course there is need for development, but where is the protector overseeing the changes and using its power to halt if necessary, or place responsibility for damage?

We have oil and gas drilling and dumping in our waters. Again, necessary, but who is monitoring the changes and placing responsibility if there is a need to rectify? We have dredging for sand, gravel and maerl. Ireland's waters have a huge collection of shipwrecks, some going back centuries. These are archaeological treasures. Many are targets for souvenir collecting by divers. Surely these wrecks

'Dúchas has the brief to police our natural heritage. It has over 16 people carrying out these responsibilities on land and yet, today, it has not even

deserve proper protection? Again, long and short-term change is being created and our heritage needs monitoring and protection.

Of course it will be said such and such an Act covers the protection. But the reality is that Acts do not work unless they are properly enforced. Dúchas has the brief to police our natural heritage. It has over 16 people carrying out these responsibilities on land and yet, today, it has not even one marine biologist! The one they had left some months ago to join the Heritage Council as its marine biologist. Unbelievably, no marine biologist has replaced her. What is interesting is that Dúchas funds the Heritage Council.

There is definitely something wrong in the thinking of Dúchas regarding our marine heritage. One has to ask "have they a deliberate policy to off load their responsibilities for Ireland's marine heritage to the Heritage Council, who by

default, must take over the guardianship"? What is needed is a policy statement and actual action from Dúchas on marine heritage issues. If they take their charge seriously, then let us see action. Firstly, they must set up a marine section that will address marine issues just as they have for monuments, plants, and national parks

Secondly, one marine biologist can not do the task, our experience is that eight is the minimum needed. Those biologists should be based along the coast of Ireland and not centred in Dublin. Sampling and creating databases must be undertaken for marine life and archaeological finds. At present could Dúchas give a list of the species of seaweeds or their biodiversity along the 700 miles of coastline of County Cork alone - not to mind the whole coastline? Those seaweeds provide both food and shelter for more than half our native species!

The one ray of hope is the EU directives, they could force Dúchas to get serious about our marine heritage. Brussels is cracking the whip more and more on environmental issues. That can be seen especially with such issues as waste and water quality management. Similarly, farming subsidies are being tied, now, to improved environmental controls. We need "troops on the water" to oversee the directives that are here and those that are coming on the marine environment. But, Dúchas should not be waiting for Brussels to tell us how to manage our heritage.

What is there about us Irish? We are an island nation yet we have never appreciated what richness exists in the seas around us. We have only to look at the state of our fish stocks. We "sold" them for agricultural gain, so we thought, when we joined the EU. We continually let those fish stocks be plundered by the French, Spaniards and others. Successive governments ignored the cries for conservation. Now, nearly 30 years on, we are seeing the cost of that action and the bitter price of restoring fish stocks. Finally, fish management has become a policy of an Irish government and the EU. More conservation of fish stocks will come, with larger areas being closed to fishing. It will be painful to Irish fishermen. If only common sense prevailed these past 30 years. Let us pray that our marine heritage will not record a similar history.

SUBSCRIPTION FORM

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Exploring the Irish Rhine

By Daphne Pochin Mould

THE year 2000 saw the conclusion of nearly twenty years of archaeological and historical survey of County Cork and the publication of the final two big volumes of the set of five. Over 15,000 sites had been visited, photographed - in many cases both from the air and the ground - and recorded. The last two books are concerned with north Cork - the rich farmlands that stretch from the Blackwater valley up to the country's northern boundaries, with Kerry and Limerick, Tipperary and Waterford. This is a very different sort of land from West Cork, where the visitors flock, but one much richer in history and story.

The Victorians called the River Blackwater "The Irish Rhine", because of its size, its beauty and the castles and big estates that are set all along its banks. It is 85 miles long, rising in the Kerry hills, flowing south toward Rathmore and then turning east, with a final right angle bend at Cappoquin, from where it is a noble tidal waterway down to the sea at Youghal. There are limestone caves in part of that great valley that have yielded bones of the animals that roamed this countryside between 34,000 and 26,000 years ago. Lemmings and Arctic foxes, reindeer and the great Irish deer, with its immense spread of antlers, red deer, brown bears and the huge woolly mammoth. Men, hunter gatherers, came much later, maybe 9,000 years ago, following the river road inland, catching its fish (the Blackwater is still a famous salmon river) and leaving, here and there, a scatter of flint tools. And later they would learn how to farm, and sow and rear stock. People and ideas, century on century, leaving tokens of who they were: megalithic tombs, stone circles, standing stones, ring forts and Celtic monasteries, castles and medieval monasteries, fortified houses, merging in more peaceful times into the "big house" with its landscaped grounds and stables, farm buildings, ice house to preserve winter ice for summer parties. (These days we don't get enough ice to store any!)

Mallow's warm spring made it a spa town in the 18th century, and if the water did you no good, the gaiety did. We still sing of the Rakes of Mallow, "beaving, belling, dancing, drinking... one time naught but claret drinking, then like politicians thinking". These are hunting and racing country and people - who gave the world the word "steeplechase" in 1752, a cross country gallop of 4½ miles from the steeple of Buttevant church to that of St. Leger, at Doneraile.

The lower part of the Blackwater was, till very recently an important waterway, and just prior to the railway age there were plans to canalise it further inland. There were coal-

fields at Dromagh, west of Mallow, and a beginning was made, of which traces still survive on Navigation road there, to carry coal. That was in 1756 but the project of taking the coal down all the way to Youghal was abandoned in 1786. The short, finished stretch carried grain to some of the many mills that the Blackwater and its tributaries powered. And up on the border with Limerick, on the edge of the Ballyhoura mountains, you can see old millstone quarries with unfinished millstones of conglomerate rock, lying about.

From the air, the river is even finer than from the ground and so the Survey learned more of what was in, or had been in, North Cork. 1989 was the year of crop marks. Where a structure had been demolished, ploughed out, the soil may be thinner or stonier, and the crop growing on it will trace the plan of the vanished ring fort, house foundation or old field fence. Weather conditions vary from year to year so much that only now and again, does growth and dryness come at just the right time for crop marks to appear in plenty.

When I saw the way crop marks were showing up, I took Denis Power, director of the Cork Survey, flying in a two seater Cessna over North Cork. Every field seemed to show something and we twisted and turned from one to the next, each picking out new sites as they came in view, and I swung the little plane round after them. Another time that such hidden foundations may be seen is after ploughing when the soil over them may show a different colour from the rest of the soil. Ring forts (and the North Cork survey lists 1,169 of them plus 388 "enclosures", many of which were probably ring forts), are the farm houses of early Celtic Ireland. The contemporary monasteries had more people, houses and churches, and so larger, less regular, enclosing banks. In grass, slight surviving banks will show up in the low sun of dawn or evening, or the winter light.. It was a day of December sunshine, frost melting on the ground, just south of Drumcollogher, when such a site came into view - a very important site, supposedly founded by the English St. Berihert who emigrated to Ireland, but rarely seen from the air. Usually I didn't have much hope of seeing it, but today was different. As I came over Tullylease virtually the whole big, oval enclosure, stood out in clear relief (see photo). With an aircraft and the right weather, new things can always appear, and quite a few of them are now listed in the North Cork inventory.

Archeological Inventory of County Cork. Volume 4 (Parts 1 & 2). Dúchas - The Heritage Service, Dublin 2000. Hardback, 796pp in 2 volumes, cased, IRE35.00 or €44.44.



Near Kanturk, Co. Cork, crop marks reveal a ploughed out ring fort and a pattern of other marks, probably old field walls.



In the bright low December sun, the outline of the enclosing banks of the Celtic monastery are revealed at Tullylease, Co. Cork. They are virtually invisible at ground level.



The ancient bridge over the river Funshion at Glanworth, Co. Cork, perhaps Cork's oldest surviving one.

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FREE RADICALS

By Anthony Toole

CHEMISTRY is about the behaviour of the tiny particles of which everything is made. It is concerned with what happens when these particles collide, how they break up during such a collision or stick together to form the materials of the world.

The smallest of these particles capable of taking part in a chemical reaction is an atom. In the course of a reaction, atoms move around into a new arrangement that is more stable, in terms of energy, than the one in which they existed previously. This frequently involves changes to the atoms themselves.

Each atom is made of smaller, sub-atomic particles, called protons, neutrons and electrons. It is the number and arrangement of these that determine the identity, and hence the chemical behaviour of the atom and define it as belonging to a particular element. The current picture we have of an atom compares it with a miniature solar system in which the protons and neutrons occupy the centre, or nucleus, and electrons spin around this, somewhat in the manner of planets around the sun. It is characteristic of atoms that the most stable system is one in which the electrons are arranged in pairs. This is achieved in different ways.

Sometimes, one atom, normally a metal, will transfer some of its electrons to another non-metallic atom, so that both have an even number of electrons, all arranged in pairs.

As electrons carry electric charges, the new particles will themselves be charged, the metal positively and the non-metal negatively. These new charged particles are called ions. The particles in table salt, for example, are sodium and chloride ions.

When atoms of non-metallic elements combine, they usually form a system in which one electron from each is shared, as a pair, between the two atoms. This shared electron pair constitutes what is called a covalent bond, and the new particle formed is a molecule. The simplest particle of water is a molecule, in which two hydrogen atoms are combined with one oxygen atom.

A third kind of particle exists, called a free radical, in which there is an odd, unpaired electron. This particle is very unstable, and will usually react, often in a dangerous manner, to try to pair its odd electron up with an electron from a nearby molecule. It does this by attacking the molecule and grabbing a piece of it. This usually creates another free radical that can go on to carry out a similar reaction elsewhere. A chain reaction takes place, which may eventually involve thousands of molecules, and ends only when two radicals pair up their individual electrons by combining together to form a stable molecule.

The atmospheric ozone that protects us from harmful solar radiation is both formed and destroyed by reactions involving free radicals. Oxygen exists as molecules, each of which contains two oxygen atoms. Radiation from the sun sometimes breaks the bond joining these atoms. The single oxygen atoms thus formed are radicals. When they come into contact with other oxygen molecules, they rapidly combine with them to form molecules containing three atoms each. This is ozone.

The process by which it absorbs radiation destroys the ozone, reconverting it into ordinary oxygen. Under the conditions that have prevailed on the earth for at least 600 million years,

the destruction and formation have occurred at the same rate, so that equilibrium has been established. In the past century, however, a new factor has upset this equilibrium by increasing the rate of destruction of the ozone.

Chlorine compounds, such as those used extensively in solvents, cleaning agents and aerosol propellants, often find their way into the upper atmosphere, where they are broken down, by the sun's radiation, to form chlorine radicals. These readily react with ozone. In the ensuing chain reaction, chlorine radicals are re-formed, so that one chlorine atom is able to destroy thousands of ozone molecules before it meets another radical and is thus inactivated.

Some of the oxides of nitrogen, formed during the burning of fuels, owe their instability to the fact that they are radicals. There is evidence that they may also play a part in the process of ozone destruction. Paradoxically, nearer to the ground, particularly in cities, the same oxides help in the formation of ozone, which at these altitudes is a pollutant and a serious irritant to the eyes, throat and lungs.

Free radicals are often formed as intermediates during the natural breakdown of compounds. The metabolism of food in our bodies is one example. The problem here is that these short-lived particles may survive long enough to come into contact with important molecules, such as the proteins or DNA of which our cells are made. The reactions that occur can disrupt the normal chemistry of these molecules and make them behave in ways that may be harmful.

Abnormal behaviour of DNA, for example, initiated by the action of free radicals from food, is thought to be one cause of some cancers. Radicals are also believed to combine with blood cholesterol, causing it to stick to the walls of arteries, blocking them up and leading to heart disease.

Many constituents of food, such as vitamins A and C and other substances known as phytochemicals, found in fruits and vegetables, appear to help prevent ailments partly by reacting with the radicals and mopping them up before they can do harm.

Free radicals are not always detrimental. They often have an essential part to play in the formation of useful substances.

In the manufacture of plastics like polythene, PVC, polystyrene and others, compounds made up of small molecules are heated with a suitable catalyst. They break up into radicals, which then start linking together so rapidly that, by the time they cease to react, huge molecules containing thousands of atoms have been produced.

The opposite process may also be brought about. Crude oil often contains large hydrocarbon molecules for which there is little use. The radicals formed when these are heated can be made to combine into smaller molecules of the type found in petrol, for which there is much greater demand. The petrol made in this way is usually a more efficient fuel than that obtained directly from the oil.

Free radicals are a necessary and unavoidable part of the chemistry of the world. Like all chemical entities, they can be good or bad. Understanding their behaviour enables chemists to create new materials with novel and useful properties, and to minimise the effects of harmful substances and reactions.

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

County-wide Collections of Household Hazardous Waste

By Katherine Walshe

FOLLOWING on the success of the pilot initiative to facilitate the collection of potentially hazardous household waste last winter, the 20/20 Vision Waste Management Strategy for Cork County Council and Cork Corpora-

tion provided a more broadly based service in 2001.

There were free-of-charge household hazardous waste collection points at various locations throughout the City and County during the year. The 2001 collections were provided by Cara Waste Management Ltd. on

behalf of the two local authorities in partnership with Janssen Pharmaceutical Ltd., Pfizer Ireland Pharmaceuticals and Schering Plough (Brinny) Company.

Collections took place on Saturdays with a specially equipped truck (the Cara Chemcar) located at designated sites – two on each day – from 10 a.m. to 1.00 p.m. and from 2.00 p.m. to 5.00 p.m. People were invited to bring household hazardous waste for environmentally friendly recycling or disposal.

Hazardous waste includes a range of items such as batteries, paints, paint thinners, paint strippers, glues, adhesives, inks, old medicines, weed killer, insect killer and other poisons. It also includes bleaches and other cleaning agents, fluorescent tubes, detergents, waste oils and brake fluids.

The programme commenced on February 17th at Wilton and City Hall. It continued at locations including Skibbereen, Bantry, Kanturk, Mallow, Youghal, Midleton, Douglas, City Hall (return visit), Charleville, Buttevant, Fermoy, Mitchelstown, Macroom, Ballincollig, Blackpool, Kinsale Road Civic

Amenity Site, Cobh and Passagewest. Quantities of hazardous waste collected at these locations are given below. Other locations will include Kinsale, Carrigaline, Bandon, Clonakilty, Ballyvolane and Kinsale Road Civic Amenity Site (return visit).

Germany, Denmark, the Netherlands and the USA are notable in their treatment of hazardous items, where the waste collected is either recycled or disposed of with energy recovery. Cara Waste Management Ltd. separate the waste collected and send it to fully audited and licensed facilities which specialise in the treatment and recovery of the specific waste streams. Fluorescent tubes and batteries which contain mercury and heavy metals such as lead, cadmium, nickel and zinc are all recycled in licensed plants on the continent and full certification is provided for all the waste processed.

Katherine Walshe, Senior Executive Engineer, Cork County Council, County Hall, Cork, Ireland.



Photo: © Cork County Council

Chemcar Date	Fluorescent Tubes	Batteries	Paint	Pesticides/Herbicides	Aerosols	Obsolete Medicines
17.02.2001	26 No.	303.2 kg	1,104 kg	124 kg	8 kg	40 kg
03.03.2001	75 No.	1,586 kg	508 kg	126 kg	4 kg	62 kg
21.04.2001	70 No.	567 kg	490 kg	34 kg	18 kg	174 kg
19.05.2001	24 No.	482 kg	320 kg	20 kg	4 kg	124 kg
02.06.2001	1 No.	210 kg	188 kg	6 kg	0	48 kg
16.06.2001	0	281 kg	166 kg	0	0	22 kg
07.07.2001	0	372 kg	246 kg	72 kg	4 kg	70 kg
21.07.2001	106 No.	1065 kg	654 kg	12 kg	10 kg	122 kg
15.09.2001	103 No.	361 kg	844 kg	76 kg	0	0
29.09.2001	0	117 kg	486 kg	12 kg	4 kg	62 kg
TOTALS	405 No.	5,344.2 kg	5,006 kg	482 kg	52 kg	784 kg

Above: Quantity and types of waste collected by the "Chemcar".
Top: The "Chemcar" which is a truck operated by a qualified person.

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Floods

By John Solbé

BLOCKED culverts, sewage upwelling into houses and roads closed by land-slips are the unpleasant consequences of flooding. But how does the natural world cope? Regardless of the root causes of unusually high rainfall or climate change due to excess

release of 'greenhouse gases', floods are events which rivers and floodplains have experienced for probably hundreds or possibly thousands of times since the last glaciation. So what happens in and near the river?

Rivers are dynamic – they change their courses, widths and depths, depending on the solidity of the rock or soil

over, under and through which they flow. It isn't the volume of water which counts so much as the velocity because it is the velocity of the water which decides whether the river erodes, transports or deposits solids. A classical river may follow the sequence erosion – transportation – deposition as it approaches the sea, but more likely each

length or 'reach' of the river can demonstrate any of those aspects depending on gradient. What can happen in a flood is that a reach, placid in 'dry-weather flow' and has formed mud banks, will suddenly begin transporting, lifting the mud from its bed and carrying it downstream. Where the mud settles it may destroy the habitat of the original inhabitants, or may simply increase a sediment bed to the benefit of the animals which are adapted to living in silt. Greater velocity and the river bank may be eroded – and every lost cubic metre of bank represents a loss of soil, eventually to the sea, of roughly one and a half met-

ric tonnes. Gravels too will move and be redeposited as new banks. In North Wales, the River Elwy close to our house suddenly created a 2-metre high bank of cobbles tens of metres long where there was previously a gently shelving beach of gravels.

Sometimes the river will spread over the land and carry soil onto the fields, a local equivalent of the 'gift of the Nile' before the completion of the Asswan High Dam prevented the natural pattern of flooding. Given the highest velocities, the river may completely change its course, cutting through a horseshoe bend for instance and leaving 'ox-bow lakes'. There are plenty of examples of old river courses in Europe, and typically the old courses reappear as temporary ponds in and after floods.

River banks come in all shapes and sizes. Newly eroded banks may be of

benefit to sand martins or kingfishers, revealing rabbit burrows as useful nesting sites. Banks with established trees resist erosion, until the whole tree falls, suddenly directing the full flow to the opposite bank with devastating consequences. Some trees spend most of the year standing in water, like the cypress of the southern USA or the mangroves of tropical coastlands. (An area of water with trees standing in it is called a swamp, not a marsh, fen or bog!)

What of the animals? Even in a flood we should not think of a river as all moving at one speed through the reach. Close to the bed it may be relatively slow moving; it may even be moving upstream - downstream of those V-shaped groynes used to improve the diversity of habitat and thus the fishing. Smaller animals, especially those which are flattened, streamlined, or equipped with grasping devices, may be able to hold their position. Strong fish and those with spiny pectoral fins, may also be able to resist the forces attempting to carry them off downstream. Sadly, many small fish will be

washed out to sea. The true freshwater species like roach and tench will be killed by the salinity but the trout and stickleback will survive. If those gravel beds, mentioned above, contained salmon and trout eggs, which slowly mature through the winter, they may be washed out and lost. Birds may benefit in the short term. Flooded fields may bring soil organisms to the surface for waiting gulls and waders. Near our house those engaging little water birds, the dippers, survived the flood and were seen at their 2000 and 2001 nest site when the

flow had returned to normal.

In one sense, nothing is lost. Every particle of soil, every damaged animal body and every torn-off tree branch will be a source of minerals or of food, or a place to live for the estuary (where the salinity encourages the formation of

lumps of soil and deposition as mud) or for the sea. Even what seems to us to be devastating destruction is simply a local rearrangement of the river valley. Many of the civil engineering operations (straightening, dredging and structures built for our convenience - bridge footings, embankments and culverts) prevented the river from behaving 'naturally'. This manipulation of the river may, as we have seen, have mixed blessings for us, just one of the species inhabiting the wetter lands of the planet.

John is a biologist with many years experience in the UK water and chemical industries. He is a Visiting Professor in both the Centre for Eco-Chemistry at the University of Cranfield and the Department of Civil Engineering at the University of Newcastle upon Tyne. He has given several papers at the Sherkin Island Conferences. Any opinions in the above article are his own and may not be attributed to either University.



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URBAN SPRAWL – The Cursed Blessing of Economic Prowess

By Robert S. De Santo, Ph.D.

The Problem

Urban sprawl means straggling expansion of an indeterminate urban or industrial environment into an adjoining countryside. In the United States, it began in the 1950s with explosive urban development that started after 1945 and the end of World War II. It then accelerated and is directly linked to the US interstate highway system that began construction in 1956 (See Sherkin Comment 2001 – Issue No. 29 Page 9). Urban sprawl is one result of pressures created in the United States by the “American Dream” that is to own a home and an automobile. Ireland has started down that same slippery slope and caution should be the watchword for dreams of living in expanding suburbs and owning an automobile to travel anywhere at any time. If the dream is achieved without planning, control, and foresight, the drive will only lead to a shrinking countryside of low diversity and the many other consequences of urban sprawl.

Self-control vs. Self-indulgence

Urban sprawl (a.k.a “urban blight”) is an undesirable symptom of newly affluent societies that move away from self-control toward self-indulgence. It brings with it uncontrolled and rapid urban development of low density residential housing, industrial complexes, and “business parks.” As it feeds on open space and grows, automobile traffic increases at an alarming rate.

Traffic sustains, and is the life’s blood of, urban sprawl. It bleeds away the vitality and resources of cities as it degrades places. It is uncompromising. As a direct consequence of the urbanisation of the United States, its rural countryside suffers population loss, economic imbalance and degradation of physical and social infrastructure. This phenomenon leads to decreased use of buses, trains, and non-motorised transit. Resources are lost from cities and, are transplanted to

encroach on and convert open countryside into indeterminate, low density, and inefficient land use. The growth of this lifestyle is sustained by the mobility of people and goods. Without highways and without automobiles to replace the mass transit, urban sprawl cannot sprawl.



Photos: © Robert De Santo

The Old Appian Way was built in about 312 B.C.. It is the most important of the consular roads in Rome, which, when all such ways are taken together, formed a network that the modern transport infrastructure were built to follow. The mobility it helped give the community allowed residences to spread into the countryside. Such transport corridors as this 1,700-year-old example, link mobility with urban sprawl.

Growth and Prosperity

When a society finds itself riding on a welcomed tide of sustained economic growth and prosperity, its people quickly seize on that blessing and spend their newfound wealth to spread out. They are driven by a dream of increased comforts and conveniences — a dream that includes their individual mobility in the form of an automobile. Their dreams are achieved in the short run, but they find that in the long run

those blessings of wealth transform into curses of glutony. The transformation dooms society to struggle under a self-inflicted burden of excess that cultural and natural resources can not sustain without careful and comprehensive government planning regulations.

Their neighbourhoods have no public transit and they each rely on two automobiles for their transport to and from home. They each have two children who are still too young to drive an automobile of their own. I am happy to have been able to achieve my American Dream, but I under-

as it exists in the United States with all its blemishes and opportunities, wealth and mobility are important facets of culture and society. Its wealth and mobility has created a social laboratory that proves the dynamic growth and complexity of urban sprawl. The laboratory strug-

its ever growing and complex maze of jurisdictions and regulations. These are divided into fifteen categories including: General, Grants, Air, Water, Pesticides, Radiation, Noise, Oceans, Solid Waste, Superfund (dedicated to cleaning up toxic spills), Effluents, Sludge, Energy, Toxics, and CEQ (the Council on Environmental Quality). Each year, the federal government amends these regulations and their complexity grows. The resulting pages of regulations are all in one source — Title 40 of the Code of Federal Regulations (40 CFR). They reflect where the United States is going and how it will get there.

By simply counting the total number of pages in Title 40 CFR, one can gauge the efforts of the government of one federal agency in the US to regulate society and protect the environment. The first 40 CFR volume contained 450 pages and was promulgated in 1972. In 2000, 28 years later, that same volume had grown to 18,220 pages, 40 times larger than when it began — an average increase of about 635 pages added every year.

The planning, management, and environmental protection of that society is a race in which we win if we can learn from the past history of others. We win if we institute decisive planning and if we balance our transport and life-style to protect both natural and social resources. Losing means we fail at environmental protection and social justice. Losing means we turn the hard earned dreams of wealth and mobility into the nightmare of lost community resources and a bankrupt environment.

There is much to conserve for ages to come. Only by immediate and rigorous environmental protection at all levels of government, at all times, and by everyone, can we foster and preserve harmony in the present struggle to preserve the treasure of those values of the social and natural environment. We must control the onslaught of urban sprawl or lose that struggle.



The typical growth of urban sprawl is seen in this aerial photograph of Smithtown in Long Island, New York, on the eastern seaboard of the United States. In 1976, its land use was mixed residential/industrial. By 2000, it had been fully developed with single-family residences and a population of 8,956 in which most occupants owned at least two automobiles and worked within a radius of 60 miles.

The American Dream

When I was young in the 1940’s, my family of four was housed in 1,000 square feet of living space on the first floor of a two family house, built on half an acre in a residential neighbourhood, within walking distance of a city centre. We shared an automobile jointly owned by my father and my uncle that was seldom used.

When I raised my own family of the same size in the 1970s, we lived in a 1,900 square foot single-family house on 2 acres in a newly established neighbourhood in a rural setting. Transit was not available and we were obliged to own first two, and then four, automobiles once my two children were 16 years old and licensed to drive. My wife and I continue to live in that same house. My children are married and each lives in a house of about the same size on lots that are considerably larger.

stand that the cost of that dream is my contribution to urban sprawl.

When people are mobile by driving themselves, and when they live in a society that has a reliable and an extensive highway transport network, each individual can work anywhere within their driving range, provided they can afford a vehicle and its fuel. No one is geographically constrained and urban sprawl is an inevitable outcome of wealth coupled with independent mobility. The more efficient the vehicle and available transport infrastructure, the faster and wider the sprawl that it will certainly enable.

Urban sprawl feeds on transport. The more efficient the transport available to this affluent society, the greater will be the pressures and the faster the speed of its sprawling growth. That is what happened in the United States over the past 50 years.

In an open and free society,

gles to manage community growth and to protect natural resources. Success of its experiments is measured by the stability of its society, the associated attitudes of its people, and by the judgements and emulation’s of its global neighbours. That experience can help find cures to the ills of urban sprawl.

The Control & The Cure

Control of urban sprawl requires control of the attitudes and dreams of the people in the sprawling communities. Such control is not entirely possible in a free society, but mitigation of the undesirable consequence of transport and mobility, is possible. To do so takes courage and dedication. In the United States, a major tool of such control is the body of federal regulations that govern the Environmental Protection Agency (EPA) and



The characteristic of the newest style of urban sprawl in the United States is this example of a subdivision of large single family homes in East Lyme, Connecticut in the eastern United States. Each home occupies about an acre of land and contains about 3,000 square feet of living space. Its occupants own at least two vehicles and they work in other communities, some as much as 50 miles distant. Shopping is mostly in malls and shopping centres distant from this neighbourhood. One year earlier, this land was a peach and apple orchard.

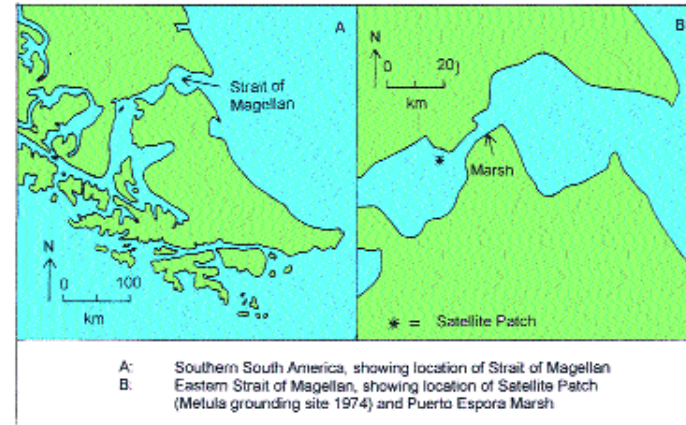
Robert S. De Santo, Ph.D., Vice President, Chief Scientist, and Director of Environmental Planning, Parsons Transportation Group, Inc., 655 Winding Brook Drive, Glastonbury, Connecticut 06033, USA.

THE FORGOTTEN OIL SPILL: Lessons from the Land of Fire

By
Dr. Jenifer Baker

THE 'land of fire' is the island of Tierra del Fuego near the southern tip of South America, near Cape Horn. It is separated from the mainland of Chilean Patagonia by the Strait of Magellan and is called the 'land of fire' because in this inhospitable climate the original Yaghan inhabitants kept fires going night and day.

On 9 August 1974 the oil tanker *Metula* grounded on Satellite Patch in the Strait of Magellan, and lost an estimated 47,000 tonnes of light Arabian crude oil and 3000 - 4000 tonnes of heavy fuel oil between this date and the successful refloating on 25 September. As a result, there was oiling of a variety of shorelines, mainly on Tierra del Fuego but also along part



A: Southern South America, showing location of Strait of Magellan
B: Eastern Strait of Magellan, showing location of Satellite Patch (*Metula* grounding site 1974) and Puerto Espora Marsh

entific point of view. In particular, monitoring work has been done by scientists from Chile (the Instituto de la Patagonia in Punta Arenas), the USA, Canada, and myself, working co-operatively. Tierra del Fuego is one of the few

classify shores on a 10-point scale, following the basic principles that have become apparent from long-term monitoring of spill sites. These 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 organisms. For example, at the least sensitive end of the index, natural cleaning and recovery times are usually rapid (sometimes only weeks or months) on wave-exposed rocky headlands (ESI 1) shores. Then there are shores of various intermediate sensitivities. Tierra del Fuego provides several examples, e.g. steeply sloping shores of coarse grained sand (ESI 4), and biologically productive intertidal flats (ESI 7). At the most sensitive end of the index (ESI 10) are highly vulnerable shores such as saltmarshes. The extreme shelter of such areas means that they act as long-term oil traps, often with severe consequences for the flora and fauna.

One such saltmarsh in a very sheltered estuary received deposits of viscous 'chocolate mousse' after the *Metula* spill. Chocolate mousse is an intractable emulsion formed when certain types of crude oil are whipped up with sea water by wave action. Different areas of marsh received different thicknesses of mousse. In the worst affected areas of marsh, with mousse averaging about 4cm thick and going up to about 10 cm thick, oily layers are still present, with very little biological recovery. In short, natural cleaning and recovery of this worst case scenario has not occurred after

27 years, and one may estimate that complete natural recovery will take many decades. In contrast, natural recovery is good or well under way in areas which received thinner oily layers (up to about 2 cm thick).

The value of all this to oil spill cleanup teams is that it makes it possible to provide some prediction of what will happen if they leave an area uncleaned. On the basis of this information, it may be decided, for example, that a recently oiled shore of a particular intermediate type will recover naturally in about two years, and that cleanup effort at that site is therefore unnecessary if it is remote and not a public amenity area. On the other hand, recovery times of many decades are unlikely to be acceptable for badly oiled saltmarshes wherever they are. This may justify removal and disposal of thick oily layers, but responsible disposal (e.g. by incineration or to landfill) is expensive and can generate its own problems. With this in mind, part of the worst affected area of the Tierra del Fuego marsh was turned into an experimental site ten years ago, to look into ways of has-

tening *in situ* degradation of the oil. Of the various approaches that have been tried, tilling (digging or ploughing the oil to mix it with the underlying sediments) has shown good results. It does indeed speed up *in situ* oil degradation by getting more oxygen into the oil layer. Natural recovery of salt marsh plants has started in experimental plots treated in this way, because the degradation of the oil has made it possible for seeds washed in by the tide to germinate and grow.

Who would have thought that the forgotten oil spill would still be providing useful information after nearly thirty years?

Dr. Jenifer Baker has worked all round the world as an environmental scientist, specialising in oil spill response, and is currently a theological student.



Experimental tilling



The experimental site, in an area where the oil layer is up to 10cm thick.

of the Patagonian coast. Though this was a bigger spill than the famous *Exxon Valdez* incident, very few people have heard of it, and there was hardly any clean-up effort. This was partly because the area is very remote with low population density.

This history means that Tierra del Fuego - specifically the Puerto Espora area - is one of the most interesting oil spill sites in the world from the sci-

ences which can help answer questions such as: how long does it take for purely natural processes (such as dispersion by wave action and biodegradation by bacteria) to remove oil which is left on different types of shoreline? It is one of the areas which has been of importance in developing shoreline Environmental Sensitivity Indexes (ESI's) for oil spill contingency planning. In a nutshell, ESI's typically



The beginning of recovery: seeds can grow in cracks in the oily layer provided the oil had degraded sufficiently.



Partial recovery of marsh where the oily layer was 1-2cm thick.

Photos © Jenifer Baker

Rocky Shore Survey

By Talei Jackson

SHERKIN Island Marine Station's major survey of the Cork coastline is now more than fulfilling its objectives, as a book by Dr. Gillian Bishop and seven major internal reports on the findings of the last 20 years are being finalised. The results from these are reiterating the need for long-term monitoring of rocky shore environments.

Sherkin Island, situated off the southwest coast of Ireland, is subjected to oceanographic frontal systems associated with the Atlantic Ocean's proximity. The irregular coastline gives rise to a wide range of easily accessible littoral environments, of both rocky and soft sediments. These range from very exposed rocky shores facing the open Atlantic to almost totally enclosed bays bounded by shores of moderate to extreme shelter. This unique location provides the ideal setting for studying the marine environment.

sites covered in algae, to extremely exposed shores on steep sections of rocky coastline. To date, more than 600 species of flora and fauna have been recorded at these transect sites.

The Sherkin Island Rocky Shore Monitoring Programme is now the

prominent decline in species abundance in the early 1990's. In the past three years a gradual recovery in species abundance has been observed.

- In general, there have been many changes in the distribution of flora



Dulse (*Palmaria palmata*) is commonly found on the extreme lower shore growing on rocks and on or among the kelps. It is one of the many red seaweeds that can be dried and eaten.

longest running, most extensive study on rocky shores in Europe. Little is known of the natural variation within shore communities and the effect factors such as pollution can have. It is important to monitor the rocky shore over the long term, as changes and fluctuations in species abundance and diversity may not be apparent in the short term but could have major effect on rocky shore communities over time.

Seven major internal reports, interpreting the data from the 146 annual survey sites have been prepared in 2001. Over the past 26 years, volunteers at the marine station have collected an enormous volume of data. The 20 years of data from 1981 to 2000, has determined a lot about changes and fluctuations of species on the rocky shore. For example:

- After the occurrence of a red tide bloom in the late 1970's, an immediate decrease in the abundance and diversity of species was observed at the sites in the affected areas. This was followed by a delayed mortality of barnacle species. Only four to five years after the phytoplankton bloom, did flora and fauna species begin to show signs of recovery.
- At many transect sites, certain species of algae show marked seasonal changes e.g. Link Frond (*Enteromorpha intestinalis*) shows a noticeable increase in abundance in summer months while a summer decrease is evident in Pepper Dulse (*Osmundea pinnatifida*).
- A peak in the abundance of barnacles occurred in 1989 and 1990. This was followed by a poor settlement year and a crash in barnacle abundance in 1991.
- Many of the areas surveyed in Southwest Cork showed a

and fauna species at transect sites since 1981. These changes would never have been noticed if sites were surveyed on a once only basis.

Sherkin Island Marine Station's major achievement in the spring of 2002 will be the publishing of a new book by Dr Gillian Bishop. This will be the result of the dedication of volunteer biologists who have worked on the Rocky Shore Monitoring Programme over the past 20 years. Dr. Bishop was the first biologist at the marine station in 1975 and her book interprets the data collected from the seven monthly survey sites on Sherkin Island, the majority of which were established in the late 1970's and early 1980's.

A fascinating comparison has been made between the sites with 20 years of monitoring data and those with only seven years of data. Analysing the data has shown the real need for long term monitoring of the rocky shore environment. Short term monitoring of such areas is simply inadequate.

By monitoring the rocky shores of Southwest Ireland for the past 26 years, much has been learnt about the rocky shore and the dynamics of this unique environment. However, in order to gain better understanding of interactions and critical factors on the rocky shore, it is vital that long-term monitoring of the 146 sites continue into the future. When Sherkin Island Marine Station have monitored the rocky shore for 40 years, it is highly probable that the 20 years of data to date will seem inadequate in comparison.

Talei Jackson was a volunteer at Sherkin Island Marine Station in 2001.

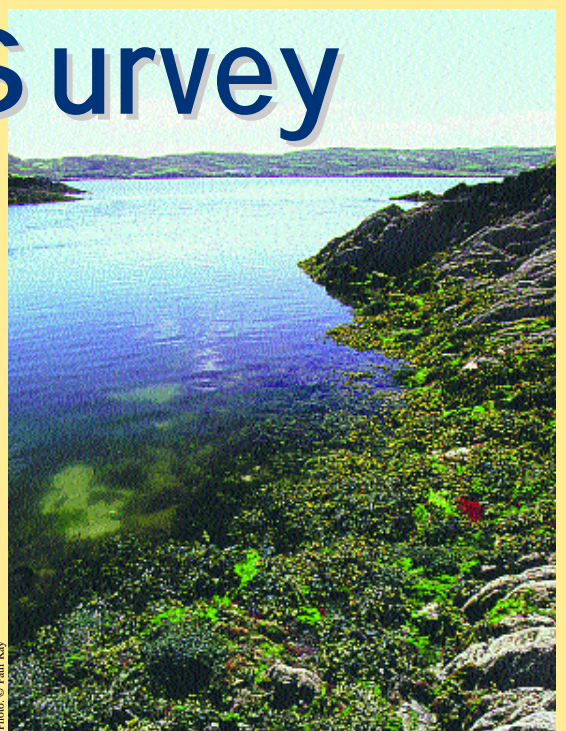


Photo: © Paul Kay

The number of sea shore sites monitored annually by Sherkin Island Marine Station now totals 146.



The brown seaweed *Asperococcus* spp. is commonly found in rockpools on the lower shore.

The Sherkin Island Marine Station have been running a Rocky Shore Monitoring Programme since 1975, with 69 sites surveyed annually on Sherkin Island and the islands of Roaringwater Bay. On Sherkin Island, seven further sites are visited on a monthly basis from April through to October. In 1995 the programme was extended along the 700 miles of coastline from Cork Harbour to Bantry Bay, and 68 new sites were established. In 1996, 1997 and 1998, further sites were established along the Cork coastline, thus increasing the number of annual sites to 146. A representative variety of exposures and aspects were chosen to monitor changes across the rocky shore. The rocky shore transects range from extremely sheltered

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RAY KEARY

Irish Seaman & Visionary

The long haul from "rooting around on the seashore" to the £21m National Seabed Survey

By Enda Gallagher

MANY people in the marine world will recognise the name "Ray Keary," and not just in Ireland but internationally too. For Ray is a man well respected for his vision and his unwavering determination to initiate exploration and understanding of marine science. He is the man largely responsible for the approval of the ongoing National Seabed Survey being managed by his employers - the Geological Survey of Ireland (GSI) - until his retirement.

Water, both onshore and offshore, has been a constant right throughout Ray's life. He grew up in a small village, Woodford, near Lough Derg in South East Galway. He remembers that his grandfa-ther "always had a boat out on

the lake" and that he taught him how to row when he was scarcely big enough to even handle the oars! Water too played a role in his father's life as, before Ray was born, his father was the doctor to the island of Inishbofin.

Ray headed off to UCD as a teenager to study for a BSc and continued his studies via post-graduate research into the Wicklow Granite. In 1962 he was appointed as Assistant Junior Lecturer in UCG. Later in his career he acquired an MSc in Oceanography.

At that time a lot of British universities used to carry out research in Connemara. As he quickly realised that it was almost impossible to compete with their equipment and resources. It was a natural deviation for Ray to begin to concentrate his research activity on the seashore, or as Ray himself puts it "to begin rooting around on the seashore!"

Thus began his odyssey into marine research and he commenced with several papers on the composition of beach sands.

He managed to convince Prof. Mitchell, an Engineer Geologist, the then Head of the Department of Geology, to introduce marine geology to the BSc course. Until then geological maps reached the shoreline and "only a blue boundary appeared thereafter, - so did the geology stop there" he wonders?! Because of his ever-increasing interest in marine geology and the dearth of like-minded scientists, Ray availed of the opportunity to go out to sea on several ships, one of the first being the *Prince Madog of Wales*. One of her cruises showed for the first time prospectivity on the Porcupine.

As a Junior member of the teaching staff Ray tried to



Ray Keary on one of many data collecting cruises.

encourage an interest in marine science and he credits Prof. Mitchell with a great degree of "tolerance" as he let Ray pursue what was by now his main scientific interest. Also helpful was the fact that the Zoology Department in the college was also involved in marine work and there was real co-operation between both departments.

In the earlier cruises the data collection methods included sampling equipment, "sparkers" for shallow seismic data and the Kelvin Hughes Transit Sonar for side-scan sonar data. In the case of the sparkers two were strapped together and two sets of bang boxes were used.

Ray had many extra-curricular activities during his time in Galway. Perhaps not known to too many is the fact that he used to run guided tours of Galway's building heritage. The tours took place on a Saturday afternoon, and oddly enough many of the buildings visited lay adjacent to some well-known watering holes!

As the emphasis on marine science slowly began to improve UCG acquired a small boat the *Ona III* and Ray began taking students out on it. One particular day, whilst dredging west of the Aran Islands, it was dead calm. At sea on a calm day mist can play tricks with the eyes and it certainly did to one of the students that day - a very well known "character" who holds distinguished office in Irish Marine Science today. For as Ray recounted the story to me this government official indeed claimed full sight of that great island, Hy Brasil, that very day!

Ray was appointed Statutory Lecturer in UCG in 1970, around the same time that Prof Mitchell retired and a few years after Dr. Williams became Director of GSI. The latter appointment was significant since Dr. Williams had been involved in Marine Geol-

ogy in New Guinea. Dr. Williams agreed to set up a Marine Section in GSI if Ray would come on board (ahem!) and so Ray did in 1975. Times were good in the early seventies, with the economy in good shape, and also in 1975 the

a link with the British Geological Survey and a series of corroborative maps, mainly for the Irish Sea, was produced.

In 1979 BIM asked for a piece of work to be done off the Donegal coast and this



Dr. Peadar McArdle presenting Ray Keary (right) with a Cunningham Award - a Member of Staff of the Year award a few years back.

National Science Council bought the *Lough Beltra* in Killybegs. She was the first Irish research vessel. Despite Ray's preference for Western waters she began work in the Irish Sea, since the demand here was greater than off the west coast, with gravel banks being of particular interest.

During her initial cruises the equipment used included sparkers, boomers, side-scan sonar (a little later) and, because of a link with Prof. Tom Murphy and the Dublin Institute for Advanced Studies (DIAS), magnetometers.

Then in the late '70s the economy hit some hard times and the GSI Marine section was whittled down to just Ray himself as other temporary colleagues moved onwards. This time was characterised by

turned out to be very significant indeed as it was the first applied work that had been requested in the marine field. The situation was that there were two patches of clear ground for trawling but they lay separate, and trawling each on its own was uneconomic. The brief was to use side-scan sonar techniques to locate a clear path between the two. This was done very successfully and a GSI Report was published in 1980 entitled "RS 80/1 Marine Geology, Identification of potential trawling-ground by side-scan sonar." Co-operation with DIAS on this project also produced some very interesting magnetics data.

By now Ray was espousing the view to all who would listen "provide the service and

Applied Science for Net Profit

The Marine Institute, Marine Fisheries Services Division, Abbotstown, Dublin 15, Ireland.

Website: www.marinic.ie

the market will come." Unfortunately though the economic climate wasn't improving much and the *Beltra* was taken out of service for a year due to insufficient funds. Then over a pub conversation (where else?!) with Captain Frank Traynor, skipper of the *Beltra* and 2nd Captain of the *Asgard*, Ray had the brainwave of using the *Asgard* as a test case for research. The *Asgard* herself, as an almost totally manual ship, was not really appropriate for surveying but her size was about right and using her would give one an idea of what kind of a schooner was best suited to research. So, very optimistically, Ray put a proposal to his department to hire the *Asgard* for a few weeks.

Miraculously for the economically stagnant time, the proposal was approved and Ray gathered together a mix of scientists for the experiment. Despite dreadful weather conditions the experiment was a success - "she could hold a steady course and she was much more sea-friendly than the *Beltra*." Despite the relative lack of sea-friendliness of the *Beltra*, Ray's memories of the *Beltra* are mostly good ones. But there was one notable exception - he broke his leg in Galway getting back onto her after seeing a movie

downtown! To this day a piece of metal holds his left leg together after the break.

Around this time the UN Law of the Sea was in progress, with Piers Gardiner to the forefront of the quest to define our boundary - the Irish/Gardiner formula. Similarly, Ray recalls that Dr. Williams was summonsed to the Department of Foreign Affairs to draw a line for the boundary. Ray relates that Dr. Williams did a fine job considering what we now know compared to what he knew then. Then, the boundary definition aspect of marine responsibilities was taken from GSI and given to the Petroleum Affairs Division (PAD) who then proceeded to do some work around the boundary line. Never one to capitulate easily however, Ray "continued to agitate" about the need to survey our entire seabed area (10 times the size of our land area). Finally, the current GSI Director, Peadar McArdle reacted to the ongoing agitation by politely requesting a plan and a cost figure! Ray duly obliged, estimating a cost of £10m, which proved later to be quite accurate indeed for its time.

Then another significant event occurred - the GLORIA survey. GLORIA was a long range mapping device and

GSI, through Ray, got money from the Marine Institute to use the technology and the survey proved successful in that it showed that GSI could run a big marine survey.

By now, Dr. McArdle was fully convinced that, as Ray had argued for years, the entire seabed area should be surveyed and a formal proposal was submitted to government. Then, in April 1999 the Government approved a £21m survey of the Irish Seabed. A short time later Ray Keary retired, content that his career dream had finally been realised. Today the seven year survey is delivering high quality data and is a testament to his outstanding dedication to marine science.

Throughout his career Ray has been tremendously supportive of all aspects of marine science. He has consistently and selflessly given of his time and energies to assist a plethora of academics and others involved in the marine world, and still, even though retired, assists GSI in the National Seabed Survey. Just as light-houses guide ships ashore safely, we in GSI are thankful that Ray still offers us some guiding light from time to time.

Enda Gallagher, Geological Survey of Ireland, Beggars Bush, Haddington Road, Dublin 4.

YOUTH ANGLING

the way forward

THE Dublin Angling Initiative has been a major success in encouraging youth angling around the capital.

"The kids love it, it's a fun day out for them, and if they catch anything, well it's happy days!" So says Fiona Duignan, from the NICKOL Project in north Dublin, just one of the many groups in Dublin who have benefited from taking part in the Dublin Angling Initiative run by the Eastern Regional Fisheries Board.

Established in 1995, the Dublin Angling Initiative (DAI) has worked to develop angling in the greater Dublin area. The Initiative began under the management of Josie Coleman and Godfrey Donohue and is presently managed by recently appointed Des Chew.

As there are many angling locations in Ireland to choose from, it is often forgotten that Dublin has many venues for the enthusiast. As well as promoting these fishing venues, the Initiative's purpose is to promote and service angling in the greater Dublin area. Interest in fishing has traditionally been handed down through generations within families, regardless of where they live. The DAI aims to provide an opportunity to introduce those not involved in the sport and help develop their interest.

Throughout the summer months the Initiative has been running up to 12 courses a week providing children and young adults the chance to take part in the sport of angling, whether it be game, coarse or sea fishing. Hosting up to twelve people per course and ranging from eight to 18 years old respectively, the Initiative teaches the basics in angling where to fish, how to fish and what equipment to use.

"Some of the young people we take out would never have thought of going fishing," says Fiona Duignan. "But they really enjoy it. It's opened up new skills to learn and Des Chew and his team have a wonderful understanding with these people. It's one of the few activities that we do where people of all ages take part together."

The courses also cover water safety, environmental awareness and the value and importance of conservation methods, as these are fundamental to angling. In some cases the participants are taught to prepare and cook a fish. The DAI provide all tackle, bait and tuition.

Venues used are the Royal Canal at Leixlip and Maynooth for coarse fishing. Rathbeggan in Dunshauglin, the Blessington lakes and Aughrim in Co. Wicklow are the game locations, whereas Greystones is principally used for the sea angling courses. Most of these



locations are easily accessible to the angler by bus or rail in the Dublin area.

Many community groups such as Youthreach, Summer Projects, Youth Strategy Groups and National Schools (i.e. School Tours) from the Dublin area participate in the Initiative. Volunteers from the relevant groups, as well as local angling clubs, help to supervise them. These groups come back to the DAI year after year and the Initiative is involved in assisting groups to join existing or form new angling clubs. "We have volunteers from tackle shops and angling clubs that help supervise these courses and we really couldn't do it without them," says Des Chew, project manager of the DAI. "They prepare bait and tackle as well as coming out to help on the day."

The children are also encouraged to utilise their local tackle shop to get advice on equipment and other angling supplies. The tackle shop is a focal point for many anglers and a lot of information can be obtained for the new and inexperienced angler.

This scheme has been well received and has done much to popularise angling, particularly amongst those who do not normally have the opportunity to engage in the sport. Since this initiative started over five years ago, thousands of young people have experienced angling on sea and game fisheries and at coarse angling venues. Fishing is a wonderful hobby catering for all ages, male and female and it is hoped that in time, with the assistance and support of this Initiative, more waters in the Dublin area will be opened for the enjoyment of all enthusiastic anglers.

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Designation of Nitrate Vulnerable Zones

By Maurice O'Callaghan

THE imminent designation of Nitrate Vulnerable Zones - NVZs - could bring about a significant improvement in Irish environmental legislation. Water pollution has been steadily increasing for decades and agriculture has for long been identified as a major contributor, in fact the largest contributor. There is a need for additional legislation specifically addressing agricultural activities which are known to involve a high risk of causing water pollution. Phosphorus and, to a lesser extent, nitrates are the main pollutants in Irish waters. The EPA estimates that agriculture is the source of 73% of phosphorus, and 82% of nitrates, entering Irish waters. Ireland is the only EU Member State which has not yet designated any NVZ under the 1991 EU Nitrates Directive. The EU Commission has announced its intention to take a case against Ireland in the European Court of Justice for failure to designate NVZs. We have yet to grasp the nettle firmly in the case of legislation to protect waters from pollution by agriculture. But changes are on the way.

The environmental challenges presented by the agricultural sector were well described recently in an article (Sherkin Comment 2001, Issue no 29) by Mr Iain MacLean, a director of the Environmental Protection Agency, in which he points to the need for

significant improvements in agricultural practices and a strengthening of Irish legislation. He advocates, for example, a minimum six-month storage requirement for organic waste on all farms. He also advocates a prohibition on slurry-spreading for the six-month period from October to March inclusive. Are we ready to meet these challenges?

Minister of State Dan Wallace at the Department of the Environment and Local Government has indicated that Nitrate Vulnerable Zones will be designated in relation to certain groundwaters in five counties - Carlow, Cork, Kerry, Louth and Waterford - which are affected

by nitrates from agriculture. In these areas, special attention will be given to protecting water quality, especially in terms of requiring better management of manures and slurries. In the case of surface waters, the EPA issued a report in March 2001 which identified 17 estuaries and coastal waters as eutrophic or potentially eutrophic due to excess nitrogen and phosphorus inputs. A large proportion of these nutrients will have come from agricultural sources and this report will have to be

taken into account when designating NVZs. The Minister was, in fact, quick to respond to this report by making Regulations (in June 2001) which require higher-level treatment for sewage discharges in these areas. The Regulations require the removal by local authorities of nutrients from discharges from large sewage treatment plants into these waters. The Minister has also indicated recently that General Binding Rules are being

prepared in relation to the recovery of organic waste on farms. It seems, therefore, that better legal protection for water quality is on the way. I welcome this prospect.

Take, for example, slurry-spreading. Landspreading of

slurry on ground which is waterlogged or frozen creates a high risk of water pollution. There is a case for a simple, straightforward prohibition of this practice so that it would be possible to prosecute an offender. There is a case for prohibiting slurry-spreading at unsuitable times such as the months of December or January, when ground is almost certain to be waterlogged or frozen and slurry spreading is almost certain to be washed into waters with the first heavy fall of rain. There is a case for prohibiting the overloading of land with excessive nutrients, whether from slurries or fertilisers, which are almost certain to leach into waters. There is a case for specifying a necessary minimum capacity for slurry-storage on farms: too often slurry is spread at the wrong time simply because the storage tanks - of inadequate capacity - are full. There seems to be a clear case for imposing specific legal requirements in all of these cases.

I am aware that there are general provisions in the Water Pollution Acts and the Waste Management Acts which make it an offence "to cause or permit polluting matter to enter waters" or to store, recover or dispose of waste in a manner "which causes or is likely to cause environmental pollution". But in most cases the odds of securing a prosecution are stacked too high against public authorities. In reality, local authorities do not have the resources for the scale of monitoring

and investigations that may be needed for widespread, effective enforcement. It involves too heavy an onus of proof to demonstrate that environmental pollution actually occurred and was caused by a particular careless action or malpractice on the part of a particular person at a particular time.

I acknowledge that there are Codes of Practice which advocate good agricultural practice and these codes have definite merits. They set standards and promote good practice. They draw attention to carelessness which might lead to pollution. But a voluntary code of good practice is not law. Compliance is not a legal requirement and non-compliance is not an offence.

In fairness, there have been some important moves in the right direction in recent years. The licensing system operated by the EPA has been extended to apply to certain intensive agricultural activities (e.g. large-scale poultry production and pig-rearing). This probably covers about 100 farmers or less. It is also to be welcomed that the Department of Agriculture, Food and Rural Development takes steps to promote environmental protection, particularly by the inclusion of Nutrient Management Planning in REPS. However, the REPS scheme reaches about 40% of farmers and does not reach those large-scale farmers whose activities are, arguably, very likely to be the main source of nutrients in waters.

A small number of local authorities (5 at the last count) have taken the important initiative of adopting local by-laws under the Water Pollution Acts. These by-laws are intended specifically to combat water pollution from agricultural sources. The councillors and officials in these areas are to be commended for their foresight. Cork County Council was first to adopt by-laws, in 1999, and was followed by Tipperary South, Westmeath, Cavan and Offaly. Hopefully more will follow. However, the by-laws typically apply only to specific, focus areas where water pollution is a particular problem. The protection of water quality deserves a strong legal basis in all areas. Perhaps we need to follow the example of countries such as Denmark, Germany, Austria and the Netherlands each of which has designated the whole country as an NVZ ? I look forward with interest to developments in this area.

'In most cases the odds of securing a prosecution are stacked too high against public authorities. In reality, local authorities do not have the resources for the scale of monitoring and investigations that may be needed for widespread, effective enforcement.'



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The US Fishery Observer Programme

By Michael Ludwig

MANAGEMENT of a fishery can not be complete without seeing what is being caught, how it is caught, and what is being kept, or dumped overboard. Just as a store owner needs to understand what is in the store to make wise choices of replacement stock, resource managers need similar insights of their resources to be successful. More than 100 years ago, the US began observation of fishing practices and harvests. However, waiting on the dock does not facilitate answers to many of the most important questions. To obtain those insights, the National Oceanic and Atmospheric Administration (NOAA) sends trained observers to sea on commercial fishing vessels. This year, NOAA will place observers on slightly more than 10 percent of commercial fishing trips for selected species or gear types in the northeast. Observers will focus on groundfish gill netting in the Gulf of Maine,

swordfish long-lining, pelagic drift-netting and pelagic paired-trawling efforts. From Maine to Virginia there will be an observer on about 1,600 trips, and cumulatively, they will log almost 10 years of "days at sea." The observers are not on board to police the fishermen. In fact, much of what they see and hear will never be revealed. By making that pact with the fishermen, NOAA observers can perform their work in "friendly partnership" with the fishermen. During the trips, the observers will transmit information on the harvesting. When they land, there will be more complete reports and samples from harvested species.

What observations are made at sea? There are three, main types of information gathered; 1) impacts on protected species, 2) gear operation, and 3) biological characterisation of the catch. Protected species such as whales, seals, dolphins and seabirds are caught while fishing. Why and how that occurs and solutions to the problems start, frequently, with observations. For instance, dolphins often swim

with tuna and become a bycatch (discards). Hundreds of thousands of dolphins used to be killed, accidentally, when tuna were harvested in purse seines. The invention of the net spilling manoeuvre that releases dolphins but retains the tuna has greatly lessened the problem. The technique is based on discussions with fishermen and observations. Dolphin-free tuna is now the American standard.

Estimates of bycatch of non-protected species are recorded also. Because shrimp fishermen use small mesh nets, they catch a lot of young fish of other species. Shrimp fishermen are often accused of being the most destructive of all fishermen because they can catch up to nine pounds of bycatch for every pound of shrimp in the net. Fish and sea turtle release devices such as the Nordmore Grate and Turtle Excluder Device systems were

invented to resolve these problems. They were tested at sea, under the watchful eye of observers. And, the observations were used to set the devices as standard gear. By speaking with fishermen, their experiences are woven into management and that has benefits for everyone.

The third major responsibility of the observers is biological characterisation of the catch. Size and health, sexual maturity and nutrition data are not easily gathered at the dock because many species do not come ashore in one piece. (The information on the age of some deepwater fish from the North-eastern Pacific

[*Sherkin Comment* No. 29] comes from observer gathered fish scales and otoliths.) Sea scallops are harvested solely for the muscle mass that opens and closes their shells. Food availability, water temperature and bottom type influence

muscle size and quality. Because nothing but the muscle comes ashore, we'd know little about the resource without observers taking measurements and samples of the shells, and the organism itself. After a marked decline in sea scallop size and number, areas were closed to allow the stock to rebuild. When parts of the closed areas were reopened, last year, the character and quality of the catches were easily assessed using observer data.. Another unique value of observers is their ability to collect species we don't use or see often in our scientific sampling. As commercial fishing seeks new sources of fish, they are "sampling" areas that researchers may have never sampled. The catching and preservation of unusual species for land-side study is expanding our knowledge of the oceans faster and less expensively than ever imagined.

We live in a time where traditional fishing practices have reached or exceeded the ability of the global ocean to sustain the volumes being harvested. Today, we know that resources

can be exhausted. However, the pressure to harvest and the difficulties associated with managing common property resources, such as fish, hampers successful management. Aquaculture is partially filling the shortfall. Today, one third of the seafood consumed globally is cultured. Will aquaculture displace traditional fishing and allow the native species to recover? Probably not, because; 1) fishing wild stocks is the easiest way to feed people. And, 2) most aquaculture practices are costly. Those costs preclude raising products that do not recover the investment. If one follows the money, it reveals shrimp grown in Bangladesh or South America moving onto plates in Europe and North America - few are used to feed the growers. We need to observe all fishing practices if resource management is to be successful.

Michael Ludwig, NOAA, NMFS, 212 Rogers Ave. Milford, CT USA 06460, USA.

'From Maine to Virginia there will be an observer on about 1,600 trips, and cumulatively, they will log almost 10 years of "days at sea".'

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Red Band-fish in Irish Waters

By Declan T. Quigley

THE red band-fish (*Cepola rubescens* L.) is a very elongate ribbon-like benthic species found singly or in small groups at depths ranging from 10 to 450m, with an 'optimal depth window' between 60-120m, and inhabits temperate and subtropical waters. In the eastern Atlantic it occurs from Britain and Ireland to north Senegal, including the Mediterranean Sea but not the Black Sea. Off the West Coast of Britain, the species is most frequently found at depths of 70-200m, where it constructs and inhabits burrows in stiff muddy sand substrates.

For many years the red band-fish was considered rare in Irish waters, probably because its habit of lying buried in stiff mud made it difficult to capture and also because it had no commercial value. Up until the early 1950's only a handful of specimens had been recorded and most of these were fish found stranded after severe storms when, presumably, they had been driven out of their burrows. However, the species is now known to be relatively common in certain areas, especially where there are suitable substrates for it to burrow in. Trawlers fishing for Norway Lobster or Dublin Bay Prawns (*Nephrops norvegicus* L.) have captured a significant number of the specimens recorded to date. Several populations were discovered during the development of new trawling grounds during

the 1960's and 1970's, particularly off S (Waterford), SW (Kerry) and NE coasts (NE Irish Sea). The species seems to be uncommon on the NW and E coast and so far unrecorded from the N and SE coast (see Table 1).

The red band-fish spends long periods concealed curled up in its vertical burrow. Indeed, the respira-

tory properties of its blood indicate adaptations to survival in oxygen deficient environments. The depth of the burrow is related to the length of the fish and it uses its tail to keep tactile contact with its burrow. Measurements of burrows showed



Photo © Declan Quigley

the burrowing crab (*Goneplax rhomboides*) and the Norway lobster (*Nephrops norvegicus* L.) in an arrangement that suggests a possible behavioural association. In daytime, red band-fish have been observed partially emerged from their burrows, but more frequently with their heads some 10-20cm below the surface. At the burrow entrance fish position themselves with their heads pointing into the current. Observations in aquariums have shown that, outside of their burrows, the red band-fish swims slowly, maintaining itself vertically head uppermost, with very pronounced body waves.

Maritime Region	%	Number
South	21.6	24
South West	39.6	44
West	12.6	14
North West	2.7	3
North	0.0	0
North East	22.6	25
East	0.9	1
South East	0.0	0
Totals	100.0	111

Table 1: Irish Maritime distribution of Red Band-fish

the burrowing crab (*Goneplax rhomboides*) and the Norway lobster (*Nephrops norvegicus* L.) in an arrangement that suggests a possible behavioural association. In daytime, red band-fish have been observed partially emerged from their burrows, but more frequently with their heads some 10-20cm below the surface. At the burrow entrance fish position themselves with their heads pointing into the current. Observations in aquariums have shown that, outside of their burrows, the red band-fish swims slowly, maintaining itself vertically head uppermost, with very pronounced body waves.

The results of stomach content analysis indicate that red band-fish rely exclusively on zooplankton. Indeed, the species appears to be well

adapted to a planktonic diet as evidenced by the relatively large number of gill rakers (c45). Red band-fish have frequently been found in the stomach of John Dory (*Zeus faber* L.), dogfish (*Scyliorhinus* spp.), whiting (*Merlangius merlangus* L.), hake (*Merluccius merluccius* L.) and cod (*Gadus morhua* L.). In

Juveniles migrate to the bottom when they reach 5-6cm. In the NE Atlantic, the spawning season appears to be shorter (June to September). Although post-larvae have been found in the plankton of Galway Bay in May, July, August and September, adult fish have been captured in various locations around the coast

Once considered to be rare in Irish waters, the red band-fish is now known to be relatively common in certain areas, especially where there are suitable substrates for it to burrow in.

parts of the Aegean Sea it was found that John Dory >14cm T.L. fed almost exclusively on red band-fish <30cm T.L. (age 3). John Dory are particularly well adapted to catching red band-fish in their burrows because of their ability to protrude their jaws extensively, whereas the other species probably prey on red band-fish when they are out of their burrows. Several specimens have been found in dogfish and whiting stomachs in Galway Bay and one specimen was found in the stomach of a cod captured on rod and line in Dingle Bay. However, anglers, rarely capture the red band-fish itself, which is perhaps unsurprising considering the species' planktonic diet.

In some parts of the Mediterranean (e.g. Aegean Sea) the red band-fish forms a small (1.4%) but significant component of the trawl catch that is discarded, whereas in other areas (e.g. Spain and Italy) it has some commercial value, particularly during the summer months. Annual catches of red band-fish off the Catalan coast (NW Mediterranean) are relatively important, about 150 tons, and similar to those of other highly valued species such as the gilt-head sea bream (*Sparus aurata* L.), Norway lobster and pandora (*Pagellus erythrinus* L.). Maximum catches occur at the end of spring (May/June) and reach a minimum at the end of autumn and the beginning of winter (December/January). This seasonality seems to be related to the species' reproductive behaviour, since the highest catches occur during the spawning period, when temperatures reach about 17.5°C.

Throughout its geographical range, spawning occurs over an extended period, possibly from late spring through to mid-autumn. In Spanish waters (NW Mediterranean), red band-fish larvae appear in the plankton from May until October, and from May until November in the western and northern Aegean Sea.

throughout the year, though mainly during the summer months.

The red band-fish is characterised by bimaturism (i.e. males and females mature at different ages and lengths). Males mature later than females. In Italian waters, the minimum length at maturity for males and females is 11.5cm and 13.5cm respectively, whereas in Spanish waters, it is 33.2cm and 15.2cm respectively. All females >17cm and all males >38cm are mature. The longevity of females is about 8 years. Hence a female may reproduce up to three or four times. Growth is rapid in the first 4-5 years. The maximum size is about 70cm.

Mature red band-fish (age 4-8) are characterised by sexual dimorphism with respect to size, tail shape and colouration. In both sexes, the main body colouration is orange-red which pales to almost white on the ventral body surface anterior to the anus, while the anterior part of the dorsal fin is a darker vivid-red. In males, the anal, caudal and dorsal fins are a golden-yellow with a narrow, pale blue/violet fringe. The latter colouration is absent in females whose dorsal, caudal and anal fins are orange-red and pelvic fins very pale or colourless. In mature males, the tips of two or more of the middle rays of the caudal fin project for several centimetres whereas this feature is absent in mature females. The red band-fish's striking colouration and attractive appearance make it conspicuous in any fish catch. The author is interested in obtaining specimens from any part of the Irish coast, but particularly the NW, N, E & SE (Mobile: 087-2349440; Email: declanquigley@eircom.net; Fax: 0404-62406).

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



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Life as a Nature Photographer

By Richard Mills



Photo: © Robbie Murphy

Richard Mills at work.

BEING a nature photographer is as much a way of life as a business. Every season and every location has something fascinating to offer. Whether it's flocks of brent geese grazing in Dublin's north suburbs, unconcerned by passers-by and heavy traffic, or the prodigal beauty of wild flowers spangling high hedges in a country lane, the pattern of small plants colonising a stone wall or the light and shadow over a mountain lake - there are opportunities to be found everywhere and captured through the lens. If there is one thing I have learned over the years, it is always to have a camera loaded and ready wherever I go. All too often, the moment must be seized instantly it presents itself, before it disappears forever. Every photographer has a mental catalogue of wonderful shots missed throughout the years through not being ready.

Nature has different activities in every season. In spring the busy work of nest building starts and you keep a sharp eye out for the vital clues, such as a thrush carrying dried grass, or a blackbird with a beakful of worms. Careful observation is then followed by slow and patient setting up of equipment, so that the birds are not disturbed while being photographed. It is important to know the species and what it is likely to do, how it is

likely to behave, in order to get good pictures. The corncrake, for example, is extremely skulking, and although you will hear its call clearly enough in its few strongholds, it can take hours of patient waiting to catch a glimpse of this elusive and now sadly declining species. Others, like the heron or the redshank, are easier to shoot from a hide or even from a car window, since only a moving human figure alarms them, not a vehicle. There is always the chance that you will discover something unusual, like an albino oystercatcher or a rare wader among a huge mixed flock on the tideline. In winter, of course, we get great numbers of migrants moving down from colder countries to our relatively mild climate. One of the most colourful and spectacular of these has to be the waxwing, which feeds on berries in suburban gardens. I can well recall the exceptionally severe winter when I spent several days chasing a flock of waxwings around a Dublin suburb, arousing the suspicions of both



Albino Oystercatcher

local residents and the gardai as I cruised in and out of housing estates with a long lens poking out the car window. One of the drawbacks of being a nature photographer is that your intentions are occasionally misunderstood!

Animals are often even shyer than birds, and can demand long periods of sitting or standing



Photos: © Richard Mills

Red Fox

motionless to get that perfect shot. Squirrels rarely give you time to focus before they leap off with a

up and down through the tangles of a bramble bush as easily as if the stems were broad staircases.

Ireland, and I never tire of finding new ways to capture their beauty, whether it be the tightly curled fronds of a fern before it expands, or the delicacy of silk button galls on oak leaves. Fungi are fascinating too, appearing as if by magic overnight in the autumn woodland. The fly agaric is delightful to photograph, while the pungent dog stinkhorn has an elegance, which comes across well on camera.

There are times when, staggering up a steep hill or along a rocky shore, loaded down with tons of equipment, I wonder if there aren't easier ways to earn a living. But then the setting sun sends a shaft of light across the heather, or a flight of ducks takes off in a flurry of wingbeats, and discomfort disappears in the excitement of catching the moment. Seeing and enjoying nature in all her seasons and moods, and capturing her most beautiful images for all time, is both a privilege and a deep pleasure.

Richard Mills is a photographer with Examiner Publications, Cork.



A blackbird at nest.

whisk of their tails, while rabbits and hares can be frightened away by any unwary movement. Sometimes the most unlikely subjects can provide fascinating material for shoots. I once spent an entire morning focusing on a group of brown rats feeding on spilled grain, scurrying

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Waxwing



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Sawfly Larvae



Cockchafer

Life as a Nature Photographer
By Richard Mills

Photos © Richard Mills



Grey Heron



Horse Chestnut in Autumn



Fly Agaric

Mallards

By Oscar Merne

OF the sixteen duck species which breed in Ireland, the Mallard, or Wild Duck, is by far the most widespread and numerous, occurring in all kinds of still or slow-moving freshwater and brackish wetlands. Outside the breeding season they are also found on tidal estuaries and sheltered sea bays. In autumn, up to 1,000 sometimes rest on the open sea in Dundalk Bay, awaiting nightfall, when they fly to the rich pickings of the stubble fields around the bay. In winter, large numbers of migrant ducks of various species arrive in Ireland from Iceland, northern Britain, Scandinavia, central Europe, and even western Asia. When these are here several species outnumber the Mallard, but none is so widespread. Most of the winter immigrants tend to congregate in large flocks in the major wetlands, while the Mallard are still to be found in small ditches and ponds throughout the country. Most of our native Mallard appear to be fairly sedentary, but ringing recoveries indicate that they are joined by winter immigrants from Britain and western Europe.

The mid-winter population in Ireland, of both native and immigrant Mallard, is estimated to be c.50,000 birds, though it is a difficult species to census because of its very widespread distribution outside the major wetlands. There are probably considerably more than 50,000 in Ireland in autumn, before shooting mortality takes its toll. Mortality of juveniles



The Mallard is by far the most numerous and widespread of the sixteen duck species that breed in Ireland.

can be up to 75%, and of adults 55-65%. One lucky bird is known to have lived nearly 30 years!

The breeding population is estimated to be c.20,000 pairs, based on surveys of Irish breeding birds in 1968-72 and 1989-91. In addition to the wild breeding birds, large numbers are hatched and reared in pens by wildfowlers, who release the fully-grown ducklings into the wild in late summer to provide more birds for hunting when the season opens

on the 1st September. Rather few migrant wild ducks have arrived in Ireland by that date so it is useful to have extra hand-reared Mallard available to reduce the risk of over-exploiting the wild birds. Many of the hand-reared Mallard survive the shooting season and breed successfully in the following spring, thus contributing to the maintenance of a healthy wild population.

Outside Ireland and western Europe the Mallard is found right

across temperate and sub-arctic regions of Asia and North America, and in winter extends south to c.20 degrees N. apart from in the Sahara Desert. Introduced populations are established in Australia, New Zealand and South Africa. Several distinct sub-species are found in Greenland, Hawaii, and the Caribbean area. Mallards have long been domesticated, giving rise to dis-

quite low – on average four to five ducklings per brood.

While the females are hidden away incubating and rearing the ducklings, the males often congregate into flocks (sometimes up to several hundreds) and in June and July undergo their annual moult of their flight feathers. They lose all the primaries together and are flightless for several weeks. So in order to

be less vulnerable to predators they also undergo a body feather moult known as an "eclipse moult", which leaves them rather drab, brown and streaked like the females. Once they are able to fly again they have a second body moult and emerge with fine new colourful



The average clutch size for the female Mallard is ten eggs, but as few as four and up to 17 have been recorded.

plumage in good time for the winter courtship. Mallard are "dabbling" ducks, that is, they don't dive but feed on the water surface, often up-ending to reach deeper water plants and aquatic invertebrates. They also feed on dry land, on spilt grain and weed seeds in cereal stubbles, and on waste from root crop harvesting. A wide range of terrestrial invertebrates (insects, worms, molluscs, etc.) is also eaten.

Mallard, like many other ducks, engage in courtship in mid-winter and form pair bonds. The females often begin laying in early February, though the main nesting season runs from March to June inclusive. Breeding continues at a low level (often involving second or replacement clutches or broods) until September, or sometimes well into October if the weather remains mild. The average clutch size is ten eggs, but as few as four and up to 17 have been recorded. Predation by crows and mammal predators is high, and small ducklings are very vulnerable to cold weather, so fledging success can be

plumage in good time for the winter courtship.

Mallard are "dabbling" ducks, that is, they don't dive but feed on the water surface, often up-ending to reach deeper water plants and aquatic invertebrates. They also feed on dry land, on spilt grain and weed seeds in cereal stubbles, and on waste from root crop harvesting. A wide range of terrestrial invertebrates (insects, worms, molluscs, etc.) is also eaten.

So, next time you are feeding pieces of bread to the Mallard in the park, think of how remarkably adaptable, successful and widespread are these familiar ducks.

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

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ENVIRONMENTAL PROTECTION AGENCY An Ghníomhaireacht um Chaomnú Comhshaoil

Plastic Shopping Bag Levy

D-Day 4th February 2002

By Matt Murphy

THE year 2002 will see a major step forward by the Department of the Environment to curtail the use of plastic shopping bags. On 4th February 2002 a new levy of 15 euro cents (12p) per bag will come into force. The Minister, Mr. Noel Dempsey T.D., has stated that "Plastic bags are a visible and persistent component of litter pollution in towns, throughout the countryside and along our coastline. They impact on ecosystems and on habitats and wildlife. Their prevalence suggests that we are careless of our environment, and of the environment image we convey."

"As a society, in marked contrast to many other countries, we have tended to make profligate use of plastic bags without having any regard to the consequences of this approach. It is conservatively estimated that some 1.2 billion plastic shopping bags are provided free of charge to consumers at retail outlets annually. This equates to roughly 325 plastic bags per person per year. "Our use of plastic shopping bags is excessive and largely unnecessary. I hope that consumers will respond to this measure by significantly reducing our consumption of plastic shopping bags dispensed at retail outlets."

"The levy will apply at the point of sale in supermarkets, shops, service stations and all sales outlets. Retailers will be obliged under law to pass on the full amount of the levy as a charge to customers at check-out and must be itemised on any invoice, receipt or docket issued to the customer."

Certain classes of plastic bags are exempt from the definition of a plastic bag for food safety reasons:

- i) fresh fish, meat and poultry and fresh products of each.
- ii) fruit, nuts and vegetables
- iii) confectionery
- iv) dairy products
- v) cook food, whether cold or hot provided that such products are packaged in bags not greater in dimension than 215mm by

345mm by 450mm. Other exclusions are plastic bags designed for re-use, which are used to contain goods and products and which are sold to customers for a sum not less than 70c (55p) each.

What retailers need to understand is that the levy will be collected by the Revenue Commissioners on a quarterly basis. They must keep in a permanent form a full and true record of:

- a) The number of plastic bags in stock, defined as plastic shopping bags, on the 4th February 2002.
- b) The number of all other plastic bags except for (a)
- c) Records of plastic bag purchases and sales must be retained for a period of six years.

If the retailer fails to furnish a return in writing to the Revenue Commissioners, Revenue will then estimate the amount of levy payable.

This new levy will change the habit of both the retailer and the consumer to shopping. It will not be an easy changeover. The theory is environmentally correct but in practice it will be the acid test for every one of us. Can we as a nation re-adjust to the shopping habits of the 40s, 50s and 60s when people took a re-useable bag or basket for their shopping. This "going back" will be a very contentious issue with retailers sooner rather than later, as it will create a security problem for them.

This levy must work. It is a major step forward in environmental awareness and care. Retailers and consumers will have difficulties adjusting but they must for the good of society. Let it be understood by all of us that this is but the beginning of many such levies, in order to get us to reduce our waste.

"Revenues raised from the plastic shopping bag levy will be assigned to the new Environment Fund - which will also receive funding from the proposed landfill levy. This fund will be used for supporting appropriate waste management, litter and other environmental initiatives. However, the Minister emphasised that the primary purpose of the levy was not to generate but to change consumer behaviour. "I want to see a significant reduction in the use of plastic shopping bags," said Mr. Dempsey.



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- Ireland's seabed area is 10 times the size of its land area?
- in its deepest areas you could hide complete mountain ranges?
- most of it is unmapped and unknown?
- it represents a large untapped resource of great potential to many sectors?

In others words 90% of Ireland's territory is underwater, undeveloped and undiscovered!

So how can we learn more about it?

- a comprehensive survey of Ireland's seabed is currently underway.
- it is a multibeam sonar survey of an area of 525,000 sq. km in size.
- it is one of the largest surveys of its kind ever undertaken anywhere in the world

Who benefits?

- Marine industries e.g. fishing, mineral and oil/gas exploration, marine engineering and infrastructure, renewable energy developments and marine policy-makers
- Marine biologists and research groups e.g. universities
- Marine heritage and protection
- EVERYONE! Yes everyone! Irish society as a whole benefits from all of the above.

A wide range of data will be collected from the survey and many different types of products will result from the data. The primary products will be bathymetric (water depth) and seabed classification maps of the Irish offshore.

To learn more please contact:

Deepak Inamdar,
Marine & Geophysics Section,
Geological Survey of Ireland,
Beggars Bush,
Haddington Road,
Dublin 4.

Tel: 01 604 1436
Fax: 01 604 1495

<http://www.gsi.ie>
<http://www.gsis seabed.ie>

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The Common Frog

Species Profile

Food: Slugs, worms, flies and other insects
Habitat: Damp vegetation, camouflaged ponds, hedgerows
Reproduction: Breed around February and spawn around March, Tadpoles hatch and grow from April to May, Tadpoles metamorphose into froglets, and leave the pond in June/July.

THE Amphibians were the first group of vertebrate animals to make a serious attempt at a life on land. Their history is long and complex. It is thought that the amphibians arose over 350 million years ago from a fish-like ancestor. They can, in general, move, feed and breathe equally well on land and in fresh water, but nearly all amphibians return to water to breed.

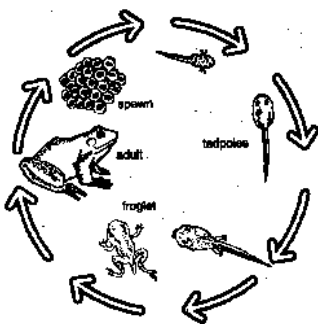
The Amphibians are divided into three groups: the Urodela (newts and salamanders), the Apoda (worm-like caecilians), and the Anura (frogs and toads). The Anura are the largest and most widely distributed amphibian group with over 3,500 species world-wide.

Irish Amphibians

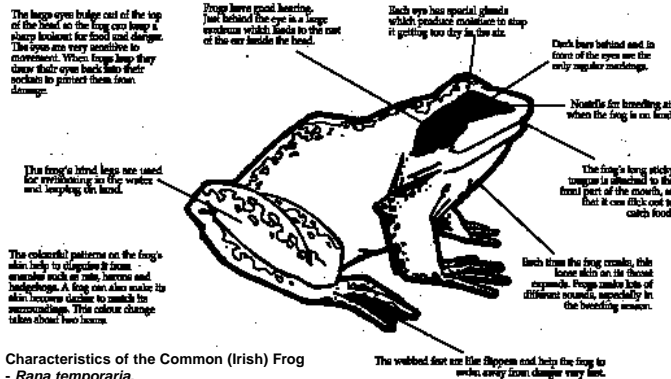
There are three species of amphibian found in Ireland - the Natterjack Toad (*Bufo calamita*), the Smooth Newt (*Triturus vulgaris*) and the Common Frog (*Rana temporaria*). The Natterjack toad is extremely rare, and is confined to a few areas in County Kerry. The Smooth Newt is fairly widespread in Ireland, although it may be very local in distribution in the north-west and south-west. The Common Frog is the only species of frog found in Ireland and is listed as an internationally important species. The skin colour and markings of the Common Frog vary enormously. The basic colour ranges from a pale green-grey through yellow to a dark olive-coloured brown. The only regular markings are the dark bars across the limbs, and streaks behind and in front of the eyes.

Frog Life Cycle

When the adults emerge from hibernation they migrate to congregate at various breeding sites. They may travel up to half a mile to find a site where they gather in large numbers. The males always arrive first and strike up a chorus of loud croaking to attract females. Frogs do not have any elegant courtship rituals; the eager male simply grabs the nearest female as she arrives at the spawning site. Jumping onto the female's back, the male wraps his fore limbs



Life-cycle of the Common Frog



Characteristics of the Common (Irish) Frog - *Rana temporaria*.

around her body and grips using nuptial pads, on the fore limbs - a position called amplexus.

Spawning itself can take place any time during amplexus and lasts only a few seconds. The female lays over 2,000 black eggs while the male releases sperm. The eggs are fertilised immediately and before their gelatinous capsules absorb water, swell and rise to the surface. After spawning the female usually leaves the pond, while the male often goes on to search for another mate.

Both male and female frogs return to the same pond year after year, probably recognising it from the smell of the water and algae.

Eggs & Frog Spawn

Each frog egg is 2-3mm in diameter and is enclosed in an envelope of jelly. When the egg is deposited in the water the jelly swells to a diameter of 8-10mm insulating the eggs from the water. The egg develops into a tadpole in 10-21 days (the higher the temperature the shorter the development time).

Tadpole

The tadpole digests the spawn jelly using a special secretion and hatches. Specific adhesive organs fasten the newly hatched tadpole to other spawn or plants in the pool. At this early stage tadpoles have no mouth, and until its mouth organs form it feeds on an internal yolk sac attached to the stomach. At approximately 2 days old the external gills, mouth and eyes are formed. At this stage it moves like a fish and begins to eat algae. At 12 days spiracles and internal gills are formed. At 5 weeks the hind legs are showing and the lungs are forming. It then has to swim to the surface of the water to gulp air. The tadpole has fleshy lips with rows of teeth for rasping away at water plants and by seven weeks it also eats insects and even other tadpoles.

Froglet

At 10 weeks the forelegs are growing. The hind legs are fully grown and the tail is reducing. At 14 weeks the tail is nearly fully absorbed. At this stage the froglets are usually starting to spend time on rocks or in nearby damp grass.

The Frog feeds on slugs, insects, worms, spiders and similar prey, but does not predate aquatic organisms. Scarcity of food or severe cold may delay metamorphosis and overwintering tadpoles are not uncommon in northern countries.

In winter frogs hide in frost-free refuges, under tree stumps, in stacks of turf, or in rock

piles where they enter torpor until the following spring.

Young frogs usually double in size by the following autumn and they reach sexual maturity in their third year. They can live for 7-8 years.

Frog Habitats

Frogs like to be near ponds which have plenty of algae and plants near the edge, usually with shallow edges so that they can easily climb out. In general the common frog seems to prefer ponds which have water flowing in and out of them. But they also use garden ponds, streams, bog pools, drains and ditches as breeding sites.

The terrestrial habitat of frogs is also important. The land around the breeding site or pond needs to be rough with long grass and some scrub to give cover for terrestrial foraging. Frogs also require habitats for hibernation. Large stones, old logs and hedgerows offer just such accommodation.

Frog Distribution

The Common Frog is considered to be widespread and common in Ireland but vulnerable in the rest of Europe. *Rana temporaria* has an extensive range of habitat - from sea level to nearly as high as the snow line on mountains 760m up. The 'Habitats Directive' of the European Community recommends that its exploitation should be subject to a management plan.

What can you do?

Garden ponds play an important role in maintaining frog populations. Common frogs often find new garden ponds unaided and successful populations can develop within a few years. The best way for an individual to help the Irish frog is to create a garden pond. It must have a minimum depth of 60cm and should have shallow edges.

Do not introduce fish or exotic amphibians like the American bullfrog into your garden pond. Some of these species are highly efficient predators and can eat large numbers of amphibians and other animals.

Further information on "The Common Frog" is on the fact sheet which, along with other fact sheets, is available from ENFO - The Environmental Information Service, 17 St. Andrew Street, Dublin 2. Tel 1890200191 (price of local call) Fax 01-8882946 Email: info@enfo.ie Fact sheets are also available at their Website: www.enfo.ie

Looking for information on the Environment?

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there are now 7 easy ways to make contact with Enfo

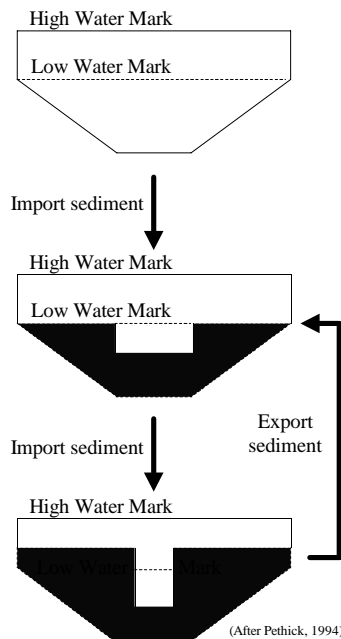
1. Write to: Enfo, 17, St Andrew Street, Dublin 2.
2. Telephone: 01-8882001 or 1890 200 191 (local).
3. Fax: 01-8883946.
4. E-mail: info@enfo.ie
5. Website: www.enfo.ie
6. Visit: The drop-in centre at 17, St Andrew Street, Dublin 2 (off Dame Street) and see the exhibition, visit the children's corner,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

Please contact ENFO for full details of our forthcoming exhibitions

How does an estuary work?

By Ian Townend

"HOW does an estuary work?" may seem like a simple question. A river flows to the sea and the tide goes in and out of the same inlet. However it is not quite that simple. Obviously the inlet has to be big enough to carry the floodwaters out to sea but many estuaries are far bigger than they need to be to handle the freshwater flow. Some are large valleys left by the last ice age which have not been able to infill with sediment. Whilst others, which have infilled, present a bit of puzzle. They are big enough to cope with the river flows and the tidal prism, which is the amount of water going in and out on each tide. However the tidal prism depends on the tidal range and the size of the inlet. This is where the puzzle lies - the size of the tidal prism depends on the shape and size of the estuary and yet, the size of the estuary depends, in some way, on the size of the tidal prism. It is a sort of chicken and egg problem. We seemingly cannot know one without already knowing the other.



There are lots of things that have an influence, like the size and length of the river catchment, the amount of river flow, the tidal range and geological setting of the estuary (often referred to as the antecedent conditions ie what went before). The recent geological record helps us to understand

something of the behaviour of estuaries. In particular, the period known as the Holocene (approximately the last 10,000 years, going back to the last ice age) is important because this determines the recent history of infilling by sediments. This has occurred as sediments are washed down the rivers, or carried in from the sea by the tide, and dropped in the more tranquil conditions of the estuary. The pre-Holocene geology is usually much harder and defines the basin in which the estuary sits. It may also provide local hard points, like the "narrows" to be found at the mouth of the River Mersey.

Looking at the amount of infilling that has taken place over the Holocene, we can begin to identify different types of estuaries. Firstly there are the deep fjords and fjards found in Scotland and Norway, where any infilling is insignificant and the shape and size of the estuary is entirely dependent on the shape carved out by earlier ice ages. Then there are a group of estuaries known as rias which are again rock forms left by previous ice ages but which have partially infilled. Examples are to be found on the south coasts of Ireland and England. Finally there are a group that are almost entirely formed within Holocene sediments, referred to as bar built estuaries and tidal inlets, as found on the east coasts of Ireland, England and the US.

This progression provides some clues as to how an estuary develops. Clearly there is a progressive infilling taking place that depends on the size of the initial basin and the amount of sediment available; either from erosion in the catchment, or from coastal erosion. Beyond a certain point, however, a sort of balance is reached and the estuary begins to release sediment, rather than retain it. This is all to do with a bias in the tide. When there is not much sediment present the greater depth at high water means that the tidal wave travels faster at high water than at low water. This helps to bring in sediment from the sea. However once the mudflats build up so that, even at high tide, water depths are quite shallow, this has the effect of slowing the tidal wave at high water. Clearly, this distortion will have the opposite effect and tend to export sediment from the estuary. As changes take place in the tides, the level of the sea, or the amount of flow from the

river, so the balance will continuously adjust.

So why does any of this matter? Well, changes such as dredging and reclamation can also alter the tidal prism and potentially the way the tide moves in and out (ie the tidal propagation). Such changes can therefore affect the whole estuary as well as the coast either side of the estuary mouth. Equally, sea level rise is likely to change the balance and so the shape and size of the estuary may also change,

with possible implications for developments in the flood plain around the estuary. It is because of the potential for far reaching effects that developments in estuaries need to be carefully examined, seeking to explain what is likely to happen to the estuary as a whole as well as in the immediate vicinity of the development.

Ian Townend, ABP Research, Southampton, England.

Barn Owl

Description:

The barn owl is, sadly, now a rare sight in many parts of Ireland. It is generally only seen at dusk or at night when hunting. It is honey coloured above and very white below. In flight the large wings make the bird seem quite big, but when settled it is about the size of a wood pigeon. It never hoots, but has a characteristic, long, eerie shriek.



Calendar:

Breeding season: Generally April to August, but may be earlier or later if conditions are favourable.

Nest: Mostly in undisturbed old barns or ruined farm buildings, but also in holes in trees.

Winter: Outside the breeding season, similar locations are needed for roosting purposes during the daytime.

Habitat:

Breeds mostly in lowland areas with suitable nest sites and feeding grounds, using farmland with a predominance of rough, unimproved patches, ditches and hedgerows or other areas likely to harbour prey. Fields with tillage crops and stored animal feedstuffs are also likely to be important. Even in these areas, it is likely to be very thinly distributed.

Diet:

The diet of barn owls in Ireland is almost exclusively of small mammals. In rural areas, they mostly take wood mice and pygmy shrews, though rats, house mice and birds are also important, particularly nearer urban areas.

How can I encourage barn owls?:

- Do not plough or re-seed any areas of rough or extensively grazed pasture, unimproved grassland, hay meadow or grassy verges of tracks, lanes or field edges, woods, rivers, ditches and hedges. These are very important feeding areas for barn owls.
- Create new feeding areas by establishing areas of tall/rough grassland.
- Leave old farm outbuildings and barns as barn owls use these as nesting sites, provided the roof is maintained to keep them dry and sheltered. They also favour holes in trees, so leave old hollow trees, particularly elms, oak, beech, sycamore and ash. You can also put out special nest boxes for barn owls.
- Barn owls can die from pesticide poisoning if they eat contaminated prey. Of particular concern are second generation rodenticides such as difenacoum, bromadiolone and the even more toxic flocoumefen and brodifacoum. Where rodent infestation is a serious problem, pest control specialists should always be consulted. If rats are not resistant, farmers should use warfarin as this has a lower toxicity to barn owls.

"Birds of Irish Farmland - Conservation management guidelines" is available from BirdWatch Ireland, Rutledge House, 8 Longford Place, Monkstown, Co. Dublin, for £6.00 post free.



Dublin Corporation Bardas Átha Cliath

Dublin Corporation is addressing Environmental Issues in a positive and proactive manner. Some major schemes, completed or nearing completion, have and will contribute enormously to environmental enhancement:

- **Dublin Region Water Conservation Project**
This project is now complete and has reduced leakage in the Dublin region by close to 40%.
- **Dublin Bay Project**
This project includes a new Wastewater Treatment Works, which has resulted in the cessation of dumping sewage sludge at sea and the recovery of sludge. It is creating a unique new environmental area in Dublin Bay, which will cater for a variety of recreational facilities and wild life protection.
- **Waste Management Plan**
The Plan is being implemented on an ongoing basis and has as a specific objective the recycling of 60% of household waste. 100,000 green bins have been distributed in the City and the programme is expected to be completed by June 2002.

Some of the many other projects at planning stage or underway, such as the Litter Management Plan, the development of a River Basin Catchment Plan, Bye-Laws to control the storage and presentation of both household and commercial waste and the ongoing monitoring and control of our water supply and drainage systems, will further enhance the environment of the City.

Publications of Interest

The Changing Wildlife of Great Britain and Ireland

Edited by David L. Hawksworth

Taylor & Francis 2000

ISBN: 0-7484-0957-2

Price: £150.00stg

This volume, a group-by-group summary of British and Irish biodiversity and a "stock-check and look to the future", follows on 25 years after *The Changing Flora and Fauna of Britain* (ed. David L. Hawksworth, 1974). Ireland is now included in the title, although the eminent contributors all hail from Britain and the emphasis remains strongly on Britain rather than Ireland. The 26 chapters cover flowering plants, ferns, mosses and their allies, fungi, algae, and land and freshwater invertebrates; although marine fauna is omitted, save for sharks in the fishes section. Here is an academic establishment view of biodiversity - and few of the foot-soldiers of natural history will be able to afford this book at such a price.

The general picture is of loss, reduction and an inflated increase in alien species. Our native flora and fauna clearly face a crisis, but it will take more than overviews and pious sentiment from the great and the good to put things right. What we need is more young naturalists and some good teachers to show them the way forward.

John Akeroyd

The Biology of Soft Shores and Estuaries

Colin Little

Oxford University Press 2000

ISBN: 0 19 850426 8

Price: £27.00stg

Marine and estuarine soft sediments are complex environments teeming with an amazing variety of plant and animal life. They provide essential habitats for many organisms whose lifestyles are dependent on the structure of soft sediments. This descriptive book is a comprehensive source of technical and practical information for anyone with an interest in marine and estuarine ecosystems. Designed to be accessible for all levels, topics covered include sediments as habitats, the ecosystems found in various sediments, sandy shores, mudflats, seagrass beds, salt marshes, mangrove swamps, estuarine and lagoonal habitats, and life below the tidemarks.

The Birdwatcher's Yearbook and Diary 2002

Buckingham Press 2001
55 Thorpe Park Road,
Peterborough, Cambridgeshire
PE3 6LJ, UK.

ISBN: 0 9533840 3 9

Price: £14.00stg

Although this book is primarily for the British market it is really a must for anyone that is interested in birdwatching in Ireland. Now in its 22nd year, it has 352 pages, which

include a bird diary and log chart which is most suitable for Ireland. Bird reserves and observatories are listed with a county directory full of information, clubs, bird reports, survey organisers. There is a guide to 150 leading bird-related websites and features sections of recent scientific discoveries in ornithology and a trade directory of the tradespeople serving birdwatchers. Great value for the bird enthusiast.

Land Waters

By Ro McConnell

By Barry Bracewell-Milnes

The Book Guild Ltd (2000),
(see above)

ISBN: 1 85776 458 7

Price: £18.50stg

Ro McConnell lived in British Guyana, now Guyana, in the fifties and her description of its natural history is a wonder. The reader will be entranced with the way she writes about the animals, plants and waters of this South American country. It makes one want to visit and explore its biodiversity for oneself. The chapter on the Botanic Gardens in Georgetown has a wonderful account of manes and especially the rearing of a baby one whose mother had been killed. Every page brings out why Guyana is one of the richest ecosystems in the world.

The Great Reshuffling - Human Dimensions of Invasive Alien Species.

Edited by Jeffrey A. McNeely

Published by IUCN, Rue
Mauverney 28, CH-1196,
Gland, Switzerland and
Cambridge, UK 2001

ISBN: 2-8317-0602-5

Price: £14.00stg

The rapidly increasing globalisation of travel and trade is leading to more and more alien species being introduced into areas where they may become invasive. This book presents papers from a workshop on the human dimensions of invasive species, giving a comprehensive and readable review of the social, economic and ethical impacts. It will be of interest to anyone with a professional interest in conservation or human economics.

Economic Values of Protected Areas

Guidelines for Protected Area Managers

Adrian Phillips (Ed)

IUCN -The World
Conservation Union/Cardiff
University 1998

ISBN: 2-8317-0461-8

Price: £15.00stg

A comprehensive source of information for all those concerned with the policy and practice of protected areas. Thoroughly informative and up to date, these guidelines are intended to help answer questions about the debate over leaving areas in their natural or near-natural

state, or developing and exploiting them. The book is divided into two parts with Part I providing core information about economic valuation, and Part II summarising a series of case studies.

A Threat To Life-The Impact of Climate Change on Japan's Biodiversity

by Akiko Domoto, Kunio Iwatsuki, Takeo Kawamichi and Jeffrey McNeely, Editors

IUCN/Tsukiji-Shokan
Publishing Company 2000

ISBN: 4-8067-1217-5

Price: £20.00stg

A Threat to Life outlines the most recent and best of Japanese research on climate change. The impact of rising carbon dioxide levels on global ecosystems and biodiversity is assessed, with particular reference to the plants, insects, birds, and turtles found in and around Japan.

This book presents an impressive range of studies and reveals the commitment and concern of numerous researchers on the destructive consequences human activity has on the climate and in turn marine and terrestrial ecosystems.

The Green Web-A Union for World Conservation

by Martin Holdgate

Earthscan/IUCN Publications
1999

ISBN: 1 85383 595 1

Price: £17.50stg

The Green Web gives a fascinating history of the last half-century of conservation throughout the world. The text was written by Martin Holdgate, formerly Director-General of IUCN 1988-1994, and thus provides an insight into the workings of one of the first conservation organisations. The IUCN was founded in 1948 and is now simply known as The World Conservation Union. The book describes its far-reaching network that links over ten thousand individuals and has produced the acclaimed Red Data Books on threatened species.

Enhancing Sustainability - Resources for our Future

Edited by Hendrik A. van der Linde and Melissa H. Danskin

Published by IUCN, Gland,
Switzerland & Cambridge, UK
1998

ISBN: 2-8317-0427-8

Price: £14.00stg

The Sustainable Use Initiative addresses uses of forests, fish and other wild resources, aiming to research and increase understanding of the need to manage these resources for future generations. This volume of papers gives an in depth overview of sustainability and management of fisheries, forests and wildlife throughout the world using case studies, with emphasis on community involvement in management and conservation.

Seabird Bycatch-Trends, Roadblocks, and solutions

by Edward F. Melvin & Julia K. Parrish, Editors

Uni. of Alaska Sea Grant 2001

ISBN: 1-56612-066-7

Price: US\$20.00

Seabird Bycatch provides an extensive assessment of seabird incidental mortality in commercial fisheries, underlining the escalating problem as a key issue in fisheries management and global conservation. The selection of reports, from the 1999 Symposium held by the Pacific Seabird Group, analyse methods of measuring bycatch and offer possible solutions. A thorough and detailed book that will increase awareness of this serious conservation issue.

Is a Mast a Must? - How to fight off intruders

By Barry Bracewell-Milnes

The Book Guild Ltd (2001),
25 High Street, Lewes, Sussex,
U.K.

ISBN: 1 85776 587 7

Price: £12.95stg

Anyone against telecommunication masts will like this book. It tells the story of a successful campaign in 1999 against the erection of a mast in Surrey, England. The chapter on "How to Fight Back" lays out the steps to be taken. The author pulls no punches. He states: "Legal action is not an attractive option for residents. The laws were to do them down and their opponents have virtually unlimited financial resources." This book has a message for anyone who wants to campaign on environmental issues.

The Heritage of Ireland

Edited by Neil Buttimer, Colin Rynne & Helen Guerin

The Collins Press 2000

ISBN: 1-898256-15-2 (pb)

Price: IR£25.00/£31.74

This fascinating book on Ireland's Heritage has 72 papers on a variety of different subjects such as Marine Archaeology, Urban Heritage, Science, Genealogy, the Natural History, Professional Conservator, Civic Trusts, Heritage Marketing, the Irish Music Industry. The text owes its origins to a one-year postgraduate course entitled the Diploma in Irish Heritage Management which was developed at University College Cork in the late 1980s. This book is ideal for anyone involved with natural, man-made and cultural heritage in Ireland. One is proud to read of the wonderful heritage we have in Ireland.

Discover the Islands of Ireland

By Alex Ritsema

Collins Press 1999

ISBN: 1-898256-67-5

Price: IR£14.00/£17.78

Flora Books

Wild Plants of the Burren & The Aran Islands - A Field Guide

By Charles Nelson

The Collins Press 2000

ISBN: 1-898256-70-5

Price: IR£10.00/£12.70 pb

The Burren of Co. Clare and adjacent Co. Galway is the most famous area of Ireland for wild flowers. In this attractive illustrated guide, Charles Nelson introduces 120 of the characteristic plants of a unique Atlantic district of limestone pavement, grassland, woodland and turlough. Here is an ideal introduction and pocket guide to the Burren and nearby Aran Islands. Each 1-page species entry has a photograph, concise description and ecological notes, and (a charming, almost Victorian touch) a space to record where and when the plant was found. Species are arranged by colour and the text is free of jargon.

Where have all the flowers gone? A study of local extinctions as recorded in the county floras

By Peter Marren

Available from: Plantlife -
The Wild Plant Conservation
Charity, 21 Elizabeth Street,
London SW1W 9RP, U.K.

Price: £15.00stg

Rarity is often best assessed at local rather than national level. This latest report from London-

based conservation charity Plantlife looks at extinctions across several English counties. Trends emerge such as loss of plants of open or disturbed ground and soils of low fertility. Even sunews are now rare in lowland England. Peter Marren, both naturalist and inspired writer, presents a lively - if sometimes depressing - picture of a situation that conservationists need to address if further losses are to be avoided.

The Flora of the Bristol Region

Ian P. Green et al.

Edited by Sarah L. Myles

Bristol Regional
Environmental Records
Centre 2000

Available from: Pisces
Publications, 36 Kingfisher
Court, Hambridge Road,
Newbury, Berks., RG14 5SJ,
U.K.

ISBN: 1 874357 18 8

Price: £27.50stg & £4.00stg p&p

Bristol has attracted botanists since the 16th century. The limestone rocks and woods of the adjacent Aran Gorge, especially, hold one of Britain's richest floras. Species include endemic whitebeams and several plants of the European mountains. Other good nearby areas are the western portion of the Mendip Hills and outlying coastal limestone outcrops, including the island of Steep Holm. This fine Flora, nearly a century after J.W. White's *The Bristol Flora* (1912), is based on fieldwork from the early 1980s onwards. It is a fascinating account of some 1600 native and introduced plants, many mapped out on a 1km² grid. Introductory chapters cover geology, soils, habitats and sites of botanical interest.

John Akeroyd

objects. When divers visit wrecks they are encouraged to obtain a permit from Dúchas - The Heritage Service and enjoy their visit without any form of disturbance or barbaric pillage. Shipwrecks are listed by county, with a short summary on each. Another wonderful volume by the author.

Mustelids in a modern world

Edited by Huw I. Griffiths

Backhuys Publishers 2000

ISBN: 90-5782-066-8

Price: 180 Guilders

Anyone interested in otters, badgers, martens, weasels and their allies will find this book of great interest. The chapter on otters in the Munster Blackwater catchment gives an insight into their distribution, density, habitat use and shows that their presence is widespread. In all there are 21 chapters, by different authors, which include the recovery of the polecat in Britain, monitoring pine marten, the impact of the management of stoats and weasels in Great Britain and New Zealand. A book that should be in the library of anyone with an interest in Mustelids.

Shipwrecks of the Irish Coast - Volume 3 1582-2000

By Edward J. Bourke

Published by the author 2000

33 Rushbrook,
Blanchardstown, Dublin 15.

ISBN: 0 9523027 2 1

Price: IR£11.99/£15.22

This is the third volume in the series. The author has now listed over 7,000 shipwrecks in the three volumes. He has many old photographs which he discovered in its preparation. He points out the importance of shipwrecks as heritage



Photos: © Flora of Dublin

Glenasmole Valley: Bracken *Pteridium aquilinum* is often the dominant plant on the sides of the sheltered valleys in the uplands of Co. Dublin. It invades former pastures and stops short of exposed ridges and wet moorland.

JOHN AKEROYD reflects on the Flora of County Dublin, a landmark study of Irish plants

FLORAS are published inventories of wild plants. Each can cover a region as large as Europe, one or more countries, a single county, or a local district such as Sherkin Island and Roaringwater Bay on the southwest coast. The

majority of counties in Britain have a Flora – some out-of-date but with new and updated accounts always appearing. Ireland has far fewer county Floras, perhaps because botanists tend to congregate around Dublin. There may also have been too little interest in plant records – a perfect source of data for studies of biogeography, climate change and land-use – among many within the Irish academic establishment.

Certainly we are seeing fewer Floras produced today

than in the late 19th century – a period the late Professor David Webb called the 'Heyday of Irish Botany'. Happily the last two decades have seen some revival of a great tradition, even if Ireland still lacks a critical or detailed national Flora. However, a 7th edition of Webb's excellent, modestly titled, *An Irish Flora* remains available as a practical guide and field Flora. And three years ago came a brand new *Flora of County Dublin*, setting a mighty standard for the future.

The Flora of County Dublin describes in detail the distribution of the 1300 wild plants, native and introduced, of Co. Dublin, a county dominated by an ever-expanding city. The book even includes difficult groups such as dandelions, brambles and roses. It was not the first Dublin Flora: an earlier Flora (1904) by Nathaniel Colgan (1851–1919), with a 1961 *Supplement*, provided a firm basis. Smaller Floras had covered Howth Head and Lambay Island. *The Flora of Inner Dublin* (1984), by Peter Wyse Jackson and Micheline Sheehy Skeffington revealed astonishing plant richness between Royal and Grand Canals. Many contributors to the present Flora were involved in, and learned much from, that earlier project. The new Flora, sumptuously produced – with computer-generated distribution maps, habitat photographs and drawings by Wendy Walsh – has brought together a veritable Who's Who of Irish field botanists. It may have been 'twenty years a-growing' and written by committee (rarely a good idea) – but the team guided their project to a tri-

umphant conclusion.

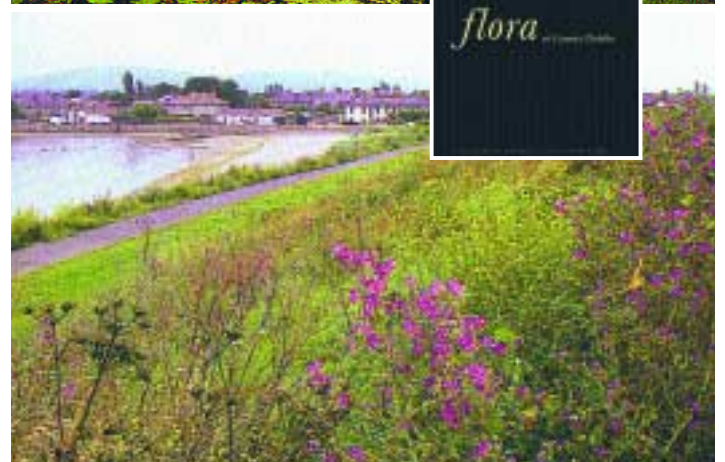
I have happy memories of Dublin's flora, and friendly and enthusiastic botanical colleagues and friends during the 1980s. And I am honoured to see some of my own finds go into this splendid account. One 1981 discovery gave me the greatest pleasure and amusement: Musk Stork's-bill (*Erodium moschatum*) on a Trinity College lawn – within yards of the *Book of Kells*! It was still there in 1996 and doubtless persists. This pink-flowered annual of seaside walls and waysides symbolizes for me continuity and resilience in wild plants.

For Dublin's plants are imbued with history. Not only are many ancient relics of countryside and seaside, or long-term colonists associated with Vikings, Normans and English, but also they recall the naturalists who came before us and left their great legacy of plant knowledge. I remember Declan Doogue driving me on a fine summer evening around Dublin's northern suburbs to show me sites such as the golf course at Portmarnock, where we saw White Mignonette (*Reseda alba*) from southern


Europe. James Mackay knew it here in the 1820s and Colgan recorded it in the early 1900s. As Declan points out in the Flora, in a scholarly and informative essay on the history of floristic study in County Dublin, Colgan's friend and colleague Reginald Scully taught J.P. Brunker, author of the 1950 *Flora of County Wicklow*. One of those Brunker recruited to help with his recording was Howard Hudson, who, until his death in 1996, was an active and prominent member of the Dublin Naturalists Field Club. He taught us younger botanists a great deal; and linked us directly with a great botanical era of an earlier century.

Now let us hope that the Dublin team, and perhaps a new, even younger generation of botanists, apply their considerable talents to a comprehensive *Flora Hibernica*.

Dr John Akeroyd has worked on many Floras, regional and local, from 'Flora Europaea' to 'The Wild Plants of Sherkin, Cape Clear and adjacent islands of West Cork'.





Above: Ringsend Dump: Some 200 species were recorded in this area reclaimed from the sea. Many of the exotic plants originate from infill of garden origin and others, for example, Hoary Mustard *Hirschfeldia incana*, arrived via the port as grain contaminants.
Top: Grand Canal, Mespil Road: This canal has the richest flora of any of Dublin's waterways. It contains representatives of almost all of the aquatic plants found elsewhere in the county.
Inset: The "Flora of Dublin County" by The Dublin Naturalists' Field Club (ISBN: 0953003701 £25.00-€31.74)



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ORGANISATION LTD.

KFO is committed to developing and advancing any sea fishery issues of relevance to its members.





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Photo © Veronica FitzRoy

Major Rutledge who often went "off to sit on a rock somewhere...to look at birds"

MAJOR Rutledge holds a very special place in the history of Irish Ornithology. In *Sherkin Comment No. 29*, Oscar Merne paid tribute to this outstanding man. Because his article generated such interest we asked his daughter to write about her father, who at 102 years of age, still has a wonderful interest in birds.

By Veronica FitzRoy

ROBERT (Robin) Francis Rutledge (Father of Anne Hemphill and Veronica FitzRoy) was born on September 4th 1899 at Browns Hill in County Carlow the home of his mother. During the birth a robin came and sat at the end of his mother's bed. Robert was immediately called Robin. Perhaps it was an early sign that he should have such a deep love and interest in birds for all of his life.

Robin was about three when he went to live at Bloomfield, the Rutledge family home in County Mayo, which his father inherited on his father's death. Bloomfield was a beautiful Georgian house, near the village of Hollymount and the town of Claremorris, set in acres of gardens, woodlands, lakes, bogland and pastures. It was an ideal place for my father and his younger brother Bill to grow up. They were both, from an early age, keen naturalists and at Bloomfield they had ample opportunity to indulge their hobby.

My father was meticulous, keeping notes and observations of all the birds he saw or heard where ever he was. This continued all his life. In later

years, this hobby made my father the leading ornithologist in Ireland. Bill went on to study locusts and did a great deal of work abroad on them. His hobby was hawks.

When his father died my father was a young man in the army in India. He realised, with great sadness, that the estate and the grounds would be beyond his financial means to keep, to maintain and run from India. It was sold to the Irish Land Commission in 1925 and is now completely demolished.

In 1928 my father married Rose Burke from nearby Cloonee on Lough Carra and near the town of Ballinrobe, County Mayo. They had known each other from childhood. My mother, on the death of her brother at an early age, inherited Cloonee. My father loved Cloonee and it was a wonderful substitute for his loss of Bloomfield. It was to here we returned from India just before the start of World War Two and where my sister and I grew up very happily.

While in India our parents were inevitably very busy and rather remote figures for us. We lived an ordered life of that period in which our existence centred on the nursery. There were excitements like going to the races, polo or hunting and watch-

My Father, the Naturalist

ing my father who was a very good horseman. We used to go to the gates of the Government House and watch the guard change. My father commanded the Madras Governor's Bodyguard. My sister and I felt very proud of him, he looked so smart in his uniform mounted on a beautiful black horse.

Both of our parents were excellent riders so my sister and I had ponies from an early age. My father arranged that we rode every day with one of the grooms from the Bodyguard stables. Indians are beautiful riders so we were well started.

Sadly my sister and I, though we have a love of birds, have not inherited our father's gift of identifying them by their song or flight. At Cloonee he used to go off sometimes for quite long periods of time. "Oh Daddy's gone off to sit on a rock somewhere, probably in the ocean to look at birds", we would say. He felt we were too engrossed with our ponies and riding to want to go birding. Anne did go once but had to sit, terrified of moving or making a sound for hours so she never went again. We did sometimes go to what was called the Gull Island on Lough Carra and help my father ring some of the baby gulls.

I don't think then we had any idea of what work our father was doing for the world of ornithology, or how much he achieved, and how he encouraged young ornithologists. We had no idea how acclaimed he had become in his field until he was awarded with a honorary doctorate in 1981 at Trinity College, Dublin. A little later, the Irish Wildbird Conservancy - BirdWatch Ireland, honoured

him by naming their headquarters "Rutledge House".

My mother always supported my father and was so proud of him. There were many times when he was away but she herself had many interests that kept her busy - the farm, the horses and the garden.

Anne, my sister, has inherited the same sort of dedication as my father, only with Connemara ponies. She has bred champions and is highly regarded in the Connemara pony world.

'My father was meticulous, keeping notes and observations of all the birds he saw or heard where ever he was. This continued all his life. In later years, this hobby made my father the leading ornithologist in Ireland.'

We have both inherited the lasting deep and haunting love for the West of Ireland which is ingrained in our father. "There is nowhere like the West", he always told us. I know what he means. The constantly changing sky and light that turns hills to purple and blue and dreary grey in the course of an hour or two. My sister is married. Sadly I married an Englishman so live away from the West.

We shared my father's love of hunting which he encouraged by getting a few hounds. When he went riding round Cloonee he used to teach

us how to work these hounds and how to blow the hunting horn.

My father, one could I think truthfully say, is not a very social person; something I too have inherited! But when anyone came to Cloonee he nearly always enjoyed their company and was a very good host. He still enjoys seeing people, especially his bird friends.

Memories of early childhood are never continuous but certain incidents are retained with snap-shot clarity. I quote an example showing my father's warmth and friendliness.

Cloonee was ruled by "Old Kate" who cooked. Not many people came to Cloonee unless invited, as it was very isolated. It was exciting for my sister and I when anyone did come. A Robert Gibbings had asked to come to see my father as he was, he said, writing a book about Ireland. He was from England, large with snow white hair and a beard. We craned out of a window when we saw his car arrive. We saw Kate open the door to let him in and her welcome to Cloonee die on her lips. We rushed down the back stairs to find Kate.

"What is he like? He is a great writer of stories you know."

"Great writer is it?", "Old Kate" sounded angry and drew hard on her self-rolled cigarette. "I'll say his is. What kind of man is he to come into Cloonee without a tie and his collar open and wearing shorts."

"But what did Daddy say to him?"

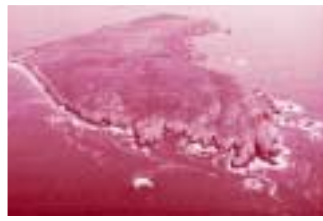
"Your father, of course he noticed, but like the proper gentleman he is said, "Welcome, welcome Mr. Gibbings", shaking him by the hand, "Welcome to Cloonee."

I think there is hardly anyone who



Photo © Oam O'Sullivan

The Major's notebook and "Ireland's Birds" (1966).



North Slob: Major Ruttledge's passionate commitment to the study and conservation of Greenland White-fronted Geese led to the establishment of the Wexford Wildfowl Reserve on the North Slob in 1968.

Great Saltee: In 1950 Major Ruttledge established a bird observatory on Great Saltee Island, off the Co. Wexford coast, to study the spring and autumn migrations of birds. The observatory continued until 1963.

Photos: © Oscar Merne

Photo: © Dick Combes

knows Ireland as well as my father or probably has such a wealth of stories told to him by the people he used to meet and talk to on his birding expeditions. As he says, "Sadly they are all gone out of it now, and the young, the generation of today, are no longer interested or have time to sit, think or watch." One story he told me which is one of many I love to hear. He was on an island Inishkea, south off the Mullet in County Mayo. He met an old man sitting, leaning on his stick, gazing out to sea. He told my father about Hy Brasil. Hy Brasil, he explained to my father, means Island of the Blessed. It is a mythical island way out in the Atlantic. He told my father he had only once seen it for a second and then it was gone.



Photos: © Dick Combes

Cllr. Anne Brady, Cathaoirleach, Dun Laoghaire Borough Council (1988), with Major Ruttledge, at the dedication of Ruttledge House.

My father told me he never met him again and had forgotten their conversation until some years later he was again, as he so often was, on

that piece of coast. He didn't see the old man but he himself saw Hy Brasil.

He was, and still is, a wonderful father. He seldom interfered or criticised. Having said that, my sister and I had a healthy respect and

Ruttledge House, prior to its sale to the Irish Wildbird Conservancy BirdWatch Ireland.

he did find reason to tell us off we certainly took it to heart.

To this day little things he would say in passing stick in my mind. "Never do business with friends or relations.", "Familiarity breeds contempt." He always answered letters by return of post and expected we should do so too. "Common courtesy", he would tell us.

A few years ago I drove him down to where geese (his very favourite and to him most fascinating of birds) flew in to graze. Up went his old and well-worn binoculars and he made a very accurate count.

"Old Kate" who I mentioned earlier had once told me as a child "Ye must never look up at the wild geese flying over. It's terrible bad luck." My father soon got me over the idea!

His great regret is not being able to go out beyond the Aran Islands to see if there are little gulls out there and is surprised that no-one seems to want to go!

He has achieved and done so much and had such an interesting life. He is still so alert, interested and passionate about Ireland and the future of ornithology.

Veronica FitzRoy, North House, Norwich, NR14 6RY, U.K.

"I'm green & I'm proud"

ESB Environmental Photography Awards

Edward W. Delaney

In association with the Irish Professional Photographers Association



Captain Cockle and the Loch Ness Monster

Abridged in four parts - Episode Four - The Rescue



Sketch: © John Joyce

By John Joyce

The story so far – Captain Cockle, retired submarine captain and inventor of the Cormorant – an amazing submarine that can not only fly, but also shrink to the size of a sausage at the touch of a button, had flown to Scotland with his wife Dr Catherine Cockle, and their grandchildren Jenny and William to sort out a row between fish farmer Alistair MacTavish and filmmaker Professor Potts. In the course of their research they have stumbled on a hidden underwater cavern containing the key to an age-old mystery – the Loch Ness Monster! But Professor Potts has followed them, putting his own life at risk as Captain Cockle tries to trap the monsters on one of Alistair MacTavish's fish cages.

"There's only one thing for it," shouted Captain Cockle. "Diving stations everyone! We'll have to retract the miniaturiser and go after Potts, or he'll be smashed to pieces by the monsters."

"Hey! Where are you going?" yelled MacTavish from the fish pen. "The beasties will be here any second. You were supposed to stay here and catch them!"

At full throttle, the Cormorant, dived down into the dark waters below the open fish-cage. Below them in the darkness a light shone amongst a mass of dark moving shapes that darted about, blocking it from view again and again. Then the light seemed to jerk, as if it was being slammed from side to side.

"The monsters are attracted to the light

of Potts' submarine," shouted Captain Cockle. He could see the hull of the Professor's submarine, with its clear dome. Inside the dome Potts was frozen behind a video camera, trying to follow the monsters as they swooped and dodged around him, banging into his submarine. Jenny could see dents in the hull, and bubbles leaking out from around the propeller.

Then one of the monsters charged at the Professor's submarine. There was a loud "clang", a rattling, grinding, crunching noise, and Pott's little submarine started to sink into the darkness.

"Quick! Catch him!" shouted Captain Cockle and stretched out the Cormorant's mechanical arms to grip the sinking submarine.

Black leathery shapes lunged out of the darkness and smashed at them. Then bubbles started to seep out from around the dome of Potts' submarine.

"They've cracked his hatch," cried Jenny. "The water's getting in. He'll drown!"

But Captain Cockle was already on the radio calling to MacTavish. "We have an emergency," he shouted. "Turn on every spotlight you have! We must lure the monsters up to the surface and into the cage before they pound us to pieces!"

The monsters whirled round and peeled off towards the light. Captain Cockle could see Professor Potts, pounding desperately on the dome of his submarine as the water poured in. Then, with a rush and a flood of light, they burst through the surface of the loch into the dazzling glare of the spotlights. Alistair

MacTavish was standing on the collar of the fish pen and, inside it, were four giant creatures thrashing the water into spray.

"Whatever it is you're going to do, you'd better do it quickly!" he shouted. "The net won't stand much more of this!" "Stand by for miniaturisation!" shouted Captain Cockle, and unfolded the metal dish of the miniaturisation machine from the rear of the Cormorant.

"But what about Professor Pott's?" yelled Jenny. "He'll drown!"

"Don't you worry about him!" shouted MacTavish, and dived into the loch, grabbed the struggling professor, and pulled him to safety.

There was a powerful hum from deep inside the Cormorant, like all the electric motors in the world being turned on at once. A blinding flash of energy surged, sparked and spat on the water . . . and before the astonished eyes of the everyone, the big fish pen and the amazing monsters inside it shrank smaller, and smaller, and smaller . . .

In a moment Jenny was reaching down into the water from the deck of the Cormorant, to where a tiny circle of rubber tube and a fine net floated like a kitchen sieve. She gently lifted the net, and the four little newt-like creatures inside it, and tipped them into a bucket of water.

"I suppose we could always keep them at home in the goldfish pond," said Captain Cockle. But Jenny glared at him.

"All right! Perhaps not!"

Later that night, the Cockles flew the miniature monsters far out to sea beyond the Western Isles, where they landed on a

deserted island, enlarged the monsters back to full size and released them into the sea. To this day there have been many sightings of the "Western Isle Sea Serpents," as they came to be known, and they are almost as big a tourist attraction as the famous "Loch Ness Monsters", which people still see from time to time, although nobody has been able to capture either.

MacTavish has retired from salmon farming and, with Professor Potts, has set up the well-known "Potts Monster Watch Centre," where they sell personally-signed copies of the famous "Potts video" taken by the Professor that night beneath the waters of Loch Ness.

As for the other details of the story? Well, Professor Potts has always kept very quiet about those.

After all, nobody would ever believe that two children and their grandparents could shrink a whole family of Loch Ness Monsters down to the size of newts, and then carry them off in a bucket underneath a submarine that turned into a helicopter. Now would they?

Abridged by the author from "Captain Cockle and the Loch Ness Monster" - published in Ireland by Poolbeg Press and available in all good book shops, price Ir£2.99 or €3.80

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

Professor Bugsy's Energy Game

Before you can play the game, which is on the other side of this page, you will need to do a little work first! You must make Question Cards and Carrot Cards. Use the pictures of the cards on this page as templates, drawing the appropriate picture on the back of each card. On the reverse side of the Question Cards put a question, with its corresponding answer. On Carrot Cards put the deed and make a note whether to move forwards or backwards on the board or whether to move to the Sin Bin or Carrot Patch. When all the cards are made (whew!) you'll need to make markers, colouring them different colours so that you can tell which player is which. Make a spinner out of card (a six sided shape divided into six equal sections, numbering each section 1 to 6), using a pencil through the centre to twirl it. Which ever side it lands on is the number of spaces to move. You could also use a dice. You are then ready to play Professor Bugsy's Energy Game! Good luck!

Carrot Cards

Move forward if you get one of these cards:

- You keep warm with an extra jumper
- You walk to school
- You use public transport
- You exercise to warm up
- You draught-proof your home
- You know double-glazing saves energy
- You shower instead of bath
- You know C.F.L. bulbs save energy
- You turn the heat down
- You use free energy to dry clothes
- You plant a new tree



Move backwards if you get one of these cards:

- You bath instead of shower
- You don't close the door when leaving a room
- You forget to switch things off
- Lazy! You don't recycle
- You don't close the fridge
- You fill the kettle for one cup
- You chop down a tree
- You leave the window open with the heat on
- You use a tumble dryer
- You turn the TV off with the remote instead of the power button
- You leave the hot tap running

Go to the Sin Bin if you get this card:

- You're an energy waster – go to the Sin Bin (make 2 cards)

Go to the Carrot Patch if you get this card:

- You're an energy saver – go to the Carrot Patch (make 2 cards)

Question Cards

1. What is the earth's greatest energy source?
The sun.
2. How do plants get their energy to grow?
Sun light and water.
3. Where do humans get their energy?
Food.
4. Why is air pollution dangerous for humans?
Air pollution is bad for our health, it can give us breathing difficulties and allergies.
5. Give an example of air pollution?
Exhaust from cars, smog from factories, chemicals from burning plastics and tyres.
6. Why is lucozade often linked with sport?
Lucozade is high in energy and when playing sport we need a lot of energy.
7. What is warming on earth due to global warming?
The earth's atmosphere.
8. What is the common name for electrical energy?
Electricity.
9. How can a solar powered car move?
With energy from the sun.
10. What is hydro-electricity?
Electricity produced from water.
11. Why will non-renewable sources of energy run out?
They take millions of years to form and once we use all there is on this earth we cannot make more in our lifetime.
12. What is a CFL?
CFLs are energy efficient lightbulbs.
13. Where do most items in the home get their power?
Electricity.
14. What energy does a sailing boat use?
Wind energy.
15. What type of energy do wind turbines generate?
Electricity.
16. How many watts in a 11 watt CFL?
11 Watts.
17. Where do you find calories?
Calories are found in food.
18. Name two types of renewable energy sources.
Examples of renewable energy sources are: timber, solar, hydro and wind.
19. How do you know how much electricity you're using in the home?
Electricity meter or electricity bill.
20. Why are some fuels called fossil fuels?
Fossil fuels are those fuels that were formed from fossils.
21. Does it take more energy to recycle a can or make a new one?
It takes more energy to make a new can.
22. Where would you find a lagging jacket in the



home?

- On a cylinder or hot water tank.*
- 23. Where would you find double glazing in the home?
Windows.
- 24. Name two types of fossil fuels.
Examples of fossil fuels are: coal, peat, oil, gas.
- 25. How do you prevent the heat going out the roof and walls in your home?
Insulation.
- 26. What is heated in a power station to produce electricity?
Water is heated (by burning coal, peat, gas or oil) to produce steam and steam turns the turbines.
- 27. Why should you not leave the window open when the heating is on?
Heat will escape from the open window which wastes energy.
- 28. Why should you turn off the light when you leave the room?
Leaving the light on while there is no one in a room is a waste of energy?
- 29. Is it more energy efficient to have a shower or a full bath?
A shower. It uses less hot water so less energy.
- 30. Why is it better to take a bus rather than being driven in a car?
More people can travel in a bus than a car. A full bus uses less energy per person than a full car.
- 31. When you're finished watching TV, what should you do?
Turn the TV off at the power button and not with the remote control.
- 32. Can just one person help protect the environment?
Yes, one person can make a difference.
- 33. How can trees help stop global warming?
Trees absorb carbon dioxide to live and one of the gases that causes global warming is carbon dioxide.
- 34. If you are feeling a little cold at home what should you do?
Put on another layer of clothes instead of turning the heat on.
- 35. What type of waste do you put in a compost bin?
Vegetable scraps and grass cuttings.
- 36. Is the greenhouse effect about the earth becoming cooler or warmer?
The greenhouse effect is about the earth's atmosphere becoming warmer.
- 37. If it is sunny should you dry your clothes outside or in a tumble drier?
You should dry your clothes outside because it is more energy efficient. Tumble driers use electricity.
- 38. Will saving energy lower your electricity bill?
Yes.
- 39. Why should we protect our peat bogs?
If we destroy our peat bogs, we destroy the habitat of many flowers and animals.
- 40. Which is less harmful to the environment, renewable or no-renewable energy?
Renewable energy.

Sizzling Baked Seafood

with Cherry Tomatoes & Crème Fraîche

To Prepare

This is so simple to create for a special celebration. Use fish like turbot, brill, sole, plaice or Greenland halibut.

You need:

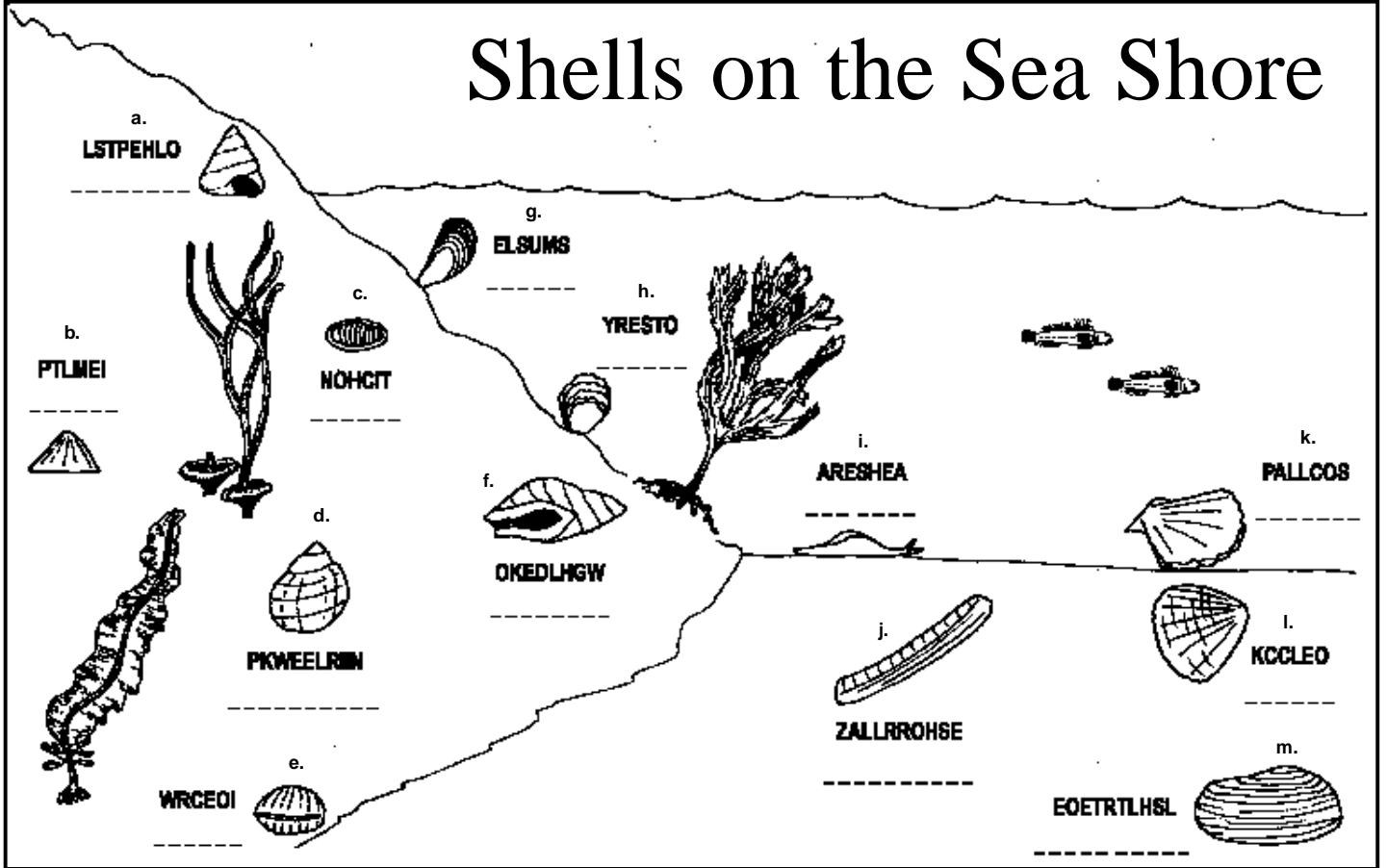
- 675g/1½lb fish fillets
- 15g/½oz butter
- 12 cherry tomatoes
- 150ml/¼ pt crème fraîche or cream
- 110g/4oz Parmesan cheese, grated
- Salt & Pepper

Method:

Arrange fillets on buttered dish. Season. Place tomatoes on top. Pour on crème fraîche and sprinkle with Parmesan. Bake for about 15 minutes in a moderate oven until it sizzles!
Serve with spinach and roast potatoes.



Shells on the Sea Shore



Above is a picture of shells on the seashore. You can colour them in and you can also see if you can name the shells found on the shore. To help you, the answers are jumbled up with spaces left for the correct name. All the shells are found in the list below. (Answers below)

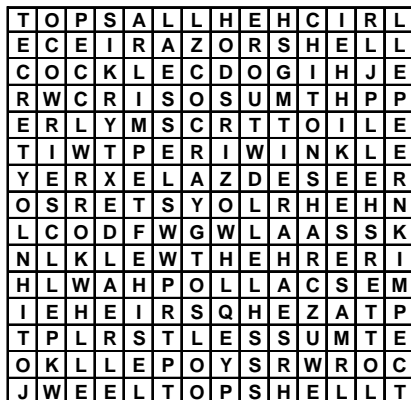
- CHITON
- COCKLE
- COWRIE
- DOGWHELK
- LIMPET
- MUSSEL
- OTTER SHELL
- OYSTER
- PERIWINKLE
- RAZORSHELL
- SCALLOP
- SEA HARE
- TOPSHELL

Shells, Shells & More Shells

- If a fish could shave, which shell would he use? _____
- Which edible shell did Molly Malone need a shovel to collect? _____
- Name a shellfish beginning with "o" that is cultivated in Ireland? _____
- Which mollusc (sea snail) has an internal rather than external shell? _____
- Which shell can roll itself into a ball to protect itself? _____
- Which shell has a strong sucker foot to attach itself to rocks? _____
- Which shell got its name from its resemblance to a children's toy? _____
- Which shell sounds like a part of the body? _____ (Answers below)

Shell Search

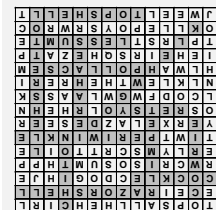
All the shells mentioned above can be found in the box below. They can read up or down, back to front or diagonally. Answers below.



Irish Names for Shells

- Coat-of-mail Chiton - Ciotón máille
- Common Cockle - Ruacan
- European Cowrie - Finicín Eorpach
- Dogwhelk - Cuachma chon
- Common Limpet - Diúilicín
- Common Otter Shell - Sliogán dobharchú coiteann
- Common Saddle Oyster - Sligin slámach
- Edible Periwinkle - Littorina littorea
- Common Razorshell - Scian mhara chuar
- Great Scallop - Muirín mór
- Sea Hare - Giorra mara
- Painted Topshell - Faochán Mhuire dathannach

ANSWERS TO PUZZLES



- ANSWERS TO PUZZLES:
- 1. Razorshell; 2. Cockle; 3. Shell; 4. Sea Hare; 5. Oyster; 6. Limpet; 7. Chiton; 8. Mussel.
 - SHells, SHells & MOre SHells: Shell; Scallop; 1. Cockle; m. Otter; Hare; j. Razorshell; k. Mussel; h. Oyster; l. Sea Cowrie; f. Dogwhelk; g. Chiton; d. Periwinkle; e. Topshell; b. Limpet; a. Topshell; i. Razorshell; j. Limpet; k. Mussel; l. Razorshell; m. Otter.

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Silver President's Awards for Pupils of Mount St. Michael's, Rosscarbery



Picture on the occasion of the presentation of Silver President's Awards to eight participants from Mount Saint Michael Secondary School, Rosscarbery, Co. Cork, are: Teacher and Award Leader Yvette Jennings, Labhrás O Murchú, Director of Comhaltas Ceoltoirí Eireann, John Murphy, Chief Executive of the President's Awards and the prize winners: from back left - Emer Leonard, Roberta Jennings, Anna McCarthy, Jenny Shanahan, Peter Hourihane, Eoin Milner, Peter O'Donovan and Máiréad Cadogan (seated).

By Yvette Jennings

EIGHT talented students from Mount St. Michael's Secondary School, Rosscarbery, Co. Cork, were recently presented with their Silver Gaisce medals in the Brú Ború Centre in Cashel, Co. Tipperary, marking the culmination of months of hard work within their community. The awards were presented by the director General of Comhaltas Ceoltoirí Eireann, Senator Labhrás O Murchú who praised the award as one of the great citizenship building programmes of our time. The Silver President's Award is presented to young people who achieve a challenge they have set themselves in four different areas of activity over eighteen months. Each participant becomes involved in planning and working for the development of the local community, learns a new skill, participates in a physical recreational activity and takes part in a venture project.

Work for the development of the local community ranged from learning First Aid, lobby-

ing for an ATM machine in Rosscarbery, becoming an active member of Civil Defence and training younger pupils in a variety of sports. Learning to play the flute and violin and completing computer courses were some of the skills learned. Their physical activities and venture projects

'Gaisce is an excellent way of achieving personal goals and instilling initiative, leadership and caring skills in young people.'

included a sixty kilometre walk around Killarney and a cycling trip around Galway. A cake sale raised money for the neo-natal unit in Erinville Hospital.

And what did the participants think of the Gaisce experience? According to Emer Leonard "Gaisce is an excellent way of achieving personal goals and instilling initiative, leadership and caring skills in young people."

Mairead Cadogan found "My community involvement was the most rewarding aspect of Gaisce. Doing a Christmas fast we raised £1000 for an African school. I was also involved in a "Buddy" system in school to help first years make friends."

Peter O'Donovan said "We raised money for the Irish Cancer Society by organising and participating in a 160 mile cycle around Cork and Kerry." For Peter it was a remarkable achievement because five years ago he fought and survived cancer himself.

Eoin Milner also took part in the cycle ride. "When we finally made it back to Rosscarbery, I felt a sense of achievement. I achieved something I thought I could never complete. That has given me great satisfaction."

Yvette Jennings is a teacher at the school and 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 or Website: www.p-award.net



The Central and Regional Fisheries Boards

An Príomh Bhord Iascaigh agus na Boird Iascaigh Réigiúnach

The Central and Regional Fisheries Boards are the State Agencies responsible for conserving, protecting, developing, managing and promoting Ireland's inland fisheries and sea angling resources.



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Above: Scoil 'n Fheirtearaigh, Baile 'n Fheirtearaigh, Tralee, Co. Kerry, being presented with their prizes by Mr. Dan Wallace, T.D., Minister of State at the Dept. of the Environment & Local Government. Also present are Mr. Charlie Hipwell, Pfizer Ireland Pharmaceuticals, Ms. Mo Mathies, BIM, Ms. Niamh Hunt, Janssen Pharmaceutical Ltd., Mr. John O'Connor, Central Fisheries Board and Mr. Matt Murphy, Sherkin Island Marine Station.

Below: Our Lady of Good Counsel, Lota, Cork, being presented with their prizes by Mr. Dan Wallace, T.D., Minister of State at the Dept. of the Environment & Local Government. Also present are Mr. Charlie Hipwell, Pfizer Ireland Pharmaceuticals, Ms. Mo Mathies, BIM, Ms. Niamh Hunt, Janssen Pharmaceutical Ltd., Mr. John O'Connor, Central Fisheries Board and Mr. Matt Murphy, Sherkin Island Marine Station.



Environmental Competition for Primary School Children in Munster 2001

WE had an excellent response to our Sherkin Island Marine Station's Environmental Competition for Primary School Children in Munster for 2001. We were delighted to have Mr. Dan Wallace, T.D., Minister of State at the Dept. of the Environment and Local Government presenting the prizes at the prizegiving ceremony at the Carrigaline Court Hotel, Carrigaline, Co. Cork. Here is a very small selection of some of the 405 prize-winners.

We would like to take this opportunity to again thank our sponsors for this year. They were: BIM (Irish Sea Fisheries Board), Central Fisheries Board, Cork Corporation, Cork County Council, Denis McSweeney Photoshop, Cork, Dept. of the Environment & Local Government, Janssen Pharmaceutical Ltd., Pfizer Ireland Pharmaceuticals and Waterford News & Star Newspaper.



Photos: © Sherkin Island Marine Station

Above: Scoil Iosagain, Hospital, Co. Limerick and **Below:** Kilnaboy N.S., Co. Clare - both schools being presented with their prizes by Mr. Dan Wallace, T.D., Minister of State at the Dept. of the Environment & Local Government. Also present are Mr. Charlie Hipwell, Pfizer Ireland Pharmaceuticals, Ms. Mo Mathies, BIM, Ms. Niamh Hunt, Janssen Pharmaceutical Ltd., Mr. John O'Connor, Central Fisheries Board and Mr. Matt Murphy, Sherkin Island Marine Station.



Above: St. Joseph's G.N.S., Clonakilty, Co. Cork, being presented with their prizes by Mr. Dan Wallace, T.D., Minister of State at the Dept. of the Environment & Local Government. Also present are Mr. Charlie Hipwell, Pfizer Ireland Pharmaceuticals, Ms. Mo Mathies, BIM, Ms. Niamh Hunt, Janssen Pharmaceutical Ltd., Mr. John O'Connor, Central Fisheries Board and Mr. Matt Murphy, Sherkin Island Marine Station.



Ringaskiddy, County Cork

Proposed Waste Management Facility

- Community Recycling Park
- Waste Transfer Station
- Waste-to-Energy Plant (incineration)
 - Irish hazardous waste • Industrial and municipal waste serving Cork
 - Electricity generation – power over 20,000 homes annually

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Planning Permission for Waste Management Facility

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- Waste-to-Energy Plant (incineration)
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 - Electricity generation – power over 16,000 homes annually

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- Recycling of newspapers and magazines
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Irish Records for Marine Fish



The new record ling (far right) and happy captor Tony Sol (NL) (2nd right) looking on and four other specimens for skipper Mark Gannons' (2nd left) party.

THE Irish Specimen Fish Committee (ISFC) is a voluntary body funded mainly by the Central Fisheries Board. It was founded in 1955 and it has now processed over 20,000 claims. In 2000 the ISFC received 599 claims and ratified 508, including five new records. In total 51 were rejected for non-compliance with the rules.

The five new records were:

Bass - 17lbs 13ozs taken by Emmet Naughton, 5 Colmcille St., St. Mary's Park, Limerick, at Doughmore Strand, Co. Clare on 21st October 2000.

Coalfish - 27.61lbs taken by Jan Tom, Steur 87, 2986 SK Ridderkerkerk, Holland, fishing out of Courtmacsherry, Co. Cork, on 13th August 2000.

Ling - 48lbs 8ozs taken by Tony Sol, Osdorperwee 112, 1066 EN Amsterdam, Holland, fishing out of Courtmacsherry, Co. Cork, on 29th May 2000.

Smooth Hound - 16.58lbs taken by Keith Gray, 6 Feltwell Road, Anfield, Liverpool, at Carne, Co. Wexford on 25th September 2000.

And the pride of place, a **bluefin tuna** at 240 kgs (529lbs), taken by Alan Glanville, Elsinore, Dunmore East, Co. Waterford, fishing out of Killybegs, Co. Donegal on 25th September 2000. This is the largest fish ever taken on rod and line in Irish waters and it is the first time the species has been taken by an angler off the Irish coast. The Dr. West (noted biologist - see *Sherkin Comment* No. 29) Young Angler Award for the best specimen taken by an angler aged 13 years or younger on 31st December 2000, was awarded to Master Thomas Dunphy, Raheewarren, Newbaun, Co. Wexford for a Three Bearded Rockling of 1.16kg taken off Hook Head on 15th October 2000.




Jan Tom from the Netherlands with the new Irish record Coalfish of 27.61 lbs taken while fishing out of Courtmacsherry.



Alan Granville (centre) with his bluefin tuna of 240kg, a new Irish record and the heaviest fish ever taken on rod and line in Irish waters.

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Irish Record Fish - Some Marine Species

Species	Weight	Date of Capture	Place of Capture	Captor
Angler Fish	42.985 kg	3.11.1985	Belfast Lough	Sean Neill
Bass	17 lbs 13 oz	21.10.2000	Doughmore Strand	Emmet Naughton
Cod	42 lbs	1921	Ballycolton	I.L. Stewart
Conger Eel	72 lbs	June, 1914	Valentia	J. Green
Dab	2.02 lbs	28.1.1989	Dunmore East	Paul Beglin
Dogfish	23 lbs 12 ozs	29.5.1983	Valentia	Tony Outmayjer
Flounder	4.9 lbs	2.10.1993	Ballyteigue, Co. Wexford	Brian Russell



The new Irish record smooth hound of 16.58 lbs taken by UK angler Keith Gray at Carne, Co. Wexford.

A Christmas Stocking Filler

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