



SHERKIN COMMENT

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Glenstal Abbey, Co. Limerick

(see centre pages)

Photograph: Fr. Philip Tierney, OSB

WATER: Our Priceless Resource

EDITORIAL

By Matt Murphy

HERE in Ireland most of us seem to accept that our water taps will never run dry. We do not realise how fortunate we are to have such a gift when a quarter of the world's population already has no access to clean drinking water. Each year 4 million children die of water borne diseases such as cholera. There is no doubt that in years to come wars will be fought over this precious natural resource. In the poorest countries, particularly Africa, the women, who bear the brunt of water problem, sometimes spend 5 to 6 hours a day collecting and carrying water for the family.

The next 10 years will see major changes in water quality and supply in Ireland. Many of the sources of supply will be deemed unfit for use - unless we now take the necessary steps to avoid the problems that are there at present. It will become a very difficult political issue for the government of the day because decisions will have to be taken which will see certain sectors of agriculture and manufacturing industry having to spend large sums getting their act together with the very rigid EU pollution regulations.

I would like to pose some questions

about the future of water supply and quality in Ireland. They are issues many believe are so far into the future to be of no consequence. But I must point out that but a few short years ago if one mentioned problems with waste disposal and the need for a new approach, one got a very jaundice look, as if to say "stop trying to stir the pot". The questions to be posed are:

1. Who determines the maximum amount to be extracted during dry spells so that the watershed will be conserved?

2. In the future if a local authority or private interests wish to export water, what are the safeguards for the watershed ecology?

3. If a future government decides to privatise water supply as in the UK, is water the property of the state or the local authority? Remember, private investors are attempting to broker deals between former Soviet states. At present there are more than 70 internationally brokered water basin initiatives worldwide.

4. Groundwater - are there sufficient safeguards in place to protect its use and its quality from pollution and the amount that can be drawn from an individual source?

5. Should we have stiffer fines for pollution of our water resources? At present they are inadequate. Recently in the UK one of the two rail companies were fined £250,000 for polluting a groundwater source with a 2ft depth of diesel oil. If this

happened here in Ireland today the fine would be more like £1,000 with meaculpas by the dozen, that it will never happen again.

There is too much complacency in Ireland with regard to the use of water. We waste it, we pollute it and of course we expect to get it free. It is not acceptable that water to households continues to be unmetered and not charged for. The leakage and waste rate nationwide is over 40%. Thus if charges were made there would be sufficient resources for local authorities to undertake major refurbishing of water mains which would, as in the present Dublin Waste Water Reduction Scheme, see major savings in daily water use.

The proposed EU Framework Directive on waste water policy sets a framework for comprehensive management of water resources within the EU. It will be based on the river basin, as the natural unit for management and will require the development of river basin management plans.

Measures must be taken within each river basin for matters such as:

- the determination of the characteristics

- (type) of the waters concerned
- the operation of monitoring programmes in respect of water quality,
- the control of direct and diffuse discharges to water
- the review of the impact of human activity on the status of the waters
- the establishment of environmental objectives aimed to achieve quality targets
- the drawing up and implementation of a programme of measures to achieve the established environmental objectives, and
- the carrying out of an economic analysis of water use.

The above directive will mean that local authorities will have the responsibility to undertake this work so they will need major financial input and not all will come from central government. As the funding must be found the local authorities will have no option but to charge water users. Financially painful some may say but at present around IR£2.00 per 1000 gallons, very cheap indeed for the luxury of having clean water.

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Why Bother about Antarctica?



Photos: Tony Fogg

Mount Herschel: named in 1841 by Sir James Clark Ross after the famous astronomer who supported his Antarctic expedition

By Tony Fogg

THE Antarctic is the most inaccessible and hostile region in the world. In spite of modern navigational aids the belt of ocean surrounding it, thousands of miles wide and strewn with ice, is fraught with danger, even in summer. A plane flying above its turmoil may still have to contend with appalling landing conditions produced by sudden ferocious winds and white-out, with no alternative air-fields at hand. And when one gets there ninety-nine per cent is nothing but ice.

If Antarctica had profitable reserves of minerals or oil none of this would deter people, but, although there is doubtless wealth somewhere under the ice, it is difficult to locate and prohibitively costly to get out. The fact that in 1991 the interested industrial nations agreed, almost without argument, to a fifty-year moratorium on mining and oil-drilling in Antarctica speaks volumes. The abundant living resources of the southern seas have provided rich harvests

in the past but bitter experience has shown that stocks of whales, seals, and fish can be rapidly exhausted whilst the vast shoals of their main food organism, krill, are not so easily utilized by man as some have hoped. Antarctic tourism booms but is small-scale and likely to remain so, being patronized by the relatively few with specialized tastes in travel and sufficient money.

Nevertheless, in spite of lack of immediate commercial returns and agreement under the Antarctic Treaty of 1961 that all national territorial claims to Antarctic lands should be shelved, some thirty nations have active interests in Antarctica. It may be a no-man's land with an unpredictable future but it has seemed prudent to maintain a presence, just in case something of value crops up or some other state makes nefarious political or military use of the area. Actually, the treaty prohibits any military activity, in particular testing of nuclear weapons, south of 60°S and Antarctica is the only continent which has not seen war. During the cold war American and Soviet scientists worked amicably

side by side in the Antarctic and when two signatories to the Treaty, Argentina and Britain, were involved in hostilities in the South Atlantic, both were scrupulous in seeing that these did not spread into the Treaty region. Indeed, the Antarctic Treaty has so far worked rather well and has served as a model for other international treaties such as those for outer space and the seabed.

With commercial and military activities prohibited, science has provided the only sensible means by which a state can maintain a physical presence in Antarctica. This has had an unpremeditated result. With surveying for minerals and weapon testing ruled out and the Treaty, in addition, requiring co-operation and free exchange of information between the different national research groups, there has been no incentive for the bureaucrats to dictate what research goes on. As often happens when scientists are given a free rein to follow their own interests, some of their findings have been unexpected and of great significance for mankind.

Some background is called for here. The Antarctic is unique in being a continent centred on the geographical pole, with the strongest current in the world, coupled with a belt of cyclones in the atmosphere above it, continuously circulating around it and impeding heat flow from lower latitudes. The Arctic is different, having an ocean centred on the pole and being surrounded by land masses which break up the general pattern of circulation, introducing warm currents from further south. This being so and with its vast expanse of ice reflecting solar radiation back into space the Antarctic is much colder than the Arctic and acts as the earth's main heat sink, providing the dominant driving power for global atmospheric and oceanic circulation. It follows that we cannot properly understand the forces which control our environment without knowing what goes on in the Antarctic. This situation has been intensified by the threat of the "greenhouse effect" and global warming. Studies on cores taken from the ice-cap show that global warming has occurred periodically in

the past 160,000 years and that sea-levels have been generally correlated with atmospheric temperature. However, the short term effects are uncertain and the mathematical models with which we try to predict these greatly depend on information from the Antarctic. One result might be that the Antarctic ice melts, raising sea-level by as much as 60 metres. On the other hand, global warming

lar vortex in the upper atmosphere provides a unique container in which destruction of ozone becomes very evident. This discovery brought home to industrialists and politicians the extent to which man's activities damage the environment and led to the first global agreement to limit pollution.

Antarctic research has been equally valuable in a more exalted sphere. The earth's mag-

netic lines of force dip down to the poles forming a pair of funnels for charged particles from the solar wind to penetrate deep into ecosystems. Microbiologists working on ice, the dry valleys (areas perennially free from snow and ice), and lakes, are finding how micro-organisms function under extreme conditions. If living microbes can be recovered from the freshwater lakes which seem to have existed for around a million years, held between the bedrock and 3000 to 4000m of ice-cap in East Antarctica, they will surely prove to include some strange forms of life. Such research not only broadens our knowledge of what life is capable of, but is of practical use, for example in controlling food spoilage during refrigeration or finding strains of micro-organisms which might be used in biotechnology to avoid the expense of providing elevated temperatures during processing.

For practical reasons - politics, science, and global conservation - we cannot dismiss Antarctica as not worth bothering about. But there is something else. The immense wilderness brings out the best in those who traverse it. We all know of the faith and courage shown by Scott and Shackleton



A radiosonde balloon being launched at the British Antarctic Survey's Halley Station. It will be traced by radar and give information about upper air winds.

might cause more precipitation and simply increase the thickness of the ice. Again, glaciers sometimes show sudden surges

netic lines of force dip down to the poles forming a pair of funnels for charged particles from the solar wind to penetrate deep



An Adelle penguin rookery on Paulet Island, Antarctic Peninsula in mid-January when the down-covered chicks are about 5 weeks old. The pink colour of their excreta is derived from the krill on which they feed.

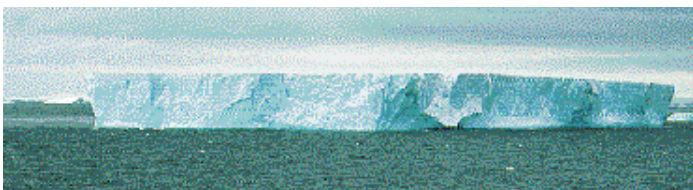
suggesting that the ice-cap of Western Antarctica might suddenly disintegrate. It would be nice to know which of these things will happen! With the "ozone hole" things are more clear cut. It was suspected 25 years ago that chlorofluorocarbons (CFCs) released into the atmosphere by human activities might cause destruction of ozone, our chief screen against harmful ultraviolet radiation. Intensive monitoring failed to show anything of the sort happening until in 1984 a dramatic decrease in ozone over the British Antarctic Survey's Halley Station in the Antarctic spring showed that the effects of CFCs were even more serious than feared. A stable cirrupo-

into the atmosphere. This produces the spectacular auroral displays. It also gives unique conditions for ionospheric research since the south geographic pole, the magnetic pole, and the geomagnetic pole in space are well separated. Much of what we know of what goes on in geospace has come from the Antarctic and has been of immense practical value in radio communication, operation of satellites, and space research.

Biological research in the Antarctic has been less spectacular but equally innovative. Studies on the feeding habitat and population dynamics of penguins and albatrosses have provided data showing just how important seabirds are in ma-

but their companions became imbued with the same spirit. One of these was Tom Crean of Co. Kerry, a naval rating who was no scientist or seeker after fame, who took part in no less than three of the heroic age expeditions and showed outstanding bravery and resource under appalling conditions.

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A recent publication by Prof. Fogg is "The Biology of Polar Habitats" published by Oxford University Press
ISBN: 0 19 854953 9 (Pbk)*



A tabular ice-berg, typical of the Antarctic, formed by ice breaking of the edge of an ice-shelf. This one was about a kilometre across but some may exceed 100km in length.

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WATER WASTE REDUCTION

Dublin - A Model for the Rest of the Country

THE Local Authorities of the Great Dublin Area, Kildare and Wicklow are having great success in their water conservation project. Over £1 million is being spent monthly in the region.

When a study, commissioned by the Department of the Environment and Local Government in 1996, found that over 42% of all water produced in the region was unaccounted for - mainly because of leakage in the distribution system - the project systematically tackled these losses by a programme of installing water distribution meters and network management tools.

Since the project began:

- Daily water savings of 7 million gallons have been achieved.
- 16,000 leaks have been repaired to date.
- Population growth of 32,000 people has been catered for.
- 25,000 extra housing units have been supplied with water.

- Night time pressure reductions affecting 150,000 people, mainly in South County Dublin, has been permanently removed.
- Industrial/commercial growth in demand of 5 million litres per day has been catered for.
- Tourist growth from 2.96 million out of state visitors in 1997 (£488.6 million spent) to 3.4 million in 1999 (£600 million spent) has been catered for (30% of national tourism based in Dublin).
- 6,445 additional manufacturing/service jobs with £3000 million capital investment served by water have been saved during the project
- 20 million litre per day temperature driven increase in consumption in summer 1999 and 2000 met with no water rationing.
- There has been a 5-10% increase in centre city pressure.
- There is now a Geographical Information System (GIS) and network model in place.

The Problems of Water Stress

WATER stress, which is pressure on the quantity and quality of water resources, exists in many places throughout Europe, resulting in serious problems of water shortages, flooding, pollution and ecosystem damage. Although there has been much improvement in water quality since the first European law on bathing water twenty years ago, there has been little progress on the integrated management of water resources, which is the most effective way to address water issues.

The main problems concerning water quantity and quality are:

- The demand for water is generally increasing, particularly in Southern countries, and especially from agriculture, though industry remains the major user of water in Europe. (For Europe as a whole, 53 per cent of abstracted water is for industry, 26 per cent is for agriculture and 19 per cent for household use but with wide variations between countries.)
- This increasing demand for water is leading to a switch in approach from just increasing its supply, through reservoirs, etc, to demand side management, which focuses on the more efficient use of water by reducing losses, less wasteful use of water, more efficient appliances and water recycling. For example, water efficiency measures reduced the consumption of water in Madrid by 25 per cent between 1992 and 1994. This is the equivalent to a reservoir providing over 100 million m³ of water per year. The use of 6 litre toilet water flushes in the UK, rather than the usual 9 litres, would save 10 per cent of the UK's household water use.
- The intensity of water use, which is the percentage abstraction of water resources available from within the country and from transboundary rivers, varies widely from 0.1 per cent for Iceland to 72 per cent for Belgium, with an average of 15 per cent for Europe.
- Some 20 European countries depend on other countries for more than 10 per cent of their water resources, with 5 countries relying on over 75 per cent of their resources coming from abroad via rivers.
- Unsustainable use of water is the withdrawal of water from natural resources at a rate faster than it can be replenished by nature. About 60 per cent of large (over 100,000 inhabitants) European cities, have 140 million people living in or near areas of such groundwater over-exploitation.
- Two-thirds of people in Europe rely on groundwater for their supplies of drinking and other water needs - a hidden, yet pre-

vious stock that once polluted or depleted, is expensive and time consuming (i.e. a matter of decades) to restore.

- In many parts of Europe the price of water used by industry, agriculture and households is either subsidised or is much less than the total cost of supplying and using it. This encourages inefficient water use. New incentives and pricing structures for water are being considered in order to achieve the use efficiencies needed to avoid water stress. For example, the full costs of applying pesticides and fertilisers to agricultural land would need to be included in their prices if overall economic efficiency is to be achieved.
- On the supply side, drinking water losses from the distribution system are estimated to amount to an average of around 30 per cent in most countries. In urban areas, leakage is substantially higher, reaching 70 to 80 per cent in some cities. Finding and repairing leaks is costly, and since the losses do not translate into higher water prices, thereby remaining unnoticed by the public, suppliers are often reluctant to spend money dealing with this problem.
- The over use of water is also contributing to the loss of Europe's wetlands. 50 per cent have disappeared in recent years and 25 per cent of remaining wetlands are threatened by drainage and excessive abstraction.
- Water shortages and restrictions on industrial and other uses are already occurring in many parts of Europe as a result of the above pressures on water supply. For example, river basin authorities are increasingly restricting the rights of industry to abstract water and similar pressures on agriculture are likely in the near future.

Source: *Water Stress in Europe - Can the Challenge be met?* prepared jointly by the European Environment Agency (EEA) and United Nations Environment Programme (UNEP)

Breakfast in the Bronze Age

By Victor Buckley

WHETHER you prefer fish and chips or a spicy curry, have you ever wondered what our ancestors ate and more importantly how they cooked their food? Films depict oxen being roasted on spits over roaring fires, but the reality may have been very different 4,000 years ago as the results of recent archaeological excavations is revealing.

The most common type of archaeological site in the Irish landscape is known in Irish as a 'fulacht fiadh' or 'deer roast'. If untouched by modern agriculture they are to be found as kidney-shaped or horseshoe-shaped mounds of burnt stones. In ploughed fields they can be recognised as blackened splodges standing out in colour compared to the soil in the rest of the

field. They are usually found in wetlands or by the edge of small streams. Over 6,000 of these sites have been located in Ireland so far and new examples are being found every day, especially during the course of large scale developments such as motorways. In one week on the new Drogheda by-pass some 15 new fulachts were discovered during construction work.

So why are these sites so common and what are they? The answer is that they are cooking sites dating from the Bronze Age (c. 2000-500BC). Eating is very important – if you don't eat, you DIE! Therefore these sites were an integral part of everyday life.

How did they work? First a hole was dug in the ground and sometimes this was lined with wood to make a trough. This was then filled with water and beside this a fire was started and stones were placed on the fire until they were red-hot. The stones

were then cast into the water and gradually the water would have been brought to the boil. Chunks of meat were then wrapped up in straw and dropped into the water. Experiments at modern reconstructions of this type of site have shown that the meat cooks at 20 minutes to the lb with 20 minutes extra for a perfect taste. Sometimes reconstructions of the way the cooking was done are carried out at the Heritage Parks at Ferrycarrig, Co. Wexford and Craiggauanowen, Co. Clare.

This type of cooking is well recorded in the Irish myths, where we have the Fianna being sent off into the countryside during the summer months to fend for themselves and digging out a pit, heating stones and cooking deer.

There are many more of this type of site still to be found in Ireland, and not yet recorded by archaeologists. Perhaps you may know of one or if a field has just been recently ploughed look out for the dark stain that may indicate where one of these sites once stood. If you find what you think is an unknown site – write to *National Monuments Service, Dúchas The Heritage Service at 6 Ely Place Upper, Dublin 2*. We will be glad of any new information.

Victor Buckley is Senior Archaeologist with Dúchas - The Heritage Service, 51 St. Stephen's Green, Dublin 2. Website: www.heritageireland.ie Email: [Duchas@indigo.ie](mailto:duchas@indigo.ie) Victor Buckley is also Editor of "Burnt Offerings" (Wordwell Press, 1990) - the set text on fulachta fiadh in Ireland and Western Europe.



Trough and hearth in reconstructed fulacht.



"Hubble-bubble" - meat cooking in fulacht pit.



Burnt mound spread showing in field in West Cork.

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Ghost Story

By Jim Lichatowich

THROUGHOUT the coastal areas of the Pacific Northwest, scattered along riverbanks and in bays and estuaries stand reminders of the great salmon industry. Log pilings that once supported busy canneries are silent testaments to the rivers that were once teeming with salmon. In the early days of my career, one of my first jobs was to convert an old cannery building into a laboratory for research on marine fishes. The old building sat on dark pilings over the waters of Sequim Bay, Washington. It was very old with a sagging roof and the way it moaned and creaked in the wind gave me the feeling it was approaching its end. Then one night, shortly after the lab conversion was complete, the old wood ignited and flames consumed the whole building—only the pilings remained. Since the fire, I always take notice of other skeletons from the heyday of the canning industry. Sometimes, these old forgotten places are more than just rotting log pilings, more than just the echoes of a forgotten past—they are the home of ghosts—ghosts of the salmon and ghosts of the salmon people.

The ghosts are still comfortable in towns like Astoria. Other old-time salmon towns like Seattle, Anacortes, The Dalles, and Bellingham also have their ghosts, but their presence is harder to detect. They have largely moved on and away from their salmon roots. Reminders of the salmon are lost among factories that make airplanes or paper or refine oil into gasoline.

Astoria still clings to the rugged hills at the mouth of the Columbia River. Its streets and docks are no longer crowded with fishermen, Chinese salmon butchers and the rotting piles of spoiled fish, but the city is full of reminders of the industry that once thrived there and the great runs of salmon that supported it. Wandering down Marine Drive under the Astoria Bridge, I stop in front of Soumimi Hall, of the Finnish Brotherhood. The dates chiseled over the door are "1893 to 1947"—the good salmon years. Standing in front of the hall in the evening, I can imagine the angry shouts of gillnetters arguing over the price of salmon and cursing the cannery owners. They are anxious to finish their meeting and get out on the river. It was in the evening that the fishermen took their butterfly fleet into the night's fishery. There are many places here that remind me of the town's salmon roots. Across the street from the Soumimi Hall the old Finnish meat market still stands.

The houses that salmon built still retain their

1890s character, but now they offer bed and breakfast to tourists from Portland and Seattle instead of room and board to lonely men from Helsinki, Bergen and Karlskrona. Walking the steep streets among the old Victorian houses I imagine the laughter of the boom years, and the cries of new widows who lost their husbands to the river. Astoria is crowded with ghosts and they are comfortable here.

Across the river from Astoria, part of the Columbia takes a sharp swing to the north into shallow Baker Bay. One evening during a low tide, I watched the sea ebb from the bay. It was slipping away under a thin mist that lay lightly on the darkening water. Slowly, hundreds of worn and rotted pilings appeared to rise from the bay—silent reminders of a wild and dangerous past. I came here to see these ghosts, reminders of the trap fishery of Baker Bay. As small waves lapped at the pilings I imagined this place 100 years ago with heavy, tar-soaked netting hanging from frames attached to the pilings. I tried to picture in my mind the wild splashing of thousands of chinook salmon—60 to 70 pound "June hogs,"—and the shouts of men trying to manhandle the wild thrashing fish from the traps to the flat-bottomed scows that would take them to the canneries.

As darkness settled over Baker Bay, the lights of Astoria were visible across the river. I remembered reading about dark, moonless nights when the gillnetters from Astoria would slip across the river to their competitors, the trappers of Baker Bay. Angry shouts and even gun shots echoed across the water in the darkness. Then the gillnetters would row back across the river, silhouetted in the light of burning traps. The trappers are gone, the gillnetters and the salmon are nearly gone. In coastal towns, their ghosts are remembered in waterfront boutiques selling memorabilia of a time that will never return. All that is left of the great salmon runs and the lives of men who fished for them are paintings, plates, coffee cups and t-shirts, poor substitutes for one of the earth's greatest living resources and for the men's lives who depended on it.

Much of what we associate with the heyday of the salmon industry is gone and it will never return: the big canneries in every bay, traps, fishwheels, and large fleets of gillnetters or trollers. They are now ghosts, reminding us of something we had, mismanaged and lost. While the loss of a way of life, the dissolution of communities and the degradation of a significant part of our cultural heritage may provide a moral imperative, a reason for trying to restore the salmon, they offer little advice as to how that recovery can be achieved.

The salmon do have important advice to offer, if only we will seek it out. The first step is to recognize that they are far more experienced at the work of restoration than we are. In fact, the salmon have been restoring themselves for over 15 million years. It is only our arrogance and the deep-seated belief in human separation and control over nature that leads us to believe we can restore the salmon without being attentive to the lessons these magnificent fish can offer. Our failure to pay attention to the salmon and to learn from them has led us to hatcheries and smolt barges as a substitute for healthy rivers. It has led us to conclude that the amount of money spent is the most important measure of progress towards salmon restoration. It has led us to ignore the important lessons the salmon have to teach us. And the richest source of those lessons can be found among the ghosts of salmon.

Salmon ghosts are found in unlikely places—in the dry stream beds below irrigation diversions, in rivers blocked by impassable dams, under tons of silt and mud below logged hillsides, under the quiet, warm waters of reservoirs or in the hot water of streams stripped of their riparian vegetation. They may be under the pavement of the local shopping center. City dwellers are often unaware that many old salmon streams are imprisoned in culverts and buried under the asphalt and concrete they drive on every day. Salmon ghosts are found in places with names like the John Day, Umatilla, Klamath, Yakima, Tillamook, Weiser, Ohwyee, Dungeness, Pysht, Alsea, and Jimmy-Come-Lately.

What restoration lessons do the salmon ghosts have to offer? To unlock their secrets we have to go back to some basic relationships among the landscape, rivers, climate and salmon. The landscape of the Pacific Northwest is incredibly diverse, including mountains, deserts, flat valleys, coastal foothills, scablands, and old lava flows. Rivers of all sizes wind their way through this complex mosaic. The rivers, through their natural, seasonal flow patterns are continuously rearranging their channels, rebuilding and maintaining the basic structure of salmon habitat. The interaction between the land and water produce a diverse array of habitats reaching from the lowlands to headwaters in a continuum of connected places where salmon can live. Superimposed over this is a patchwork of climates—coastal, inland, rain-shadows on the eastern sides of mountains and wet areas on the western slopes. Within this crazy quilt are thousands of microhabitats, each with its own challenges to the salmon's survival. How the salmon have collectively met those challenges are at the heart of the lessons they have to offer us regarding their restoration.

Viewed from the salmon's perspective, this patchwork of habitats is a riverscape of salmon friendly areas where survival is high and other areas where survival is low. The survival peaks and troughs of the riverscape are always changing. They are more akin to the ever-changing peaks and troughs of the sea than our conventional vision of nature as machinelike consistency and uniformity. For example, eggs of chinook salmon buried in the clean gravel of a headwater stream may exhibit higher survival than eggs deposited in silt laden gravels of the lower river. Later in the year juvenile chinook salmon in the lower river and estuary may exhibit higher growth and survival than the fish that remain in the cold headwater streams. On the other hand, in some years the lower river may be too warm for salmon to survive through the summer. Salmon respond to the survival peaks and troughs in the riverscape through life history—the way

the salmon lives in and uses the riverscape through all its life stages. Life history is the salmon's solution to problems of survival in diverse and changing habitats. Life histories are the pathways through the riverscape. Within each population, the salmon follow several pathways through the survival peaks and troughs of the riverscape.

In undisturbed rivers each salmon population is composed of a bundle of several life histories, several alternative survival strategies. Unlike the hatchery environment with its feedlot regime, in a natural salmon population, in a healthy river, all the salmon are not doing the same thing in the same place at the same time. They are following different life history pathways through the time and space dimensions of their habitat. As the riverscape changes due to natural disturbance (fires, floods, drought, etc.) some of the life histories in the bundle are in survival peaks while others drop into troughs. This diverse array of life histories prevents the population from putting "all its eggs in one survival basket," so to speak. Even though the habitat was changing in response to natural disturbance regimes and climate fluctuations, the salmon's multiple survival strategies allowed them to remain productive and a reliable base for the Indian's economy prior to the arrival of Euro-Americans; an economy and production system that sustained itself for several thousand years.

All of that began to change about 140 years ago. By now we are all familiar with how over-harvest, irrigation, mining, logging, grazing, urban, and industrial development contributed to the impoverishment of the salmon. But if that is all you know, then you know only part of the story, and it is the least interesting and useful part. And that brings us back to the ghosts and the important lessons they have to offer for the salmon's recovery.

Before white settlers began rearranging the rivers of the Northwest, salmon life histories evolved into a complex web of pathways through the Northwest's diverse riverscapes. One by one those pathways became death traps for fish trying to follow them. Irrigation dried up the lower reaches of rivers cutting off salmon migration through the summer months. Grazing eliminated riparian vegetation raising stream temperatures reducing stream-rearing areas. Logging destroyed the natural habitat structure of forested streams. Hatcheries stripped away diversity while molding the salmon to a uniform sameness that fit their factory-like operations. Dams eliminated spawning and rearing areas and migration corridors. Today, in many rivers of the Northwest, salmon spawning and juvenile rearing are confined to small areas in the headwaters of the rivers. Migration is restricted to a narrow window in spring. Life history diversity, the complex array of pathways through the riverscape has been eliminated.

The loss of life history diversity is a direct by-product of our pursuit of the vision of simplified, controlled and "improved" rivers and salmon populations. In some rivers like the Columbia, we have largely achieved that vision. The river has been brought under the control of engineers. The seasonal flow patterns have been rearranged, and the free flowing channel has been converted to a series of placid reservoirs. The salmon are also largely under human control. At least 80 percent of the salmon in the Columbia River are produced in hatcheries. Even the few wild salmon left depend on humans to carry them downstream in barges. We have achieved our vision of control and simplification but it has come at a terribly high price. I am continuously amazed at the salmon managers who point to the program that brought their vision to fruition—the hatcheries and the barges, for example—and make their claims of success. They conveniently ignore the fact that their expensive programs are only maintaining five percent of the salmon runs that once returned to the river—without the help of man.

Continues on page 11

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The Shannon Estuary

A Marine Reserve for Bottlenose Dolphins

By Dr. Simon Berrow

THE Shannon estuary on the western seaboard of Ireland is now a marine reserve for bottlenose dolphins following its' nomination as a Special Area of Conservation (SAC) under the EU Habitats Directive - the most powerful legislation protecting species and habitats in Europe. This is the first marine SAC in Ireland and the only one for cetaceans (whales, dolphins and porpoise). There has only been 3 other cetacean SACs nominated in Europe, demonstrating the importance of the Shannon estuary for dolphins and also the good work of Dúchas in ensuring SAC status for the estuary. The Shannon estuary is home to the only known resident group of bottlenose dolphins in Ireland and one of only 6 such groups in Europe. A feasibility study carried out from May 1993 to October 1994 suggested the encounter rate with dolphins was high enough to develop commercial dolphin watching, as some animals were resident, and that it was an important calving ground. A recent study funded by the Marine Institute estimates that around 113 dolphins utilise the estuary at least

for some part of the year. This research provided the scientific framework which justified the estuary SAC status for dolphins.

Dúchas are obliged to nominate SACs for both bottlenose dolphins and harbour porpoises as these species are listed under Annex 11 of this Directive but the role of marine protected areas such as SACs for protecting small cetaceans (dolphins and porpoise) is still uncertain. Critical habitats are those which provide the resources and conditions to produce occupancy, including survival and reproduction and which are species specific, can change in time and place, with sex and sexual maturity and are typically a complex of small areas. The home range and movements of individual cetaceans are poorly known and designating specific areas in which they may only spend a small part of their life cycle may not provide full protection.

Shannon Estuary SAC

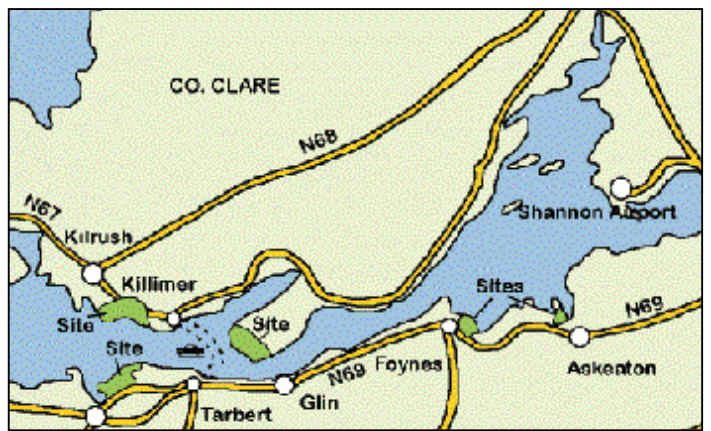
The nomination of the Shannon estuary as an SAC has been in response to the developing dolphin-watching industry in west Clare. Commercial dolphin watching started in 1993 / 94 and has steadily grown to c250 trips and c4,000 visitors by 1999. With significant investment now committed in the

form of two new purpose built dolphin-watching vessels the industry is set to expand rapidly over the next few years.

Dolphin-watching is now a notifiable activity and operators must seek permission from the Minister for Arts, Heritage, Gaeltacht and the Islands Síte de Valera T.D.. To be allowed to dolphin-watch commercially, operators must fulfill 4 conditions, i) comply by the Codes of Conduct, ii) abide by the Management Plan, iii) provide monitoring data and iv) demonstrate competence in environmental interpretation and species identification. The Codes of Conduct set standards for the behaviour of tour boats around dolphins and include activities such as not corraling or pursuing dolphins, maintaining a minimum distance of 200m between vessels, restricting the total time on a group or single dolphin to 30 minutes per trip and not allowing swimming with dolphins. Under the Management Plan the total time commercial tour boats are in the vicinity of dolphins will be controlled. Adopting the precautionary principal this will be fixed at 200 hours for the 2000 season and will not be increased unless research and monitoring show that no detrimental disturbance of the dolphins will result. The Management Plan will also limit the time tour boats are in



The Shannon estuary is home to the only known resident group of bottlenose dolphins in Ireland and one of only 6 such groups in Europe.



Location of dolphin sites on the Shannon Estuary.

the vicinity (<300m) on a single dolphin or group of dolphins. Monitoring protocols, trialed during the 1999 season, combined with photo identification, will enable the location, group and identity of the dolphins watched to be assessed which is

essential to determine the impact of commercial dolphin watching.

If operators fulfill these commitments they will become accredited and will be awarded the Dolphin Flag. This scheme called "Saoirse na Sionna" gives assurance to visitors that if they only patronise accredited operators we will ensure these vessels are adopting good practices with minimum impact on the dolphins. "Saoirse na Sionna" can help operators maintain these high standards essential if the investment in new boats and operating costs are to be justified. The eco-tourism market is increasingly discerning and will insist products such as whale watching are carried out in a sustainable manner. Operators awarded the Dolphin Flag will enjoy promotion and technical support available from the various national and semi-state organisations and it will become a very powerful marketing tool.

"Saoirse na Sionna" has been established by the Shannon Dolphin and Wildlife Foundation, a new organisation established in March 2000 to formulate and implement a plan for the development of sustainable dolphin-watching in the Shannon Region. This may seem to many to be yet another level of avoidable bureaucracy but we hope to develop a model of sustainable eco-tourism that is relevant elsewhere. There has been considerable investment in marine tourism boats around the country as coastal communities try and diversify from a predominantly fishing based economy. Significant investment is also required in developing the marine eco-tourism product or else the potential of this industry for rural areas will never be realised. Only by carrying out the background research and developing the product fully with a number of value added additions will marine tourism provide a welcome and sustainable alternative to Irish coastal communities that have one of the most diverse and fascinating coastlines in the whole of Europe.

The Shannon Dolphin and Wildlife Foundation is supported by Dúchas Marine Institute, Shannon Development Ltd., Clare County Council, Kiltrush Urban District Council, Carrigaholt Development Association and Kiltrush Chamber of Commerce and can be contacted at Merchants Quay, Kiltrush, County Clare. (Tel: 065 9052139 Mobile: 086 8545450, Email: SDWF@oceanfree.net)

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Black Guillemots

By Oscar J. Merne

IN Shetland they call them Tysties and this name seems to be gathering favour elsewhere in Britain and in Ireland too. I prefer the more internationally accepted name of Black Guillemot, which both describes the bird itself and its relationship to the other members of the auk family. Having said that, the Black Guillemot is in a genus of its own - *Cephus* - while the Common Guillemot (about which I wrote in the last issue of Sherkin Comment) is in the genus *Uria*.

Black Guillemots have an almost circumpolar distribution in the cold water areas of the northern hemisphere, occurring in North America, in Alaska and in eastern Canada (Newfoundland, Labrador, Hudson Bay and some of the arctic islands). Moving west to east they are found in Greenland, Iceland, the Faeroes, Ireland, Britain, Scandinavia, Svalbard, and on the coasts and islands of northern Russia to eastern Siberia. In Europe the Black Guillemot reaches the most southerly part of its range on the south coast of Ireland. In Britain most are in Scotland, with just small numbers on Anglesey and in NW England. Latitudinally the range extends from c.48 degrees N in Newfoundland to the edge of the permanent sea ice at c.82 degrees N at Franz Josef Land in the Russian arctic. In arctic regions the breeding birds and their offspring are driven south by the spreading pack ice in winter, but in our latitudes they are much more sedentary. In Ireland the



In Europe the Black Guillemot reaches the most southerly part of its range on the south coast of Ireland.

greatest distance a ringed Black Guillemot moved was from Rockabill in north Co. Dublin to Cork Harbour. Most spend the winter in sheltered waters much closer to the breeding areas.

In breeding plumage, which the birds sport in spring, summer and autumn, Black Guillemots are unmistakable. They are black all over apart from a large brilliant white patch on each wing.

In flight this shows up well as a patch on the centre of the inner wing. Close up, or seen with binoculars in good light, the startlingly bright red legs can also be seen, even when the birds are swimming in clear water. Closer still, especially when the birds are engaged in courtship display in spring and are more inclined to open their bills, you can see the inside matching the colour of the legs and feet. In winter, when they have dispersed from the breeding colonies, Black Guillemots are often hard to find, for they lose the black body plumage and become largely white, with just speckled feathering on the upperparts. The stubby black tail and black and white wings remain the same throughout the year. Choppy seas and poor light, which often occur in winter, add to the difficulty of finding the birds.

Unlike the other Irish auks (Common Guillemot, Razorbill and Puffin), Black Guillemots are not found in large dense colonies. Scarcity of suitable nest sites largely determines the scattered breeding distribution. The species nests in holes and deep crevices, among boulders and shattered rock screens. On the east coast, where natural sites are quite scarce, birds often nest in man-made

structures such as harbour walls at Bangor, Greenore, Giles Quay, Dublin Port, Dun Laoghaire Harbour, Rosslare Harbour, etc. At Bray Head, which with c.70 pairs is one of the largest Black Guillemot colonies in Ireland, most of the birds nest in drain holes in buttresses erected to support and protect the railway line from erosion. At Rockabill c.30 pairs nest in holes in the walls of the lighthouse compound. At Portaferry on Strangford Lough they have taken to wooden nest-boxes with landing platforms in front of them. In these nesting places the females usually lay two eggs, unlike the single egg clutches of the other auks.

Because of their hole-nesting habits and small scattered colonies (often away from the more obvious colonies of other seabirds) it is difficult to census the population of Black Guillemots. In the first British and Irish census of all breeding seabirds in 1969/70 ("Operation Seafarer") only 738 pairs of Black Guillemots were found in Ireland. Subsequent research in Orkney and Shetland indicated that counting Black Guillemots along with other seabird species in June is likely to seriously under record the species: the actual population is likely to be two to three times higher. With a major new seabird census, called Seabird 2000, coming up in 1999-2001, it was decided to include a special census of Black Guillemots, using the recommended method of counting adults in the open (on water and land) in late March to mid-May - before the females disappear into the nesting holes. At the time of writing almost the entire coast from Carlingford Lough clockwise to Galway Bay was covered in 1998 and 1999, while major sections from Connemara to Donegal were covered this spring. The remaining areas will be surveyed in 2001. Northern Ireland is being surveyed separately, and recent counts there indicate a breeding population of c.550 individuals. We now know that the population between Carlingford Lough and Galway Bay is over 1,600 individuals. On this basis the final total is likely to be c.3,000 birds, about twice the total of 738 pairs recorded in 1969/70. It's nice to find this charming little seabird is doing so well.

Oscar Merne heads the Bird Research Section of National Parks & Wildlife, Dúchas The Heritage Service.

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Bray Head has one of the largest Black Guillemot colonies in Ireland.

THE RURAL HOUSING CRISIS

Will restricting demand to 'indigenous' population provide the solution?

By Frank J. Convery

THE rapid and continuing rise in the real price of housing in both urban and rural areas have lead three local authorities - Clare, Kerry and Wicklow - to include provisions in their development plans to limit demand, or, more specifically, to confine demand in certain areas to locals. How successful are these initiatives likely to be? Should other counties follow their example?

Limiting Demand in Clare, Kerry and Wicklow

The basic principle is that in certain areas of these local authority jurisdictions, the local authority will not provide planning permission for new developments to non-indigenous people.

Mr. Michael Nicholson, Acting County Secretary of Wicklow has been quoted making the case in his county as follows:

The policy was designed to protect locals from being priced out of property in their own areas, and to prevent unnecessary development of rural land.The Council is not refusing anyone the right to live in Wicklow, merely to build in rural parts of it without what the development plan calls 'bona fide reasons.' People can buy an existing house anywhere in the county, or they can build on designated land, which is usually in or near the conurbation.....A particular problem for Wicklow is that it's very attractive to Dubliners who can sell their homes

for big money and move down. A lot of local people can't afford to buy a house, so their only chance is to get a site and build. We need to protect them - locals can't afford to pay £120,000.Many outsiders did not adapt to living in rural areas. They ring the council to complain every time they hear a cow moo or get the smell of silage. They also tend to be the first to object to others building. It's a case of close the door after you. ('Building restrictions on people from outside Wicklow defended' Irish Times, 15 April, 2000, p. 5).

If such policies are permitted and are implemented, because they will eliminate external demand in the areas to which the restrictions apply, they will certainly reduce the price of sites in such areas below that which would apply in the absence of the restriction. However, there are a number of problems with the strategy as implemented.

The demand for housing in aggregate does not change; it simply moves elsewhere, and results in increases in house prices in those localities to which it moves. For example, in the case of Wicklow, to the extent that the Dublin demand moves from rural to urban areas in the county, we can expect the prices in those latter areas to be higher than they would have been if the demand hadn't been channelled into them.

It invites 'tit for tat' restrictions. If Dubliners are prevented from buying in rural Wicklow because they push up prices for locals, why should Wicklow people have untrammelled access to County Dublin to buy and build?; there are plenty of house-poor people in Dublin who cannot compete locally in the current market, and who would

benefit from eliminating demand from Wicklow people.

Because the restrictions involve conveying substantial benefits to some and costs to others, the following conditions will need to apply if they are to be sustainable:

- The conditions and criteria for exclusion will have to be transparent and explicit.
- The decision-making mechanisms must be transparent and fair, and be seen to be so.
- The exclusions should discriminate equally against Irish citizens and other EU citizens.
- Environmental and other national objectives should be coherently served.

The last point provides the most valid national case for imposing restrictions. Dubliners will feel that it is unreasonable to provide free access to sites for Wicklow people in Dublin, if Dubliners are discriminated against in Wicklow. However, if the Wicklow scheme were designed to protect environmental endowments and vistas for all the citizenry, including Dubliners, then such a policy would be likely to be acceptable. And we have a model to look to in this regard: In order to help secure its conservation objectives, the Peak District National Park in the UK - which is comprised mainly of private land - has imposed restrictions on building by non residents, and they have proved very successful in retaining the character of the local landscape and reducing accommodation costs to local residents. It comprises a model that local authorities who are serious about using restrictions to serve mainly environmental objectives, but which also benefit local residents, should study:

Peak District National Park, in England

- New residential development is restricted to those who live and work in the area.
- Designed primarily to limit development pressure in a conservation area, but has the incidental benefit of lowering the price of housing
- Development that does take place must meet design guidelines consistent with the conservation objectives to be served
- Outside investment is allowed where expensive refurbishments of existing buildings, which would otherwise remain derelict, is undertaken.
- Simultaneously protects the natural environment, enhances the conservation of the built environment, and provides housing to year round residents at costs lower than would apply if outside investment were allowed.
- Encourages outsiders to commit to an area. In any community, 'blow ins' are a crucial source of entrepreneurial skills, capital, and community activity.

So the answer to the question - will restricting demand to 'indigenous' population provide the solution to the rural housing crisis? - is no, unless the primary objective is environmental, and the mechanisms and their interpretation are transparent, fair and effective, and seen to be so.

Frank J. Convery, Environmental Institute, University College, Dublin.

Ghost Story

Continues from page 8

Today the riverscapes in the Northwest are littered with salmon ghosts—ghosts of salmon that once made their way through the riverscape using pathways that no longer exist. River development did not just reduce numbers of salmon, it blocked and eliminated the unique life-history pathways the salmon followed through the freshwater environments. In fact, the most productive pathways, those that allowed the salmon to rear in the productive, low elevation reaches of rivers, have largely been eliminated.

Most of our restoration efforts focus on the existing life histories. They try to force more salmon through the few remaining pathways rather

than open up the old extinct ones. In some rivers those remaining life histories, largely restrict spawning and rearing to headwater areas, and those stream reaches, because of their cold waters, were never highly productive. It is futile to try to achieve salmon restoration by increasing numbers of salmon without a corresponding increase in the life-history pathways. And we cannot recover life history diversity without recovering complex, natural rivers systems.

Today fisheries management produces giant schools of domesticated salmon that all try to migrate to sea or return to spawn at the same time. These herds of ignorant salmon released from hatcheries are the product of our vision of a simple and con-

trolled river and ecosystem. They are a manifestation of our attempt to bend the salmon to our worldview.

If we are to have any hope of restoring the salmon to sustainable levels of abundance we will have to begin by paying more attention to the salmon's world. Not as it exists today, but the salmon's world as it existed before we simplified, controlled and "improved" it. Although some of the damage done to rivers cannot be changed, much can be undone. For example, unnecessary dams can be removed or breached. Riparian zones can be protected from grazing with fences. We can stop subsidizing irrigated farms in the western deserts to raise surplus crops that the government pays other farmers not to produce. Most im-

portantly we can let the rivers heal themselves. We can allow the natural riverine processes to rebuild the natural physical structure of rivers through which salmon will reconstruct their web of life histories.

One other change in our approach to salmon restoration is imperative. Recovery of salmon based on the restoration of diverse life-history pathways requires a holistic view. It's important to move away from the current myopic approach to restora-

tion that only deals with small slices of the salmon's life history. Restoring only a part of an extinct life history pathway is as useful as building a chain with several links missing throughout its length. The approach to salmon restoration has to broaden from the single riffle or pool or stream reach to the restoration of entire watersheds and entire life history pathways through the riverscape. That is the only way to bring back the ghosts and that is the only way to bring back the salmon.

About the author: Jim Lichatowich is a fisheries scientist who has worked for 30 years in salmon research and management in the Pacific Northwest. His book, "Salmon without Rivers: A History of the Pacific Salmon Crisis," is available from Sherkin Island Marine Station for IR£27.50, including surface postage.

Jim Lichatowich, 182 Dory Road, Sequim, WA 98382, USA. Copyright retained by Jim Lichatowich May 19, 2000

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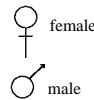
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On the Wing on Sherkin Island

By Chris Shortall

Twenty-one species of butterfly have been recorded on Sherkin Island, some of which are shown here. These range from the common Meadow Brown and Green-veined White, to the rare migrant Clouded Yellow and the internationally important Marsh Fritillary. They are a familiar sight in the spring and summer months when the adults are 'on the wing' (flying).



Clouded Yellow *Colias croceus*

An uncommon migrant to Sherkin, this butterfly is seen every year on the southern coasts of Ireland and Great Britain. The Clouded Yellow breeds in Southern Europe and North Africa and large numbers migrate northwards each summer. However, the caterpillars cannot survive the colder winters of Northern Europe and so it has not established itself in Ireland.



Clouded Yellow



Photos: Paul Kay

Common Blue *Polyommatus icarus*

A common species in areas of rough grassland, absent only from the most intensive farmland. This species can often be found in the evening, when adults congregate on grass-heads where they roost head-downwards. The Common Blue caterpillar feeds on leguminous plants - most commonly bird's-foot trefoil (*Lotus corniculatus*). Like many blue butterflies, the caterpillar is sometimes protected by ants, which feed on a sweet substance secreted by the caterpillar.



Common Blue

Marsh Fritillary *Euphydryas aurinia*

One of the most rapidly declining species of butterfly in Europe, due to drainage of its wetland habitats. The Marsh Fritillary is very rare on Sherkin, reflecting its status elsewhere in the country. The foodplant is Devil's-bit Scabious (*Succisa pratensis*) upon which the female lays large batches (150+) of eggs, these hatch and the larvae remain until the plant is devoured, when there is a mass movement to a nearby plant. This continues until late August when they hibernate, to reappear in spring.



Marsh Fritillary



Meadow Brown *Maniola jurtina*

One of the commonest butterflies in Ireland, inhabiting unfertilised grassland and woodland rides. Eggs are laid on meadow grasses (*Poa* spp.), bents (*Agrostis* spp.), and rye-grasses (*Lolium* spp.), although the caterpillar will eventually feed on a much wider variety. There is only one brood per year, but butterflies have a long flight period - from June to October or later. The caterpillars overwinter and complete their development the following spring.



Meadow Brown



Green-veined White *Pieris napi*

Very similar in appearance to the Small White, this butterfly is not so much of a garden pest. It is a common species in damp pasture and woodland throughout Ireland. The eggs are laid on cress and mustard and the butterfly does not seem to target cultivated cabbages or garden plants. The caterpillar is pale green and covered in tiny black dots with a row of yellow spots on each side.



Green-veined White



Small Tortoiseshell *Aglais urticae*

One of the most common butterflies in Ireland, the Small Tortoiseshell is a nomadic species. Adults travel throughout the countryside laying eggs wherever suitable conditions are found. The foodplants are usually nettles (*Urtica* spp.) and



Small Tortoiseshell



Orange Tip *Anthocharis cardamines*

A scarce species on Sherkin Island, and in decline throughout Ireland, the Orange Tip is, perhaps, the most attractive of our native whites. It is a nomadic species that has a distinct preference for laying its eggs on Lady's Smock (*Cardamine pratensis*), a plant that has become scarce due to agricultural improvement of meadows. When young, the caterpillars are cannibalistic - eating any smaller Orange Tip caterpillars and eggs that they come across.



Orange Tip



Peacock *Inachis io*

A common lowland species throughout Ireland. The "eyes" on the wings are an example of mimicry and are thought to dissuade potential predators. Like many butterflies, the Peacock's foodplant is the stinging nettle (*Urtica dioica*) and large batches of eggs are laid on the underside of leaves. The caterpillars are gregarious in the early part of their development, separating shortly before they pupate, and they are well protected by large spines.



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The Environment Agency of England and Wales

By Dr R J Pentreath

THE Environment Agency in the UK was established in July 1995 and started work in April 1996 when it took on the roles of its predecessor bodies – the National Rivers Authority

(NRA), Her Majesty's Inspectorate of Pollution (HMIP) and the large number of regional Waste Regulatory authorities (WRAs) across England and Wales. It was a brave and challenging step for everyone involved. Not only were the many duties of the formative organisations very different, but their work styles and cultures were also different. The NRA had only been set up in 1989,

based largely on the previous regional water authorities. The HMIP staff were civil servants and the waste-specialist staff were local government employees.

The Environment Agency is a non-departmental public body, as was the NRA before it, sponsored by the Department of Environment, Transport and the Regions, the Ministry of Agriculture Fisheries & Food, and

the National Assembly for Wales. In other words, it operates at arms length from government, with its own Chairman (Sir John Harman), its own Board, and its own Directors and executive staff. It is, by any measure, a large organisation. It employs over 10,000 people and spends some £600M per year.

So what do we do? We were set up in order to help achieve

the objectives of sustainable development by providing a more integrated and long-term approach to environmental management, and to do so within the context of having to provide economic growth and a more equitable society. Not an easy task! We regulate all major industries under a system of Integrated Pollution Control. We regulate the emissions from the nuclear industry and all discharges of radioactive wastes from other sources. We regulate all other forms of waste handling and disposal. We also regulate all abstractions, storage, and discharges of water. We take an overview of all inland and coastal flood defences, and have a major involvement in their construction and maintenance. We own and operate the Thames barrier and also operate a flood-warning service. We are responsible for the management of freshwater fisheries, including angling licensing, and navigational activities in certain areas. And we have duties with respect to recreation and conservation in an environmental context. Finally – or perhaps foremost – we have a wide range of responsibilities with regard to the monitoring of the state of the environment, and to the assessment of what should or should not be done about it.

There are thus many things to do. Strategically we attempt to create long-term visions of what we want to achieve, anchored firmly in environmental outcomes. We attempt to assess the state of the environment by looking at it – both literally and metaphorically – from different points of view. We also assess the stresses and strains upon the environment, from societal pressures to actual abstractions and discharges. Our work is thus centred around a number of "themes" such as limiting and adapting to climate change, protecting inland and coastal waters, and using natural re-

sources wisely.

We try to be a firm but fair regulator. Acting as crown prosecutor (we take our own cases to court) we have already taken over 1,700 successful prosecutions for pollution offences. Such action works: major pollution incidents have fallen dramatically. But we also believe in the need to work in partnership with others and have worked with over 500 companies on waste minimisation projects. Similarly, we have joined forces with local groups on over 600 projects to improve habitats and wildlife. We also spend a considerable effort in raising awareness, in education, and in providing information. Indeed we act as a very 'open' organisation. Even our Board meetings are held in public, with the Agenda and Board papers available in advance of the meetings on our Internet site. In fact it is through our Internet site that we release most of our information. It contains over 1000 pages of environmental information alone, including a GIS-based system to provide data on the state of the environment in your own backyard. Some pages – such as bathing water quality – are updated weekly. We also 'name and shame' persistent or blatant polluters by way of a league table, as well as recognising those companies who achieve the biggest reduction in pollution. A site well worth looking at. It's www.environment-agency.gov.uk.

In spite of all that we have done, however, we are fully aware that we still have much to do. And it's not easy pleasing everyone all the time! But we do try!

Dr R J Pentreath, Chief Scientist, Environment Agency, Rio House, Aztec West, Almondsbury, Bristol BS32 4UD, United Kingdom

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By Jim Lichatowich

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Saving the Meadows & Pastures



Sussex, England: species-rich grassland is often restricted to steep slopes that are difficult to farm.

By John Akeroyd

WE tend to take grass and grassy habitats for granted. Grasses are a background to our lives, the dominant plant cover over much of Ireland and Britain - as fields of cereals or as grassland. Even in towns they form greens, road-verges and lawns. Grasslands are notably a feature of Ireland, the renowned Emerald Isle, where lush,

green pastures cover so much countryside. Grasslands comprise an important natural resource, just like forests and fisheries, especially the older, native or semi-natural stands that have not been fertilized or even, in some cases, ploughed or cultivated.

Grasses are the most traditional of all farm crops. The old-style species-rich meadows (mown grassland) and pastures (grassland maintained for grazing) were long a feature of the countryside. They consisted not just of grasses but of a marvelous richness of colourful and

beautiful wildflowers, including vetches, knapweeds, daisies and orchids. These grassy areas supported a whole community of flowers, butterflies and other insects, and birds - remember corncrakes? Sadly, modern agriculture has greatly diminished these older grasslands. Scientists and governments have promoted a blanket need for higher yields, necessitating low species diversity and high inputs of fertilizer. Modern inorganic fertilizers promote only the most vigorous grasses, swamping the low-yield grasses and flowers. And whole swards have been resown with commercial grass-seed.

All over Europe, native and semi-natural grasslands have disappeared. This loss of old, diverse grassland has been particularly devastating in Britain. Since 1945, some 95% of the semi-natural grassland in the British lowlands has disappeared, and few farms today retain permanent meadows or pastures. When the tractor replaced the horse, farmers were able to plough up pastures for arable land or temporary grassland or leys. Silage, preserved grass cut and stored while green, has largely replaced hay, certainly in lowland regions. Ironically, a recently published study by scientists across the EU, including a group working in Ireland, has indicated that species-rich grasslands may after all produce higher and more sustainable yields. Clovers and other peaflovers are a particularly important element of this diversity.

So, saving these species-rich plant communities is not just a matter of protecting a pretty view or curiosity of natural history. Remember that our wild grasses are a valuable economic resource, of considerable value to plant breeders. For grasslands continue to be a vital element in modern agriculture - the basis of dairy farming. The constituent grasses, clovers and other peaflovers such as Bird's-foot Trefoil are perhaps the ancestors of agricultural forage plants and those used for revegetating road-verges and marginal or waste land and steep slopes. Now that conservationists are at last protecting the last old meadows - and are recreating more - perhaps we shall one day see the flowery grassland of a century ago.

Luckily, some good pockets of species-rich grassland do still survive in western Ireland and elsewhere. There are some fine examples on Sherkin Island and all around Roaringwater Bay and the adjacent peninsulas. These grasslands alone make this area of major significance for conservation. Often grading into rocky heathland or the varied vegetation of sand-dunes and rocky ground by the sea, they are colourful with wildflowers and often show up yellowish- or reddish-green from a distance. Species-rich grasslands are characteristic of steep, unploughed soils throughout Ireland, for example on the eskers or stony glacial mounds that form irregular, hilly bands across the Midlands and other parts of the country. The Burren of Co Clare has some

What are Grasses?

GRASSES are a specialised group of wind-pollinated flowering plants in their own family, Gramineae or Poaceae. This group of plants - ranging from tiny annuals of waysides to the great bamboos of the tropics - has flourished over the last 10,000 years as people have cleared woods, established meadows and pastures, and cultivated a range of cereals and other grass crops. Grasses have long narrow leaves, and stems and leaves that continue to grow after grazing or cutting.

We perhaps notice the individual grass species most in summer as they flower along waysides and in meadows and pastures, and their pollen affects unfortunate hayfever sufferers. The flowers are tiny, green and usually grouped in small or feathery clusters of various shapes. The form of the clusters varies from species to species, providing simple features to identify at least commoner grasses. They may be in narrow spikes or cylindrical, spike-like clusters, or in loosely branched groups or panicles. The flowers-parts are reduced to green, yellowish or papery scales, with male pollen-bearing stamens on slender stalks. Pollen is released into the air and trapped by feather-like female stigmas as it travels on the breeze. The fruits ('grass seed') each consist of a single starch-rich seed lying within a papery husk. They ripen from green to yellowish or brown - think of barley or wheat.

The best places to find interesting grasses are old meadows and pastures, watersides, cliffs and rocks, grassy heaths and dry roadside banks. Some occur only over limestone or near the sea, notably on sand-dunes and shingle-beaches or in saltmarshes.



Perennial Rye-grass (*Lolium perenne* L.)

Photos: Elysebeth Beckett

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wonderful grasslands, with cowslips, gentians and orchids in abundance. In Co Kildare the great grassy plain of the Curragh is a stretch of ancient grassland, although actually rather species poor.

My own favourite Irish grasslands are the small haymeadows that survive on some of the islands and peninsulas of Connemara and further north. In June and July they are bright with Yellow Rattle, Eyebright and various orchids, and tinted red by a special, dwarf and hairy-stemmed subspecies *hibernica* of Sorrel. I remember in 1980 watching a family cutting such a pocket of grassland with scythes, a timeless scene that has almost gone. The ending of traditional agriculture makes old meadows that much harder to protect.

Even so, small grassland pockets can be protected, especially on or near the coast, perhaps within a garden, churchyard or castle mound. Where I live in England, many village gardens have species-rich lawns that represent precious fragments of the lost meadows. The lawn in front of my office window is splashed and dotted with flowers: purple and lilac Self-heal, purplish pink Red Clover, and yellow Bird's-foot Trefoil and Mouse-ear Hawkweed. A nearby churchyard - where local conservationists have negotiated a liberal mowing regime - has sheets of tall Ox-eye Daisy and yellow Lady's Bedstraw and a few precious crimson spikes of Pyramidal Orchids. You can mow a lawn and the flowers will return. But fertilize it to boost the green, and they are lost, probably forever. That is what happened over huge tracts of countryside in just half a century. Let us cherish what little remains.

Dr John Akeroyd, Editor of "The Wild plants of Sherkin, Cape Clear and adjacent islands of West Cork", is the author of the influential 1994 report for Plantlife, "Seeds of Destruction", a plea for the protection of native grassland diversity.

Glenstal and its Forest



By
Anthony Keane, OSB

THE forest at Glenstal Abbey, County Limerick, is typical of many old estates in Ireland: a sacred place amidst cavernous cliffs and clefts, between mountain and plain, with a historic succession of custodians (in this case O' Cahalans, O'Heffernans, Butler, Ryan, Evans (who enclosed the deerpark by license from Charles II), O'Grady, Barrington, and, since 1927, the community of Benedictine monks). The woods themselves can boast of a longer line of succession: the early arboreal settlers - scrub birch and willow - are marginally tolerated by the lordly conquerors and masters who supplanted them - the oak of the primeval oak forest, whose following of holly, hazel, yew, rowan, apple, woodrush, briar and fern sing with the sun the music of what happens. Much of Ireland was once like this when the Fianna chased the loping deer and Diarmaid fled with eloping Grainne. Human kind may have as much right as any other kind of beast or bird to spread the seeds of plants. Yet the verdant harmony of the primeval oak forest cannot be supplied by any arrangement of exotics. There is something deep and mysterious about the oak. It does not rush to leaf in early Spring. The beech has already unfurled her veils of silken green when the oaks' buds darkly glow with buried gold. Most of the other trees have shown their colours with great display when the oak imperceptibly joins the race slipping from primal gold to green. One month later the beech is already in tatters; the oak grows greener still. Its colours grow ever deeper and richer as if inspired by the words of Vanantius Fortunatus' great hymn written in the oak woods of Gaul: *Fonde flore germine*. The trees exult in the power of the Earth and the energy of the sun until with sheer exuberance around the first of August they declare a second Spring. Fresh shoots burst forth from the branches, first bright red like Christmas candles, then in the pink of health they turn to green as part of their Laughnasa celebrations in honour of the great literator harvest god Lugh. This is known as lammass growth. When other trees have lost their leaves the

indomitable oak grows on. In October, if it decides it is a mast year, it drops its thousands of acorns and swiftly sends after them a blanket of leaves to keep them warm and moist. The fresh green leaves of the lammass growth however may last until December as if exploring the possibility of becoming evergreen.

The 17th and 18th centuries have left us paths, steps, walls, spanish chestnut, rows of sycamore and beech, a terraced garden and some skillful attempts at linear vistas with which nature wrestles gently.

In the 19th century, the botanical wonders of the world burst upon the scene. Benjamin Barrington, whose father, Sir Matthew, planted over one million trees here, accompanied David Douglas (of Douglas Fir fame) on his seed gathering tour of western North America in 1825.

The Pinetum at Glenstal thus includes some original introductions of Douglas Fir and one magnificent Sitka Spruce which towered above the rest of the forest only to be struck, some months ago, by lightning. The tree still lives but scattered all around are hundred of laths of timber, radially cleft as if prepared for plasterers: the centre of the tree exploded leaving a long gash spiraling down from a height of a hundred and sixty feet. The neighbouring trees are strewn with the long ribbon-like shivers of timber.

From Central and South America came strange plants with long red pendulous flowers designed for humming birds to handle, such as Dr. Fuch's Fuchsia. From the same area are King Montezuma's Pine and a strange, fearsome, traumatised tree that threatens like a triffid and keeps its prickly armour on for fifty years back along the branches so that "it were a puzzle for a monkey to climb it". This trembling monster Araucaria, remembers the dinosaurs and is ready for battle with high grazing Diplodocus and Argentosaurus. Claw-sharpening raptor and Tyrannosaurus, who bequeathed to our cats their tricks, could ring bark a tree in seconds: the monkey puzzles' defense is to have its bark under tons of pressure - witness the hundreds of little folds down along the tree and the giant folds around its ankles. Thus had the tree evolved by the time of the Cretaceous. It has seen no reason to ease its defences since: if attacked today with a chain saw, the bark will snap upon the chain and stop it. If one manages to get out the chain saw one makes good one's escape for there is no cut: it has already closed.

More gentle and colourful are the Rhododendrons from India and China, which combine with the Deodars ("divine oak") to make a Himalayan scene. Rhododendron Ponticum is more invasive, but just as the elephant in the jungles of India is known as the great trail maker so may an excavator rampaging for a day or two toss the invaders aside and keep them in their place.

In the 1820s and 1830s hundreds of

thousands of oak and larch were planted six feet apart (with birch as nurse trees) - some still stand. Many of the fallen have gone to the sea in ships like the *Jeannie Johnson* and the *Ilen*. Mid 20th century forestry is represented by blocks of Sitka Spruce apologetically trimmed with beech in deference to the bien pensant view of conifers, of the time. More recent plantations of oak have conifers on the outside for reasons either of simple perversity or the desire to give shelter to the forest and all its dwellers in winter.

The woods of Sitka spruce, with their dramatic composition and blue green canvas canopy lifted high on poles that are bare, have a beauty of their own. These trees will not be all cut off in their prime and sent to the factory. Some may be felled in homage to their stronger neighbours, while others gently retire from the race and offer themselves as ready dried poles for construction.

The spruce and douglas fir who remain speak in gentle reproach of their fallen comrades throughout the land: while we have in Ireland trees from the 18th and 19th centuries, the plantings of the first half of the 20th century have virtually been wiped out with hardly any of them left to show to future generations.

It is good to see trees of latter day planting stand and take their place among those of former times. Oak woods planted here at Glenstal forty years ago are already over fifty feet in height and join the conifers in showing that young trees may, given time, mature. New hosts of harlequin

exotics have joined the fray along the margins to colour scented Spring and splash with gold and red the fires of Autumn. In Capperclun Glen the wind felled trees are left in peace to serve as host to a thousand lesser creatures of the wood.

The Benedictine monks have done no more than might be expected. The Buddhist monks at Kandy near the Temple of the Tooth in Sri Lanka have guarded their area of tropical jungle for over two thousand years. Almost all of the natural cover has been stripped from the rest of the country, yet, in the suburbs of the city of Kandy this great area of tropical rainforest continues its dark chant on the origins and mystery of life.

In this spirit too St. Columcille feared nothing save the sound of an axe ringing through the wood of Derry Colmcille.

St. Kevin would not let a twig of a fallen tree be touched until it had been stripped, laid out and honoured for nine days.

The forest is a reservoir of life. In Ireland today it may be seen as a reservoir of water also for it often protects the pristine catchment areas on our mountains. As David sings:

*From your dwelling you water the hills,
the Earth drinks its fill of you.
The springs gush forth gift in the valleys
They flow in between the hills
The wild beasts quench their thirst.*

In this millennium purity, that is, lack of contamination from the fifty thousand toxins we have recently produced, is a most precious

commodity. Naturally clean drinking water is already dearer than petrol. If we in Ireland keep our forests clean we could be richer than Kuwait. Strange that our forest custodians, calling in word and deed for death, should invite the Government to dump in them, to make our growing national product grosser still.

We may not fear for nature: nature will survive, but with terrifying carelessness will cut off those who misbehave and poison the poisonous. It is man's economy that is the endangered plant and man himself the threatened species. Go to the jungle and see: was there ever a parasite who survived for long without achieving some symbiotic accommodation with its host?

From the heart of the wood wisdom calls: choose life, let live. Slip through the forest of life without breaking a twig and all the riches of Earth and Heaven will be yours.

Each tree, each wood, is an ambassador for the world community, a channel for the past and future, a conductor from the depths of Earth and plectrum of the heart strings of the swirling heavens.

At Glenstal he who writes is currently the forester. His tenure is short compared to those for whom he cares, who grow away regardless and with abundant strength and carry him along in their great symphony of praise.

Anthony Keane, OSB, Glenstal Abbey, Murree, Co. Limerick.

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The Indian cedar, called "Deodar" or "God's Tree" by the Indo-Europeans.



A terrace in the 17th century walled garden, with a young Irish Yew in foreground.



Half a mile south of the Mass Rock, the great fault of Capperullen Glen is marked by a line of springs that flow over into lakes. The viaduct in middle distance was designed by William, brother of Sheridan le Fanu of horror story fame.

Glenstal and its Forest

Photography by Fr. Philip Tierney, OSB



Silver fir and araucaria stand by as a Chilean flame tree (*Embothrium coccineum*) blushingly awaits the humming



Narcotically fragrant azaleas overwhelm the castle.



Part of the primeval oak forest enclosed as a deer park in 1673. The spring fed lakes were once great mounds of ice buried in proglacial sands and gravels.



Tree rhododendrons from the Himalayas grow to a height of over thirty feet.



A Himalayan scene of Deodar, oak and rhododendron.

Targeting Hormone Disruption

By Jane Kinniburgh

HORMONES control essential processes in animals, including humans, such as growth, metabolism, reproduction and the functioning of various organs. Some chemicals can disrupt the normal working of the hormonal endocrine system by mimicking or blocking the action of natural hormones. Concern has been growing over the evidence of a link between the presence of certain chemicals in the environment and the disruption of hormone systems that control reproduction in some wildlife species. This has also raised questions about the possibility that reported changes in the reproductive health of humans, including increased incidence of testicular and breast cancer, birth defects and declining sperm counts, might be

found to show signs of part-feminisation. Further work confirmed that around a third of the male roach in the river were affected. Studies using caged fish on the River Lea and other UK rivers suggest that the degree of feminisation was linked to effluent discharged by sewage-treatment works.

Male fish in the River Aire in Yorkshire have also shown signs of feminisation downstream of discharges from sewage-treatment works. In this case, the sewage works received effluents from the textile industry containing alkylphenol-based detergents, which are known to have endocrine-disrupting properties.

Results from a recent study of wild roach in several English rivers, and one control site in Ireland, confirm that the incidence and degree of feminisation of male fish is generally higher at river sites downstream of sewage-treatment works than at sites upstream, or in waters that do not receive sewage effluents (Figure 1).



Roach (*Rutilus rutilus*)

show signs of feminisation.

Other reports include those of alligators and turtles in some lakes in Florida that have shown a wide range of reproductive disorders that have been linked to pollution caused by certain breakdown products of the pesti-

been linked to exposure to pesticides in the environment.

What causes these changes?

There is uncertainty about which substances cause most concern because scientific research is incomplete. Some of the chemicals implicated are listed in the table below, along with their uses. These substances can be released into the environment from several sources including incineration of waste, chemical manufacturing, textile processing, pesticide applications and domestic sewage. Man-made chemicals have been important in developing the quality of modern life, but we must understand - and work to minimise - the risk associated with their use.

Once in the environment, chemicals can contaminate soil, plants and water on which wildlife live and depend. When chemicals enter the food chain, some are able to pass from one species to another, and can accumulate in the species at the top of the food chain.

What are we doing about it?

The Agency has a wide range of environmental management responsibilities, including the prevention and control of pollution and the management of water resources and freshwater fisheries. We have recently undertaken a review of all the scientific advice for hormone disruption in

wildlife and have developed a strategy for how we should deal with the problem. With regard to chemicals that may disrupt hormones in wildlife, we are adopting a precautionary approach. We are using our powers to prevent and minimise the release of these substances into the environment. At the same time, we are continuing to contribute to research to understand which chemicals are implicated and what their effects are. We are also monitoring the concentrations of such substances in the environment.

We have identified the main ways in which these substances enter the environment and will reduce their impact by:

- implementing pollution reduction programmes specific to each substance;
- developing and implementing environmental quality standards (EQSS) or targets for steroids and alkylphenols (these are concentrations below which animals are not affected);
- encouraging industry to implement voluntary reduction measures where these substances are used;
- targeting pollution prevention work at reducing releases at source (through the Integrated Pollution Prevention and Control system);
- carrying out collaborative research in high risk catchments to investigate options for reducing inputs of these substances.

More information on the Agency's strategy on hormone-disrupting substances is included in 'Endocrine-disrupting substances in the environment: the Environment Agency's strategy', published in March 2000. Copies are available from the Environment Agency, Rio House, Waterside Drive, Aztec West Business Park, Almondsbury, Bristol, BS32 4UD, or on our Web site <http://www.environment.gov.uk>

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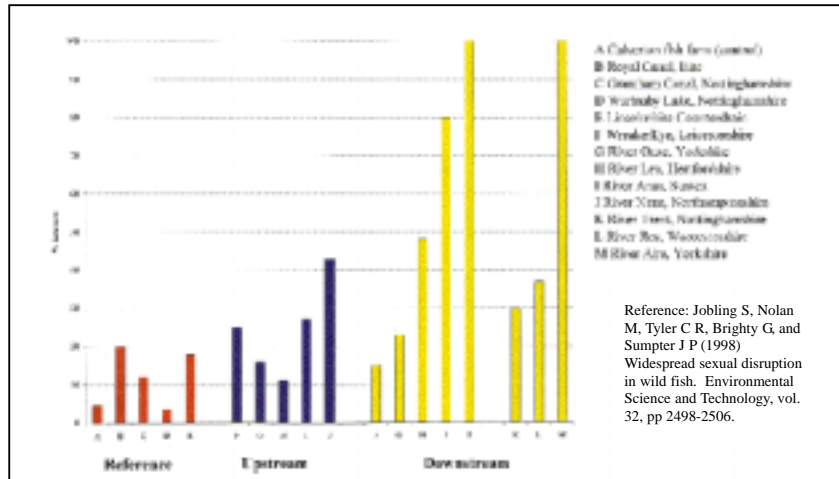


Figure 1: Proportion of male roach with signs of feminisation

caused by exposure to certain chemicals, although no such links have yet been proven.

What is the concern?

Evidence of changes in the reproductive system of wildlife caused by certain chemicals has been documented for the past 40 years. One of the most striking examples of the effect of pollution on wildlife in the UK was the identification around the coast of a condition known as 'imposex' in dogwhelks, in which females acquire male characteristics that physically prevent the female from laying eggs. By the late 1980s it was clear that this condition was widespread and caused by the use of tributyl tin (TBT) as an antifouling agent on boats. Since the ban on the use of TBT-based paints on small boats in 1987, the dogwhelks have shown some signs of recovery.

On the River Lea in North London, male roach (a type of coarse fish) were

In this study, rivers were sampled up and downstream of effluents where there was an impassable barrier between sites. Agency fisheries staff caught up to 100 roach from 18 sites from a range of eight rivers and five reference (no effluent inputs) locations. Fish were dissected to remove gonads and blood samples were subsequently analysed for plasma egg proteins (vitellogenin). Gonads were taken for analysis of the intersex condition (presence of eggs in testis tissue) and any further abnormalities. A numerical index of the intersex condition was developed, based on presence of numbers of eggs in testis tissue and other abnormalities such as the presence of an oviduct (scale from 0 all male tissue, to 7 all female tissue). The mean intersex index varied considerably, from 0.33 at some control sites to 2.3 on the River Aire.

In marine waters, male found from the Tyne, Mersey and Solway Firth estuaries have been found to

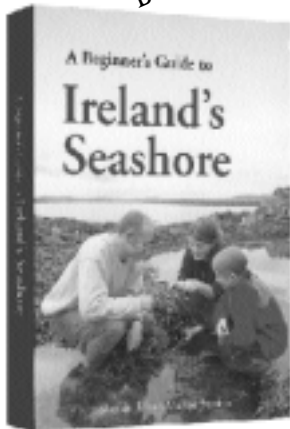
side DDT. Some gulls and terns in the USA show evidence of feminisation of males, poor egg formation and female-to-female pairing, which has

Some categories of substances with reported endocrine-disrupting properties			
Substance category	Examples	Uses	
Naturally occurring	Phytoestrogens	Isoflavones, lignans, coumestans	Present in plant material such as sprouts, cabbage, soya beans
	Female sex hormones	17-β oestradiol, oestrone	Produced naturally in animals (including humans)
Man-made	Polychlorinated organic compounds	Dioxins	Arise as unwanted by-products from some incineration and industrial chemical processes
		Polychlorinated biphenyls (PCBs)	No longer manufactured or used, but some equipment (mainly electrical) containing PCBs remain in use
	Organochlorine pesticides	DDT, dieldrin, lindane	Insecticides (some now banned or phased out/used on crops and in some sheep dips)
	Organotins	Tributyl tin	Anti-fouling agent on boats
	Alkylphenols	Nonylphenol	Used in production of nonylphenol ethoxylates and polymers
	Alkylphenol ethoxylates	Nonylphenol ethoxylate	Surfactants in wool scouring, laundries, car washing. Also used as a plasticiser
Synthetic steroids	Ethinyl oestradiol	Contraceptive and hormone replacement therapy	

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Lough Key Forest Park

Páirc Fhoraoise Loch Cé
Co. Roscommon

Location: 3.5km east of Boyle on N4 to Carrick-on-Shannon.

Habitat: Lough Key Forest Park forms part of the formal Rockingham Estate dating back to 1617. It comprises 350 hectares of mixed woodland and incorporates a number of the islands of Lough Key.

Length/Type of Trails: A number of signposted trails are developed incorporating the main features of interest within the park.

Main Tree Species: Many of the great trees of the original plantation remain, notably the giant red cedars, magnificent beeches that flank the main avenue and some ash and oak. There is a wide variety of other species.

Other Flora: The bog gardens are a particular feature of the park and display a wide selection of peat-loving plants and shrubs. Young heather plants, together with hosta, astilbe, lobelia, hydrangea and trollius provide a blaze of colour by the wide range of garden. In the gardens proper the main contribution is made by a wide range of rhododendrons which mingle with yellow orange azaleas in early summer. The ground cover in general is made up of sphagnum moss, shallon, heather and other plant species.

Fauna: The park supports a large variety of wild animals the largest of which is the fallow deer. Others present include the fox, badger, stoat, hedgehog, squirrel, otter, rabbit and hare. Bats are also numerous. Birdlife is rich due to the range of habitat types. The resident population is augmented in summer by migratory species such as chiffchaff, warblers, whitethroat, cuckoo and swallow. Wild fowl are plentiful in winter.

History: The name, Lough Key, derives from Cé, the druid of Nuadha of the Silver Arm, who, according to legend, was drowned when the waters of the lake burst forth from the earth. The area is rich in sites of archaeological interest. Within the park itself are several ringforts and some of the islands in the lake contain interesting medieval ruins. On Church Island are the remains of a Franciscan Priory and on Trinity Island the remains of a Premonstratensian Priory while Castle Island has traces of a medieval castle. Nearby in the townland of Ardarn an extensive series of earthworks marks the site a medieval village while Boyle Abbey is one of the earliest Cistercian abbeys in the country.

Facilities: Lough Key has a fully serviced caravan and camping park with service buildings including showers, toilets, laundry, games room and outdoor children's play area. A restaurant and shop is located in the forest park. Other attractions include lake cruises, boat hire, observation tower and tunnel, an old estate chapel, temple, fairy bridge, ice house and wishing chair.

Cong Wood

Coill Chonga
Co. Galway

Location: Adjacent to Cong Village near the Abbey grounds.

Geology: Limestone with remnants of former quarrying holes where stone was cut for use in the construction of local castles.

Length of Trail: 3km

Habitat: The area is honeycombed with turloughs and subterranean streamlets with natural spawning beds for pike on the bays of Cong River which runs through this area. Lough Corrib lies close by.

Main Tree Species: The wood has a wide variety of both deciduous and coniferous trees. Main species include Sitka and Norway spruces, Scots pine, silver fir, American redwoods, oak, beech, lime and ash.

Other Flora: Meadow sweet, horse's tail, bullrush, common reed, water lilies and dog-weed periwinkle.

Fauna: The area is famous for woodcock. Animals found in the locality include pine marten, red squirrel, fox, hare, rabbit, badger and stoat. Coot, moorhen, mallard and swan can be found on the river.

History: The last of the High Kings of Ireland, Rory O'Connor, lived across the river in the old abbey for the final year of his life and reign. This area incorporates a place called the "wilderness" traversed by a maze of roads, a substantial tower and huge stone walls. Cong and Ashford grounds are well known as the location for the film "The Quiet Man".

Facilities: Seats and fishing - Cong River is famous for salmon and trout. The area is very peaceful with the silence broken only by bird song. There is an entry fee if entering through Ashford Castle grounds.

"Discovering Ireland's Woodlands. A Guide to Forest Parks, Picnic Sites and Woodland Walks", produced by Coillte Teoranta - The Irish Forestry Board, provides details of forest parks, picnic sites and forest walks. Lough Key Forest Park and Cong Wood are just two of these forests. Price: £2.00.

Turk Head - A Hidden Treasure

By Alex Sen Gupta

OFF the northern coast of Sherkin Island running between Sandy Island and Turk Head on the mainland there is a narrow, steep sided channel about 20m deep. As you descend down the steep wall, through layer upon layer of ever darker water an eerie light falls on a habitat that could be from a prehistoric age.

On the lower slopes of the wall from about 10 m downwards, the rock becomes completely obscured by literally millions of brittlestars. These spidery echinoderms, relatives of the more common starfish, have a body the size of a 10p coin, with long slender legs 5 - 10 cm long covered with tiny tentacles. In the strong currents that flow through the channel the brittlestars raise their legs to catch passing particles of food with their tentacles. Food is passed along the tentacles into the mouth, on the underside of the central body. This massive population is only possible where there are strong food-rich currents that can sustain such vast numbers of animals.

Fossil evidence shows that 500 million years ago, during the Mesozoic era, populations like these flourished in the oceans'. Some unknown phenomenon wiped out most of these, leaving only a few scattered beds around the world. Different theories for the cause of this have been put forward - possibly one of the mass extinction from increased volcanic activity or a meteor impact, or maybe the increased predation from the growing number of fish and crustaceans that began to evolve at that time.

Many other species share the channel with the brittlestars. The most prevalent is another type of echinoderm, the featherstar. They are present in almost the same numbers as their brittlestar cousins. These fascinating looking animals could easily be mistaken for a strange plant, until you see them move. They have many long arms, covered in numerous feathery

branches. The arms are lifted up in the shape of a bowl, into the passing current. Below, is what looks like a set of small roots that attach the animal to the rock. As the featherstar catches particles in its branches it tightly rolls up its legs, one at a time, to bring the food

rine Station have been surveying the channel as part of a series of surveys over the past 20 years. We have made an estimate as to the number of each species present. Obviously trying to count the millions of animals present would be impossible, so at intervals

anemones and a selection of other plant and animal species. The brittlestars are often two or three deep and like to hide under the branches of the featherstars. Like children being counted on a school bus, they love to move around to make it more difficult for us. We



Common Brittlestars (*Ophiothrix fragilis*) are often be found two to three deep, obscuring rocks and sponges.



Featherstar (*Antedon bifida*) extends its legs into the current to collect food.

into its mouth. If they are dislodged from their rocks, they are good swimmers, but with a very unusual style, moving alternate legs together in a sinusoidal doggy paddle.

The strong currents and large quantities of suspended food not only attract many species, but also seem to have fattened them up to almost giant proportions. Various types of crab, colourful sea anemones, sea fans (Hydrozoans), soft corals and massive sponges are common sights. In these rich waters animals seem two or three times as large as you would normally see while diving.

In an effort to keep a record of this unusual area, we at Sherkin Island Ma-

along the channel we counted small samples, at different depths along the wall. Even this was extremely difficult as in a single metre square there may be up to 1500 brittlestars, as many featherstars in addition to hundreds of

have an extremely short time each day to carry out a survey. Unless we dive precisely at high tide, in a slot of about 30 minutes, the current becomes so strong that we just get swept out of the channel.

From the data we can see how the various species are distributed along the channel and at different depths. We can also see if and how things are changing over the years. As we have seen with so many other species around the world, the fact that these animals have survived 500 million years is no guarantee that, with us around, they will be here in another 500 million years.


This is an almost unique area and so must be treated with special care. The brittlestars and featherstars, although extremely abundant, are also extremely fragile, and any careless contact will cause damage. It is a privilege to dive there.

Alex Sen Gupta is currently a volunteer at Sherkin Island Marine Station.

¹Dr. R. Aronson (1987), A murder mystery from the Mesozoic. *New Scientist*. 1581 pp56 - 59




Jewel Anemones (*Corynactis viridis*) can create a colourful display on underwater rocks.



Ireland's Environment - A Millennium Report

Does Ireland still merit its 'green' image? Our economic boom is putting the environment under pressure. *Ireland's Environment - A Millennium Report* assesses the state of the environment, how we affect it and the steps we as a society can take to protect it - to the benefit of our quality of life and that of future generations.

Ireland's Environment - A Millennium Report is now available from EPA Publications, St. Martin's House, Waterloo Road, Dublin 4, (01 667 4474), price £15. Copies of the Executive Summary of the report, the companion booklet *Ireland's Environment - Make Action Now!* and an A2 poster entitled *Handle with Care* are available free of charge from the same address.



ENVIRONMENTAL PROTECTION AGENCY An Gníomhaireacht um Chaomhú Comhshuí

Ireland's Environment

A MILLENNIUM REPORT

THE Millennium report by the Environmental Protection Agency (EPA) on the state of Ireland's environment makes stark reading. The Celtic Tiger is causing an acceleration of pressures on the environment, which must be addressed by all of us. It is the responsibility of every citizen to ensure that future generations do not inherit insurmountable problems with the environment in which they live.

The report points to the rate of growth across strategic sectors, which are posing a major challenge for environmental protection:

- new housing completions had more than doubled and the number of households had increased substantially;
- personal consumption of goods and services had increased by one-third in a five-year period;
- the volume of industrial production had more than doubled;
- the total number of vehicles had increased by more than 50 per cent;
- the country's total primary energy requirement had increased by more than one-third;
- there was substantial expansion in forestry, tourism and trade.

We learn from the report that Ireland's international commitment on emissions of greenhouse gases mainly carbon dioxide, methane and nitrous oxide is to limit such emission in the period 2008-2012 - 13% above 1990 levels.

However, the percentage increase already exceeds this and in a business as usual scenarios Ireland's emissions by that period would reach

more than twice the limit. It states a process of major change must get underway urgently if Ireland is to fulfill its obligations.

Ireland's river water quality is highlighted in the report. It continues to deteriorate with no halt in the trend, evident since the late 1970s of a steadily increasing extent of slight and moderate pollution. This is caused by eutrophication (enrichment), which now affects about one-third of the river system. Salmon/trout have been adversely affected by factors including drainage and eutrophication. The charr has been lost from a number of lakes and appears to be particularly sensitive to eutrophication.

The report is very definite in appropriating blame relating to substances entering inland water. Agriculture is by far the major source of phosphorus inputs whilst urban waste water and industrial effluents give rise to much lower loads.

The quantities of non-agricultural solid waste are continuing to grow in Ireland, over 15 million tonnes in 1998. The largest amounts generated:

- 4.9 million in manufacturing
- 3.5 million in mining and quarrying
- 2.7 million in construction and demolition
- 2.1 million of municipal

The amount has doubled since the mid-1980s. It is heartening to learn that waste recovery in the manufacturing section has increased from 31% in 1995 to 51% in 1998.

There are often growing pressures on the environment, including changes on the land surface resulting from road building, industrial development, housing, agriculture, afforestation, quarry-



meeting future EU limits for these pollutants will present a difficult challenge.

The report calls for major changes in our thinking on a number of other fronts:

- the effect building development has on the landscape such as urban sprawl, inappropriate rural housing development, road construction and the growth of industry.
- the need for an increase in the availability of alternative modes of transport i.e. cycle lanes, the provision of good quality and efficient public transport is stressed.
- the conservation of air, flora and fauna and the protection of a number of risk species, turoughs, shingle beaches, coastal lagoon, maerl beds, machair, a range of peatlands, the otter, bats, lesser horseshoe bats and a number of bird species.

The report states there is considerable scope to reform the Irish fiscal system as part of overall approaches to addressing key environmental issues facing Ireland. Potential economic instruments include the following:

- an excise tax on the sale of fertilisers to discourage overuse;
- waste charges and taxes;
- taxes and charges to discourage vehicle use in urban areas;
- greenhouse gas taxation;
- appropriate cost recovery for the provision of environmental services and avoidance of environmentally damaging subsidies.



The report calls for a sustained long-term programme of environmental awareness raising and education. Environmental awareness in Ireland must be raised significantly so that, in daily life, citizens are sufficiently informed and committed that they will take the environment into account in the way they manage their homes and their businesses, use transport and make consumer choices. Our present choices, both as a society and as individuals, determine the quality of the environment that we will hand on to future generations.

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ACTION AGAINST LITTER




Bardas Chorcat
CORK CORPORATION

Dredging, Science and Environmental Protection

By Michael
Ludwig

VESSEL size and draft as well as cargo handling practices are constantly changing. Dredging is often needed to maintain a modern port. Today, the busiest port on the east coast of the United States receives vessels that require more than fifty feet of water and carry over 4000 container boxes or about 300,000 tons of oil. New York Harbour has a natural depth limit of nineteen feet. Without dredging those vessels could not enter the harbor. In the US, the US Army Corps of Engineers is responsible for maintaining federal channels. They dredge more than 400 million cubic yards of sediment every year.

Beginning in the late 1960s people began to investigate the impacts associated with dredging and in-water, dredged material disposal. The need to understand the environmental consequences of these activities came with the realization that many of our harbours are collecting points for pollutants dumped into them or their tributary waterways. The polluted materials often come to reside in shipping channels and berthing areas and other, deeper parts of the harbour. Handling polluted dredged materials is complicated, but we are learning ways to do it. Relocating contaminated sediments to clean areas causes pollution expansion, and threatens the environment and quality of seafood. Safely handling polluted sediment is expensive.

In 1972, concerns about using the oceans as a waste disposal site set the stage in London, England for an agreement on what types and amounts of materials could be dumped in international waters. The agreement is known as the London Dumping Convention. In the US, the Marine Protection, Research and Sanctuaries Act was created to address ocean disposal activities in US waters.

The Act requires adequate characterization of dredged materials using a series of progressively more intensive testing. The tiers start with simple queries about the dredge area, sediments and possible pollution sources. Subsequent tiers use exposure tests to identify health threats to organisms typically found at a disposal area. We have improved the testing protocol as methods and our understanding of threats poised by various pollutants have improved. Today, sediment test results are reported in parts per billion (in some cases parts per trillion) and the threat to the environment can be defined. These improvements have lead to better dredging and disposal practices.

The test results are needed to determine if the dredged material disposal will adversely impact the environment at the disposal site in other than mechanical ways. (Dumping sediments in one spot on the sea floor buries the creatures that live there. While some species can dig their way through the material, others die. Conversely, creating new habitat encourages a larger population size and increases ecological value.) Testing identifies which sediments are too polluted to place in the ocean. These must be placed in special, containment areas. Testing also provides insights on when to allow dredging, the types and sizes of dredges to be used and the method(s) of disposal.

Should there be observers on-board to watch for whales and sea turtles? Is the sediment clean enough to be used to "cap" prior sediment disposals? These are questions designed to insure the dredging protects the environment.

The testing requires up to six months for completion and can cost over \$100,000. (Dredging a harbour can cost millions of dollars.) Local species of worms, clams and shrimp are placed in containers with the sediments and maintained there for ten and twenty-eight days. Those that die are noted and the levels of pollutants taken up by those that live are determined.



Above left: Deepening harbours can require removing rock. **The Dredge "New York" is working beneath the Fitzgerald Bridge in inner Boston Harbour.** **Top:** As cargo vessels increase in size and draft, Ports must deepen channels to remain competitive. Boston has just finished their new 45 foot deep channel. **Above right & top right:** Different sediment calls for different dredges: the ripper is used in hard soil and soft rock (above right), the clamshell is used in soft and soupy sediments (top right). The power ripper shovel dumps its 10 yard bucket into a disposal scow for transport to a designated dump site. Clamshell dredges can move up to 50 cubic yards in a single grab.

Those levels are compared to amounts in animals that were held on sediments from around the disposal site. The difference in the number of dead and the levels of pollutants taken up are compared. If the numbers are not close, the sediments cannot be dumped at the disposal site.

Designation of an open water disposal site also requires a rigorous evaluation. Questions regarding its value to the natural resources of an area must be fully addressed. This step has identified sites that possess unique ecological conditions and protected the environment from poor choices. Disposal sites should retain materials placed there unless dispersal of the sediments is fully understood and desired. Much of the continental shelf ocean floor does not meet the containment requirement in waters less than 80 feet deep.

However, even with acceptable test results in hand, we are finding that some people remain convinced that all dredged sediments are dangerous. Often it is because the language of dredging isn't explained.

Any sediment that is not pure is considered "contaminated." To many people, the word means "toxic" or hazardous to health. These different definitions create confusion and concern. Other uncertainties are associated with the testing results and how the numbers are used.

Whatever the cause, the result is that some think that many government workers want to pollute the ocean. Dealing with this opposition is difficult and not always successful. When the science of sediment testing and the test results are not understood, bad choices can be

made. However, we all need to understand what is being dredged and where is the best place to place it.

Michael Ludwig, NOAA, NMFS, Milford, Connecticut 06460-6499, USA.



Michael Ludwig (left), the author and Matt Murphy (right), standing next to one of the power shovels that removes unpolluted sediment to deepen the harbor. It has State-of-the-art electronics that allow precise removal at ten yards per bucket full.

My Father, the Naturalist

By Jean Hassett

MY father, Prof. Louis P.W. Renouf, was born in 1887. He went to school in the German Benedictine Monastery in Erdington, England, and won a scholarship to King Edward VII Grammar School in Birmingham. His interest in biology started long before he left school. In 1907, he found employment in the Department of Pathology in Birmingham University where, in his own words, he did "a number of junior jobs" and acquired a practical and widely-based approach to biology which he never lost. From here, he won an open scholarship to Trinity College, Cambridge. He took his B.A. in 1914 and subsequently a post teaching biology to medical students in Glasgow University. In the same year he married my mother, Nora Wareing.

In 1922 he was appointed to the Chair of Biology in University College Cork (UCC), where he remained until his retirement. He dedicated much of his scientific life to two great tasks: the reconciliation of religion with biological science and his work in Lough Ine in West Cork. His grandfather, the Egyptologist, Sir Peter La Page Renouf, had become a Catholic and for a time was Cardinal Newman's recorder. Louis' father, Peter L. Renouf, incidentally, was an inventor and had accreditation for, among other things, inventing the free wheel of the bicycle.

Soon after his appointment to UCC, my father met Dr. Lloyd Praeger of the Royal Irish Academy. Resulting from this meeting, he paid a visit to Lough Ine and remained within its spell until he died in 1968. In common with many other scientists, he had the problem of being "ahead of his time". His work in Lough Ine was of utmost importance to him but to very few others. He got little support, financial or otherwise from UCC. His first laboratory was a packing case. This was succeeded a few years later by a garden shed, which he personally bought, importing it from England. This laboratory was situated beside the head of the Rapids and sufficed for many years until it was swept into the lough and smashed to pieces by a tidal wave.

Parallel with his research, my father had a burning passion to instill a love of nature in others. A second and finally a third wooden laboratory were constructed and fitted out with what would now be seen as extremely primitive equipment. They did suffice, however in making it possible for him to invite groups of students from far and near, to come on courses and learn from a "master". Shore collecting was a frequent exercise. Stones were lifted in search of specimens. Specimens had to be treated with the greatest respect and every stone replaced carefully so as not to disturb the environment.

Every year, from the early 1920's, the whole Renouf family moved to a small house in Barlogue, near Lough Ine, for a month each Easter and 3 months each summer. The journey from Cork to Skibbereen was by steam train. On one such journey, an enormous black spider in a glass jar was placed inside the window. I couldn't figure out why we had the carriage to ourselves that day - there was a lid on the jar and the spider couldn't have got out to harm anyone! On arrival at Skibbereen station, we were met by a pony and trap and driven to Barlogue - some six miles away. The pony and trap were owned and driven by my mother and cared for by the farmer from whom we rented the house. It was our valued mode of transport year after year.

The house in Barlogue was about a mile of rough boren from my father's much loved "labs", to and from which he walked, apparently effortlessly, twice every day and sometimes



Above: "Animal Life on the Seashore", written by my father.

Right: One of the few photographs of my father - here in his punt with my mother's bulldog.



Photo: © Jean Hassett

more. We saw little of him apart from mealtimes which were regular as clockwork at 8am, 1pm and 6pm respectively. Left to our own devices, we tuned into the local environment. I was the baby of the family, born in 1927. My sister, Mena, and brothers Luan and Pat were 2½, 8 and 11 years my senior respectively. Pat was my champion. He had a small sailing boat. It was my job, at the start of each season, to fix the rigging on the top of the mast. The boat would have capsized had Pat climbed the mast. Pat taught me to sail and took me fishing and climbing cliffs looking for seabirds' nests.

Pat and Luan, one year occupied themselves by getting two young ravens and rearing them to adulthood. I loved the ravens and played with them by the hour year after year. One wing on each bird was cut after each moult to prevent them from flying away. They seemed happy

10 specimens collected. One very productive year I earned 5/- with which I bought my first watch. What fate befell the ticks I do not know!

We, his children, continued to occupy ourselves with our many and varied "trivial pursuits" which we found more enjoyable and our father saw these as far more educational than anything taught in schools. He, on the other hand, dedicated himself to things way above our heads and in which we, perhaps regrettably, had little interest.

His equipment was basic and diving unheard of. He had a small rowing boat and would row in Lough Ine and Balogue Harbour stopping frequently to lean over the side and scan the sea bed through a long tubular metal object with glass fitted into the bottom. Spring tides were a much appreciated bonanza, making everything in and below the subtidal zone more accessible than at other times.



Lough Ine from the south-east, with the rapids in the foreground

Photo: Keith Wilson/Dickens - The Heritage Service

though they had to travel in a box whenever the rest of the family moved from Barlogue to Tivoli and vice versa. The ravens learned to bark exactly like my mother's Alsations and terrorised callers to the house in Tivoli by barking at them loudly even when the dogs were not to be seen. Their wings were eventually allowed to grow and the ravens went back to their natural environment.

My father needed ticks for his research and gave me the task of collecting these off the neighbours' cows while they were being milked. For these, I was paid the princely sum of 1d for every

Plankton and other tiny specimens were collected in a tow net - a conical structure made of muslin, a loop of strong wire kept the mouth open, a jar fitted in the narrow end caught specimens while excess water escaped through the muslin. To each side of the wire was tied a long cord, the ends being secured, one on each side of the rapids and adjusted carefully to hold the net in the best position for catching a sample of specimens from those being carried into the lough on the rising tide. These specimens, my father subsequently scrutinised under a microscope as he sketched and recorded them diligently. Another

of his great interests was the study of sponges about which he had vast knowledge. Regrettably little of his work was published. On record, however, is his description of a new species, *Parerythropodium hibernicum*, a beautiful and delicate, pink, soft "coral", apparently unique to Lough Ine.

From the mid 1920's on, resulting from talks given and contacts made by my father, the uniqueness of Lough Ine, as well as his on going work there, began to be seen as significantly important by other scientists. Thus evolved the long succession of scientists, some better known than others, who brought groups of students to study in Lough Ine. Among those who readily come to mind: Julien Huxley and his beautiful wife Juliette. Juliette, attired in apple green beach pyjamas of flowing chiffon, looked, to me, like a princess who had escaped from a book of fairy tales. John Ebling, a student, visited Lough Ine before the War as did Jack Kitching who headed that party. They both returned as soon as the war was over and subsequently year after year to bring more students as well as to further their own research. Oleg Polunin, author of "Trees and Bushes of Britain and Europe" and many other guides, visited visiting Lough Ine. Oleg also spent time on Sherkin Island where he camped with his family while studying its plants. Worthy of mention here is Prof. Thompson Flynn, then Professor of Zoology in Queen's University, Belfast, and also father of the well-known film actor Errol Flynn. Thompson Flynn was, all through the war years, UCC's external examiner of zoology. He was a most welcome, delightful guest and stayed in our house in Tivoli twice each year. He never left without giving my mother a big box of "Black Magic" chocolates. We were all allowed one chocolate each after lunch, every day until, sadly, the box was empty.

My father's contribution to the teaching of biology was considerable. As well as teaching students in Lough Ine and First Medicine and Science students in UCC, he was the author of "Animal Life on the Sea Shore". He and Joseph Stork of Darthmouth College were joint authors of "Fundamentals of Biology", "A Junior Biology" and "Plant and Animal Ecology", with "Stork and Renouf" becoming a household word in Britain and Ireland for several decades.

He was a lifelong philatelist. Even here his biological interests intruded: he wrote and had published two booklets on "The Stamp Zoo". On a more serious plane, he accumulated a magnificent collection of Irish stamps, including rare varieties of the provisional overprints and postal items connected with the Civil War. The stamps provided him with long hours of pleasure when he could no longer visit Lough Ine and had involuntarily "resigned" from UCC at a younger age than was the norm at that time.

The "Business World" was outside my father's realm of comprehension and was even frowned upon and seen as rather "vulgar" by both my mother and him. I remember being told "money is never mentioned in polite company". His faith in St. Philomena, UCC and human nature in general, while admirable, was unfortunately, above and beyond basic commonsense. The Sweep's Stake ticket he placed annually under St. Philomena's statue never won. My mother did not receive a pension from UCC after his death as my father had, apparently, considered payments into a pension scheme as quite unnecessary!. Money and stamps alike that he had trustingly lent to "friends" were not always returned.

I was 41 and expecting my tenth and sadly, my last baby when my father died. I hadn't got to know him any better in my adult life than I had as a child. I had, however, "inherited" his love of nature. Destruction and waste of any kind saddens me as it did him. My wish for the future is that mankind in general shows more respect and concern for the inherent beauty of the world, which was, if long ago and rather optimistically, entrusted to our care.

Jean Hassett, "Roseville", Strawberry Hill, Cork.

Publications of Interest

How are we managing our healthcare wastes?

Adrian Coad and Jurg Christen
Published by SKAT/1999
Available from: IT Publications Ltd.,
103-105 Southampton Row, GB-
London WC1B 4HH, UK.
ISBN: 3-908001-86-2

Price: £9.95stg
This recent publication assessed the current situation relative to waste disposal from hospitals, clinics, general practitioners, etc. Their liquid and solid wastes present a health hazard, whether infectious, poisonous, radioactive or potentially causing injury. Different disposal methods should be applied according to the hazard:
- incineration (infectious)
- neutralisation (chemicals)
- autoclaving (microbes)
- returning to supplier / landfill (radioactive)
Several case studies from developing countries showed that, although favourable towards a good healthcare management strategy, they lack proper financing, responsibility, public information and habit modifications.

WETLANDS, WATER & THE LAW

Using law to advance wetland conservation and wise use

By Clare Shine & Cyrille de Klemm
IUCN Environmental Policy
and Law Paper No. 38
IUCN/1999
ISBN: 2-8317-0478-2
Price: £13.50stg

This well presented guide shows the current law practices in the area of wetland use and conservation. The vast reservoir of data is thoughtfully set out with key points highlighted for quick perusal. The book deals well with its aim to show "the contribution wetlands make to sustainable management of limited freshwater resources and thus to regional stability". It is a monument to Cyrille de Klemm who died just before the book was completed in 1999, it was finished by Clare Shine a close friend and colleague. Both had worked hard for over a decade to bring this book together and it combines their research in the field with environmental conservation law.

The Impact of the Planning Process on Special Areas of Conservation

Shirley Clerkin and Billy Flynn
The Irish Wildlife Trust/1999
Price: £5.00 (£2.50 unwaged)
This report looks at the implications of the planning process for developments within Special Areas of Conservation (SACs), around Ireland.

A selection of local authorities are considered and an analysis made of planning applications and referrals to the National Parks and Wildlife (NPW), the body responsible for providing expertise on conservation issues.

The conclusions of the report is that it is unhappy with the role the NPW plays within the planning process.

A number of recommendations to improve the process are suggested.

This is a well laid out report with some

important conclusions.

CHOOSING AND USING STATISTICS A Biologist's Guide

By Calvin Dytham
Blackwell Science/1999
ISBN: 0-86542-653-8
Price: £18.50stg

A valuable handbook for all biologists completing statistics analysis. The usual format of the mathematics underpinning statistical tests has been discarded in favour of a more user-friendly manual on processing data with P.C. packages available. This step-by-step guide, with easy to follow keys and clear diagrams, meets the authors aim of producing a comprehensive guide to statistics without including equations.

COD

A Biography Of The Fish That Changed The World

By Mark Kurlansky
Jonathan Cape/1998
ISBN: 0-224-05104-0
Price: £12.99stg

Cod would, on first impressions, appear to be a strange and maybe laughable subject matter, however, this book is instantly engaging, holding your attention from the start. It is an intriguing historic read from the perspective of the cod fishing industry. Spanning four continents, the story begins a thousand years ago with the Vikings discovery of the fish as an important food source and the inevitable commercialisation, ending with today's tragic demise of the Cod fish stocks. Anyone with an interest in history or just a good read should not be put off by this title, but pick it up and have a fascinating read.

SHARKS AND THEIR RELATIVES

Ecology and Conservation

Occasional Paper of the IUCN Species Survival Commission No. 20
IUCN/1999
ISBN: 2-8317-0460-X
Price: £10.00stg

This detailed, informative paper by IUCN discusses the exploitation of sharks and the current conservation status of many species. It is a well-written report, with good background information. The report identifies the need for more thorough investigations to increase knowledge of shark biology and ecology worldwide, in order to successfully manage commercial shark fisheries. It also covers issues to be addressed in future conservation and management initiatives.

Guidelines For Marine Protected Areas

World Commission on Protected Areas Best Practice Protected Area Guidelines Series No.3
IUCN/1999
ISBN: 2-8317-0505-3
Price: £16.50stg

This is a well-presented publication, which serves as an introduction to establish-

ing Marine Protected Areas (MPA). The aims and objectives of MPAs are clearly set out with the planning and management forming the main body of text. Topics covered include site selection, zoning implementation and financial management. Working examples are used to effectively demonstrate the main concepts. The use of key words, bullet points and summary boxes makes this publication particularly helpful as reference material.

MANAGING A SEA The Ecological Economics of the Baltic

Edited by Ing-Marie Gren, Kerry Turner & Fredrik Wulff
Earthscan/2000
ISBN: 1-85383-608-7
Price: £16.95stg

Looking at the degradation of the sea by anthropogenic sources, this book uses the Baltic Sea as case study for discussing management strategies for remediation. It avoids a lot of the monitoring or scientific research that has taken place over the last 30 years, preferring to focus on the methods applied for management, including Geographical Information Systems, policy use, action plans and model simulations. It is a useful and accessible guide for both students and professionals within the field of ecological economics, with contributions from economists, ecologists and environmentalists.

Ecological methods

3rd Edition
By T.R.E. Southwood & P.A. Henderson
Blackwell Science/2000
ISBN: 0-632-05477-8
Price: £34.95stg

Ecology is a subject difficult to understand, sometimes, in the way that it brings together all the different aspects related with biology and physical science (physical factors of the environment). However, "Ecological methods" describes those methods and techniques available to study populations and ecosystems. This book provides a great aid to ecologists in developing their subject successfully. It is widely illustrated, has up-to-date bibliographies at the end of each chapter and lots of explanations and examples covering all the macroscopic groups of fauna, especially on insects. In addition, the book has an active website that provides additional information on illustrations, details of equipment and up-dated references to work published.

Collins Home Farm Handbook

By Peter Ford
HarperCollins Publishers/2000
ISBN: 0 00413396 X
Price: £9.99stg

A practical and informative spring-board of five commonly kept home farm animals. It contains clear, detailed pictures; balanced with explanations covering many angles of preparation and care for the future establishment of animal husbandry. This book has a good potential for free range cottage industries, being realistic and factual. Learning the input required to achieve quality home farm produce is illustrative for the endur-

ing enthusiast, old or new. A definite first stop for beginners.

Collins RSPCA Garden Wildlife: Attracting wildlife to your garden

By Val Porter
HarperCollins Publishers/1999
ISBN: 0 00413383 8
Price: £7.99stg

A comprehensive and informative guide to ecology in the garden. Explaining principals of interactions between animals as 'webs' and the knock-on effects of targeted animals as pests; in simple jargon. There is a good balance of colour pictures, photographs and diagrams, with bullet points concisely and clearly explained, therefore a good ready reference guide. A children's version would be an invaluable companion.

Creating a Flower Meadow

By Yvette Verner
Green Earth Books/1999
ISBN: 1 90032208 0
Price: £9.95stg
A demonstration of practical activism on our concerns of the changing environment. A chatty, thought provoking and informative guide of the author's endeavours on the small scale; outlining the importance of conservation and understanding of the local landscape. An easy read, although not really written as a ready reference book, but highlights the fact that small is beautiful and important. Inspiring for the active conservationist and a starting block for permaculture and a positive reason for set-aside in arable farming practices.

ECOLOGY AND LANDSCAPE DEVELOPMENT

A History of the Mersey Basin

Edited by E.F. Greenwood
Liverpool University Press/1999
ISBN: 0-85323-653-4

"A History of the Mersey basin" is a compilation of a series of different papers, which were presented at a conference from the work of more than fifty experts. This book goes into the urban development of a first world city and its effect and interaction with the environment since its birth. This is a rare study of an environment which is usually overlooked and will develop much greater understanding and interest of the ecological study of industrial regions.

Imagine Tomorrow's World

50th Anniversary Symposium Proceedings
Edited by Jeffrey A. McNeely, Chief Scientist
IUCN/1999
ISBN: 2-8317-0485-5
Price: £10.00stg

This proceeding is a detailed piece of work from the World Conservation Congress (in Jordan, October 2000). It addresses future issues as the title suggests, incorporating three main topics: Conservation; Community; and Consumption. This proceeding is strongly scientific in nature, and although highly structured it makes an interesting read. At the end of each chapter it includes comments from participants, making it more personal. This text is an ex-

remely useful guide to those working and studying within this area and to those who have a general interest about the topics addressed.

SPAWN, SPAT, AND SPRAINS A Manual for Aquaculture Safety in Alaska

University of Alaska Sea Grant College Program, P.O. Box 755040, Fairbanks, Alaska 99775-5040, USA

1998
ISBN 1-56612-055-1
Price US\$6.00

This aquaculture safety manual is a source of information for the aquaculture employee in Alaska. However, it should be compulsory reading for anyone involved with the sea. It is well laid out in 11 chapters, of which eight are relevant to the Irish scene. The chapter on small boat safety reminds people to wear proper clothing and lifejackets, and to inform a responsible person of one's destination and also outlines common problems to avoid. If you are involved with aquaculture or are a pleasure boater, then get this book.

THE COMMUNITY PLANNING HANDBOOK

How people can shape their cities, towns and villages in any part of the world

Earthscan Publications Ltd., 120 Pentonville Road, London, N1 9JN, UK
2000
ISBN 1 85383 654 0
Price: £14.95stg

There is an increasing involvement by local communities in the planning and management of their environment. This book is a step by step guide on how it should be done. The methods described can each be effective in their own right. But it is when they are combined together creatively that community planning becomes a truly powerful force for positive and sustainable change.

Possibly the most important pages in this excellent book are the ones on "why get involved?" The 13 reasons should be the foremost ones for those that want to organise local involvement in planning in their environment. Guidelines are given for dozens of projects such as derelict site re-use, community centres, housing development, inner city regeneration, town centre upgrade, village renewal. Highly recommended.

Expedition Field Techniques Bird Surveys

By Colin Bibby, Martin Jones & Stuart Marsden

Expedition Advisory Centre, Royal Geographical Society, 1, Kensington Gore, London, SW7 2AR, UK/1998
ISBN: 0-907649-79-3

£10.00stg
This book, produced by Birdlife International, sets out to lay down a basis for surveying and counting bird diversity throughout the world. As the most important areas from an avian perspective are concentrated in tropical regions, especially tropical forest, this book concentrates on methods for these areas. This is not to say that other areas are not catered for. Indeed, many field workers in other areas and disciplines would benefit greatly from some of the techniques laid out in this book, not least the chapters on planning fieldwork, study design and maximising the impact of the work. In short, this is not a book for the beginner, nor even, perhaps the enthusiastic amateur. However any person wishing to make a positive contribution to conservation biology in general, and ornithology in particular, should make a space for this in their bookshelves.

JUNIOR PAGES JUNIOR PAGES JUNIOR PAGES JUNIOR PAGE

LIFEBOAT STATIONS



"Lifeboats are called out to rescue people from all parts of situations - not just boats in trouble."

Every day, around the coasts of the Republic of Ireland and the UK, 19 lifeboats (on average) are launched to rescue someone in trouble. This means a lifeboat launches nearly every hour. During the time you are reading through and working on this activity a lifeboat will almost certainly be launched somewhere around the coast.

"This is your chance to save some people yourself! Don't worry you won't have to face huge waves, ferocious winds and low temperatures. You can use your imagination instead as you play 'Lifeboat Stations' and attempt to rescue the casualties in the roughest time."



The rules of the game are a little like the game "battleships, but instead of sinking the ships, you need to save them! Just like on a real lifeboat this is a team effort.

You can "play" this game with one other friend or you could form two lifeboat crews. Each crew member (you and your friends) has to rescue a variety of boats and people in distress. Each different rescue requires a different number of safety/lifelines.

- To rescue: the ferry - four lifelines (4)
- the fishing boat in trouble - three lifelines (3)
- the motor boat - three lifelines (3)
- the inflatable dinghy - two lifelines (2)
- the sailing yacht - two lifelines (2)
- the child stranded on rocks - one lifeline (1)

You have to pair up with a crew member from another lifeboat.

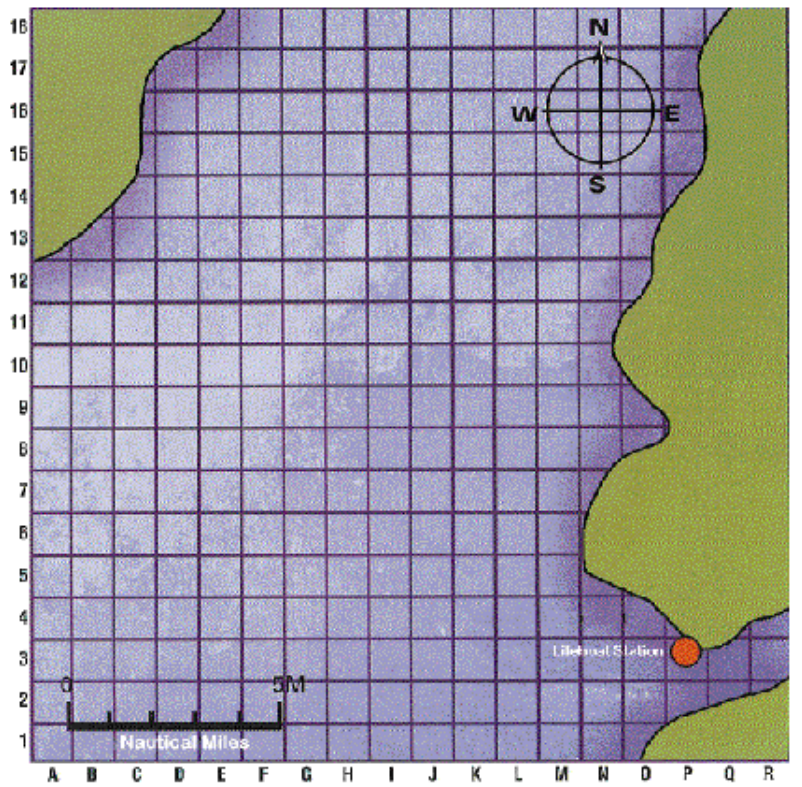
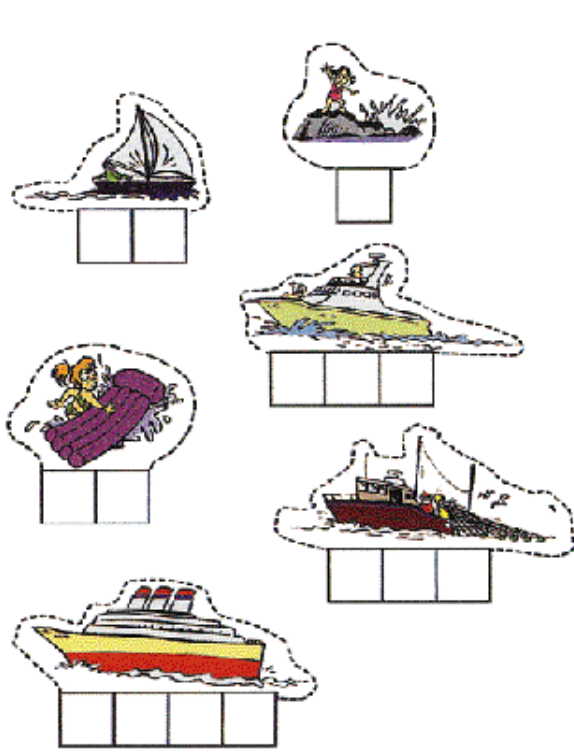
1. Each of you needs a chart (which can be copied from the one below or a piece of graph paper can be used). The six casualties also need to be copied, cut out and coloured in. You then need to place the casualties on the chart and put up a screen of books so you can't see each others' charts. Having a screen in front of you would be like launching in thick fog or on a very stormy day when lifeboat crews are unable to see the people in trouble easily. You need to record the time you take to rescue all the casualties. Although time is an important factor, you must also realise that rescues need to be controlled.
2. To rescue the people in trouble, players take it in turns to pick one square on the board by naming its letter and number, for example E6. The opposing crew member checks to see if this matches up with any of the rescue locations.
3. If the attempt misses, the crew calls "SEARCH" to tell your opponent s/he has to carry on searching.
4. If an attempt lands on a casualty of more than one

lifeline/square players call out "LIFELINE LANDED!" This tells the crew that they have landed one lifeline but need other lifelines to make it safe.

5. If an attempt lands on a one-lifeline casualty or a larger casualty is finally saved, then "RESCUED!" is called.
6. When they have rescued the casualty, the relevant casualty can be removed from the board.
7. You should keep a record of attempts taken so that you don't waste time by repeating them - just as lifeboat crews would keep a record of where they have searched during a real rescue.

The winner of the game is the one who manages to rescue all the casualties first. During a real rescue, lifeboat crews don't compete to "win" and it's important to realise they are all there for one purpose - to save lives at sea.

There is no time limit on the game but each full lifeboat crew should work out their average time taken to complete the activity. The crew with the fastest average time is the winner.

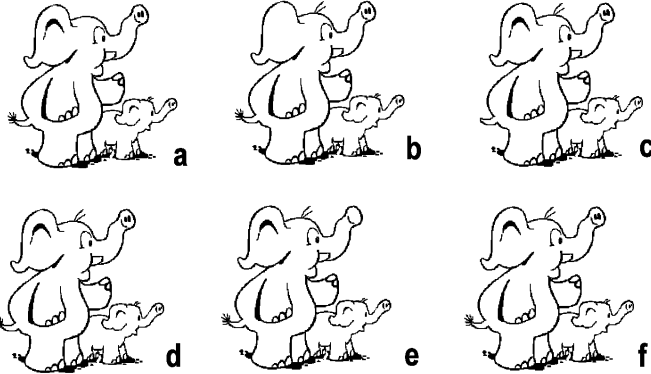


Join "Storm Force", the RNLI's club for young people, and you will be sent an exciting members' pack filled with lots of goodies. Four times a year you will receive the action packed *Storm Force News* magazine full of exciting stories, paintings, ideas or jokes to Storm Force headquarters.

To join just send your name and address, with a cheque/P.O. for £5.00 to Storm Force HQ, RNLI, 15 Windsor Terrace, Dun Laoghaire, Co. Dublin. (The above activity has been reproduced from "Storm Force News".)

Elephantmania!

Can you pick the two elephant pictures that are identical?



Clipart © 1995 SoftKey International Inc., and its licensors

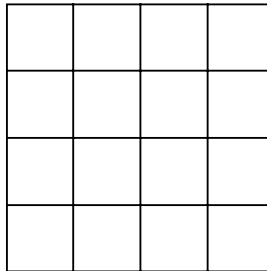
Answer on page 31

SQUARE ROUTE

All of the letters on the right will fit into the squares provided. The words will read the same down and across.

(Answers on page 31)

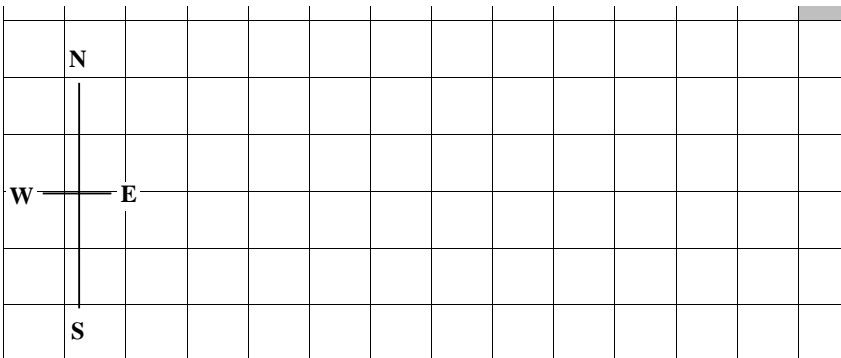
b
c
e e e
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o o
n n
s s
t t
u



A Sense of Direction

Begin on the shaded square and move the number of squares and in the direction stated. Shade in the square you land on and follow the next direction. When all the directions have been completed you should end up with a word that would make you lose your "sense of direction"!

(Answer on page 31)



S4, SW2, N6, W5, SE2, W8, SE1, N3, E4, S4, E7, NW4, SW3, NW3, E8, S6, W5, NE3, SE2, W5, E3, NE2, N2, W5, SW5, N3, E2, NW2, E8, SE5, W1, N6, E12, S5, E13, NW3, W5, NW2, E4, S6, W1, E2, N2, W8, E10

Earth TWO Earth

mud	.....	.....	pressure
acid	.....	.....	tide
coral	.....	.....	rain
ground	.....	.....	spring
low	.....	.....	bed
ocean	.....	.....	flat
shock	.....	.....	reef
spring	.....	.....	gas
hot	.....	.....	wave
natural	.....	.....	floor
river	.....	.....	water

Each word in the list above has a "pair" word in the other list (e.g. ocean/floor). Match them up and write the "pair" word on the dotted line. Answers on page 31.

What Am I?

- I am a large seabird that cannot fly and I live in Antarctica
- I am a star-shaped animal and I live in the sea. If one of my arms falls off I can re-grow it
- I am a plant that lives in the sea. I could be one of three colours: brown, red or green.
- We are small, bony plates that cover the bodies of most fish and reptiles.
- I am a very large body of water separating the Americas and Europe/Africa.
- I have a jelly-like bell-shaped body, with trailing tentacles and stinging cells.
- I am an area of land that is surrounded by water.
- I am a shock wave produced by a large, sudden movement of rocks in the Earth's crust.
- I am the third planet from the sun and I take 365 days to orbit the sun.

Answers on page 31

Visit the Sherkin Island Marine Station Webpages at:
<http://homepage.eircom.net/~sherkinmarine>

Grilled Haddock Strips with Ruby Orange Sauce

A recipe by Simon Regan, Institute of Technology Tralee



Ingredients

- 700g/1 1/2 lbs filleted haddock, cut into wide strips
- 2 tablespoons soy sauce

Sauce

- Juice of 4 ruby oranges/3 pink grapefruits
- 55g/2oz shallots/onion - thickly sliced
- 1 sprig, tarragon and rosemary
- 150ml/1/4 pint cream
- 55g/2oz butter
- Salt and freshly milled pepper

Garnish

Julienne* (fine strips) of orange, chives and chervil.

Fish alternatives - cod, hake, pollock, ling, plaice.

Method

- Dip haddock strips in soy sauce and grill until golden
- Meanwhile make sauce - combine juice, shallots, tarragon, and rosemary in saucepan.
- Boil until reduced to 1/3.
- Add cream and reduce to 1/2. Add butter a little at a time, mixing well.
- Check seasoning.
- Arrange lightly seasoned boiled rice in centre of hot plates.
- Place fish strips on top and sauce around edge.
- Sprinkle with julienne* of orange, chives and chervil.

*Julienne

Remove thin peel of 1 orange using a vegetable peeler. Cut into fine strips and place in a small saucepan with 1 tablespoon of castor sugar and a little water. Simmer until water is evaporated. Set aside and use as garnish.

Serves 4.

For further details on fish recipes write to:



Bird Inseigh Nham
Irish Sea Fisheries Board

BIM (Irish Sea Fisheries Board),
Crofton Road,
Dun Laoghaire,
Co. Dublin.
Tel: 01 284 1544
Fax: 01 284 1123
Web Site: www.bim.ie

In association with the Irish Professional Photographers Association

ESB ENVIRONMENTAL PHOTOGRAPHY AWARDS

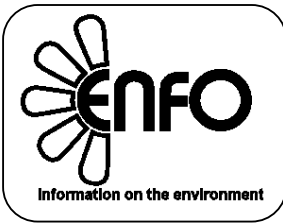
thinking about the environment

It's time to mark the year of the ESB Environmental Photography Awards from April 2000 to the end of the year. It's an award for the best environmental photography in Ireland and the UK. The award is open to all photographers and is a fantastic opportunity to showcase your work. The award is presented in the category of Environmental Photography. The award is presented by the ESB.

Judging panel of four sixteen members around the country including Dublin, Wexford, Wick, Kerry, Tipperary, Waterford, Limerick, Cork and Kerry. The award is presented in January 2000 and December 2000.

www.esb.ie

The energy starts here



Feathers

Did you ever wonder why birds have feathers?

Well let's take a look and see why.

Birds are the only creatures in nature to grow feathers. Birds use their feathers to help them fly, to hide from predators, to keep warm and dry, and to display (or show off) to their mates or rivals. So you see why birds spend so much time taking care of their feathers.

Flight feathers and contours

Birds have two main types of feathers: flight and contour. The big strong, firm ones, used for flight and for the tail are called flight. Flight feathers overlap each other like

a fan. They can trap lots of air for flight when wings are open, or can fold back when the bird is resting or diving under water. The smaller ones used to cover the rest of their bodies are contour. The contour feathers are soft and fluffy at the base. This allows them to trap a layer of warm air between the birds' bodies and the outside world, keeping them warm (a bit like a duvet or an anorak). Contour feathers can provide water proofing, especially after the bird has coated them with oil from its preen gland. Underneath the contour feathers are down hair-like feathers to keep the cold winds at bay.

Feathers must also be strong and light.

The structure of all feathers is similar: a hollow shaft runs down the centre of the feather, and a series of fine branches called barbs come out from either side. Each barb ends in a "hooked" barbule. Barbules lock the feathers together so that the air cannot pass through. If they become undone, the bird will preen with its bill and put

them back into position.

Colourful feathers

Because birds see in colour, some have developed fantastic coloured feathers like the kingfisher. Of course, not every bird wants to be colourful. Female birds who are ground nesters need earth colours to blend in with their surroundings. This is called camouflage, and it is so that they are not seen by predators when they are sitting on eggs.

Variety of feathers

Owls have flight feathers with a soft comb-like edge to help muffle sound. Herons produce a patch of downy feathers that become chalky powder. This helps the birds clean any fishy slime off their other feathers. Snipe have two special tail feathers which they vibrate during courtship, making a whirring sound called drumming.

Preening

Birds spend a lot of time caring for their feathers. This involves rearranging

ruffled feathers and water-proofing feathers with oil from a preen gland near the tail.

Moult

Feathers do eventually wear out and need to be replaced. This is called a moult. They don't do it all at once of course, they would look rather silly. As soon as a bird loses, say, a flight feather, another one begins to grow. Ducks are different. They lose all their flight feathers at the same time, then they cannot fly for weeks until the new ones grow.

Well, these are just some interesting facts about feathers. But there is lots more to find out. Why not try collecting feathers and naming them, and put them in a scrapbook? That's good fun!

*Produced by Don Conroy for ENFO September 1996
 Issued by ENFO - The Environmental Information Service, 17 St. Andrew Street, Dublin 2. Tel 1890200191 (price of local call) Fax 01-8882946
 Email: info@enfo.ie
 Web: www.enfo.ie*



Looking for information on the Environment?

Enfo may have the answer!

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.



Photo: Richard Mills

Birds use their feathers to help them fly, to hide from predators, to keep warm and dry, and to display (or show off) to their mates or rivals. This is a picture of a Rook. (from the book "Ireland's Bird Life. A World of Beauty")

An Imaginative Sailing Club



Photos: Irish Youth Sailing Club

Out to sea goes Paul McMahon from the club

THE Irish Youth Sailing Club is based in Dun-Laoghaire and it has 90 members under the leadership of Kyron O'Gorman.

Kyron is the sort of a guy that is always looking for another more creative way of doing something and the more creative the better.

If you had a Club that was based in Dun-Laoghaire and you were looking for mountains for venture activity, you would probably think of the Dublin or Wicklow mountains as the

venue. Not so Kyron, who saw Mount Snowdon in Wales as the mountain just across the water.

The Club has now twinned with St. David's College in North Wales. St. David's operate the Duke of Edinburgh Award and the Irish Youth Sailing Club operate the President's Award so they both help each other with the organising of their activities so as to earn the Award.

The Welsh participants travel to Dun-Laoghaire every second week and live with Irish families while they are taught marine skills in the Irish Youth Sailing Club.

The following week the Irish Youth Sailing Club travel to Wales and stay overnight in St. David's College and receive training in venture activity for their Award. Wales is just 90 minutes away and Stena Line sponsor the travel. You can leave Dun-Laoghaire at 10.30 a.m. any morning and you can be surfing in Wales by lunchtime.

The participants have to do four activities to earn an Award. They are: a community activity, a personal skill, a sporting activity and a venture activity.



Ciara Gallagher (at helm) and Aimill Finn, Irish Youth Sailing Club



The Irish Youth Sailing Club run a small shop in Dun Laoghaire Pier to fund their activity. In this picture Sean Kelly from Wales serves Todd Thornberry, also from Wales.

The Sailing Club organised a cycling trip through Wales for their venture.

Kyron also endeavours to create a very special occasion for Award ceremonies. The last ceremony for nine participants was on board HMS Mamouth in Dublin Bay last July when the captain presented the Awards.

Participants are green with envy at the resources available to schools in the U.K. St. David's have seven minibuses, nine out-

door educational staff and all the gear is supplied to each participant for each activity.

Further information from:

John Murphy, Chief Executive, The President's Award - Gaisce, The State Apartments, Dublin Castle, Dublin 2.

Tel: 01 4758746 Fax: 01 4758749

Web site: www.p-award.net E-mail: mail@p-award.net



Bord Iascaigh Mhara Irish Sea Fisheries Board

At BIM, the Aquaculture Development Division is committed to promoting self sustaining projects, creating sustainable jobs and economic well being in coastal regions. This focus aims to strengthen and integrate coastal communities targeting both fishfarmers and the inshore fisherman.

Through its regional aquaculture development appointments in West Cork, Kerry and Wexford, together with existing offices in Kerry and Galway, BIM is now available locally to respond to the needs of the industry as they occur as well as being a source of information to those in their regions. They form a vital compliment to the first ever Cross Border Aquaculture Initiative Team (CBAIT) which has been put in place under the Peace and Reconciliation Programme and which will see twelve border counties working together to combine their fish farming knowledge.

Through technical, financial, training, marketing and environmental/quality support services, BIM is committed to breaking new ground in introducing the most up to date and cost efficient aquaculture techniques, to produce quality seafood consistent with the needs of environmental protection and conservation.

An Bord Iascaigh Mhara
P.O. Box No. 12
Crofton Road
Dun Laoghaire
Co. Dublin
Tel: 01-2641544
Fax: 01-2641129
<http://www.bim.ie>



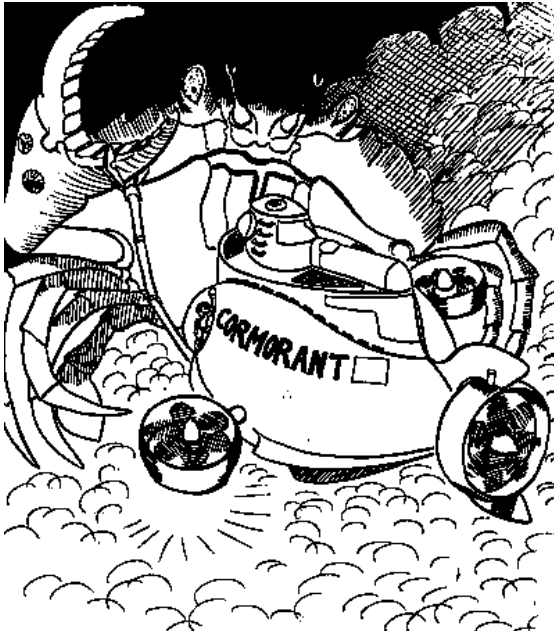


Captain Cockle & the Cormorant

by John Joyce

Episode Four - The Giant Crab!

(Abridged in four parts)



Artwork: © John Joyce

"Take that!" cried Captain Cockle over the radio, and rammed the crab right between the eyes.

THE STORY SO FAR - Captain Cockle, his wife Dr. Catherine Cockle, and the grandchildren Jenny and William have flown to the North Sea in the amazing flying submarine Cormorant to save a pair of divers trapped on the bottom of the ocean under a collapsed oil rig. To complete the rescue Captain Cockle has used his secret miniaturising machine to shrink the Cormorant and the stranded submarine Deepstar but, following the explosion of a demolition charge, the Cormorant

has vanished...

William checked there was no water leaking into Deepstar's cabin, and that there was enough electricity to blow the ballast tanks and surface, if they could not find the Cormorant.

Then he remembered that Deepstar was still only the size of a soft drink can! It would be impossible for anyone on the surface to spot them!

"Horatio! I think you had better come and help us!" said his grandmother into the radio

microphone. But there was no answer.

"Don't worry," she said. "I expect your grandfather's just..."

Suddenly a deafening, scraping, roar echoed along the hull, and through the glass dome William could see the most monstrous thing - a terrible insect shape as big as a double-decker bus, with long spider-like legs, evil beady eyes and a single giant claw - coming to get them!

It was an enormous old crab!

It lifted the little submarine and slammed it down on the sand, again, and again, and again...

There was a crack, and a hiss, and a stream of water as thick as a pencil shot into the cabin. Through the glass dome there was nothing to see except the huge black shape of the crab.

"Oh William!" cried his grandmother. "I'm sorry I let you come! Will you ever forgive me...?"

All at once, the water around them filled with light. There was a rushing, purring sound. The whirling sand cleared for a moment, and the yellow hull of the Cormorant slid into view.

"Take that!" cried Captain Cockle over the radio, and rammed the crab right between the eyes. There was a loud crunch! The crab reared back in anger, pulled itself to its full height, held the claw high in the air and snapped it shut.

"He wants to arm wrestle!" shouted Jenny and locked the Cormorant's remaining mechanical arm around the old crab's barnacle-covered claw.

What a fight it was! The Cormorant's motors whined as the crab pulled it over from one side to the other. The crab's legs dug into

the bottom. Sand swirled, the crab pulled and the submarine swayed too and fro. Then, with a shout of triumph, Jenny heaved the crab over onto its back. There was a wild scabbling of legs, and a deafening "whump".

"I'll never be able to eat a crab sandwich again," gasped Dr. Cockle. "Horatio, you must get us back to full size, before we're all swallowed by a codfish!"

"Ah...yes... well!" mumbled Captain Cockle. "You remember when I said it would be dangerous for us to pump all that electricity at that conger eel?"

"Yes?"

"Well that was because it used up almost all the power in the batteries. I only have enough left to expand just one submarine back to full size now. I'm afraid everyone waiting for us on the surface will know my secret very soon."

"Don't you worry about that, Horatio," said Dr. Cockle over the radio after a good long think. "This is what we'll do..."

And so it was that the Deepstar submarine, which everyone had thought had been lost, surfaced in the North Sea later that morning, as large as life. Out of the hatch came Dr. Cockle, Jenny and William, along with two very drunken-looking divers who immediately started telling stories about giant eels and monster crabs as big as houses.

"These poor boys have 'Rapture of the Deep'," said Dr. Cockle. "They'll be telling you they married mermaids next! Hey you - mind my medical bag! It's full of delicate equipment!"

She was very careful of her medical bag, and wouldn't let it out of her hands. All the way home on

the plane, the stewardesses were puzzled by the way she appeared to be talking to her grandson's toy submarine.

"Poor dear!" they said. "Sometimes these old folks take these children's games too seriously."

"When we get home Catherine, just plug me into the electricity supply in the workshop!" shouted Captain Cockle into the Cormorant's loudspeaker. "It'll only take an hour or so to recharge the batteries and then I can expand back to full size!"

"On one condition," hissed Dr. Cockle in a giant whisper that rattled the porthole. "We all want to be members of the crew on all your adventures from now on, Horatio Nelson Cockle! Otherwise you can stay half an inch tall!" And she chuckled so much that the Cormorant rocked up and down in her hands as if it were on a choppy sea.

The End...

... but Captain Cockle's adventures continue in **Captain Cockle and the Loch Ness Monster** - in the next edition of **Sherkin Comment**.

Adapted by the author from "Captain Cockle and the Cormorant" - published in Ireland by Poolbeg Press and available in all good book shops. Price Ir£3.99

Check out Captain Cockle on the Web at the Captain Cockle Home Page on: <http://www.cockle.com>

Common Shore Crab

Carcinus maenas

Portán glas

This is the most common of all the crabs found on the shore. Its has a mottled appearance, its colour varying from yellows to reds through browns and greens to black. These colours provide perfect camouflage amongst the seaweeds on the shore. The front of the carapace (or shell-like body) is deeply serrated like a saw and is much broader than the back. The Common Shore Crab is found under rocks and seaweed, on rocky and sandy shores and in shallow waters.

Habitat: On rocky & sandy shores, often under rocks & seaweed & in shallow waters

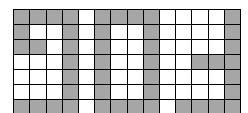
Colour: Mottled green or brown, yellow or red or even black

Size: Carapace up to 6cm across



Answers from page 27

e	n	o	t
e	h	n	s
o	h	c	e
t	s	e	b



Square Route:

A Sense of Direction: FOG

f. jellyfish; g. island; h. earthquake; i. Earth.
What am I? a. penguin; b. starfish; c. seaweed; d. scales; e. Atlantic Ocean.
 ocean/floor; shock/wave; spring/tide; hot/spring; natural/gas; river/bed
Earth Two Earth: mud/fat; acid/rain; coral/reef; ground/water; low/pressure;
Elephantmania: d & f

Sherkin Island Marine Station Environmental Award 1999



"Mizen Journal"

IN issue No. 25 of "Sherkin Comment" we had an article by the Assistant Cork County Librarian, Tim Cadogan, who was the recipient of the Sherkin Island Marine Station Environmental Award for 1998. When I first read it I was stunned at how much of our past documents have been destroyed. The most dramatic losses are

the 1821, 1831, 1841 and 1851 census returns which were destroyed in the Four Courts fire in 1922. If they had survived they would have provided a base-line record for every person living in Ireland in that period. Their value to genealogists and social historians today would be enormous. Coming to recent times it is

unbelievable that no copy of the electoral lists for County Cork before the 1960s are preserved in the county and such lists that are held by the National Archives are incomplete.

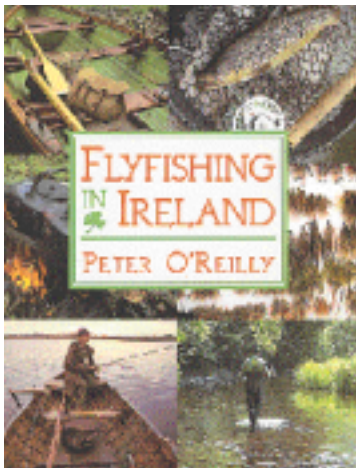
As I read Tim Cadogan's article I thought of the people in local communities around the county who have or do trojan work in researching and pre-



Mary Mackey (right), Co-Editor of the *Mizen Journal*, and Anne Marie Collins (left), Secretary, being presented with the award by Matt Murphy, Sherkin Island Marine Station.

FLYFISHING IN IRELAND

BY PETER O'REILLY



Reviewed by Fionan O Muircheartaigh

PETER O'REILLY is a very special person – dedicated to his craft as a game fisherman and eager to share and pass on that knowledge to all who are interested in game angling. As angling officer at the Central Fisheries Board, he has been both educator and an ambassador on Irish game fishing for many years. He combines knowledge and enthusiasm for his subject in equal measure, and this is reflected in this, his most recent book. This book serves a number of purposes – first it informs, second it encourages.

The CEO of the Central Fisheries Board John O'Connor stresses in his introduction two objectives of his Board – the need to make angling more accessible and attractive to young people and to promote Irish angling abroad. This book achieves both these purposes in a variety of ways.

First, it is magnificently presented by the author and the publishers. It starts with encouragement and caution – "you can do it" and "beware of the expert". Like any good teacher, Peter fosters the possibility of achievement by the pupil, and the attainability of competence and enjoyment.

Second, it presents essentials and tips for brown trout fishing on rivers and loughs with the wet and the dry fly. It explains interpretation of water surfaces, and such diverse topics as observation, equipment and casting. This is all inter-

persed with beautiful pictures – I am particularly attracted to the charming picture of an angler's lunch, dominated by that most Irish of inventions, the volcano "Kelly kettle".

There are also excellent chapters on Sea trout and Salmon fishing. Peter explains his understanding, based on long experience of the way a sea trout perceives the angler's lure. He discusses taking times and taking places and night fishing on loughs and rivers. His favourite salmon and sea trout flies are discussed and illustrated.

The book reflects Peter O'Reilly's great love not just of his craft, but also of the environment which supports it. Everywhere you will find special references to the natural habitat, the habits, feeding habits and behaviour of the various game fish types, the need for good conservation practice by anglers.

Which reminds me of one of the first days I ever spent angling, at the Ridge pool on the Moy in County Mayo. Peter O'Reilly was there, and I was making heavy weather of fly casting. Peter came to my assistance. After some intensive coaching I managed, eventually, to hook a fish. I struggled for some time to land it. Jack Charlton was on the bank, and he was calling loudly with advice. When I landed the fish Peter turned to me and said, "What would you say we release this one?" Let us show that this for us is really a sport! And we did. Few of the spectators appreciated the gesture.

But the readers of this book which I would strongly recommend, would now consider it a more normal response, and perhaps a necessary one if the Salmon is to be conserved.

My congratulations to Peter O'Reilly, the Central Fisheries Board, and the Publishers, Merlin Unwin Books. ISBN 187367435X Price: IR£20.00

The Central Fisheries Board have kindly given "Sherkin Comment" four copies of Peter O'Reilly's book. The first four readers who write in giving us the names of 10 freshwater fish found in Irish rivers or lakes will each receive a copy of the book.



Photo: Boyd Fialle

The Cusack brothers at Cushlough, budding anglers, displaying a typical bag of Lough Mask trout to 4½lb.

serving details of our past. They rarely get any recognition for their dedication. They spend many hours and often years of their spare time in a labour of love, putting together the information of local archaeological or historical interest. Too often there is no local journal for them to publish in and the information ends up on a shelf or in a drawer and never sees print. Fortunately in West Cork there is a wonderful annual publication the *Mizen Journal*, published by the Mizen Archaeological and Historical Society. The editors of the journal, Mary Mackey and Michael O'Donovan, have just put together the eighth volume, with articles that relate to events and places of local interest, usually from the Mizen to Skibbereen area.

The current issue has 15 articles, each of which is most informative and so well researched. There is a wonderful article on Julius Reuter in Ireland, who set up the SW of Ireland Telegraph Co., the collecting of news from streamers that crossed the Atlantic. Reuters, as we know today, is a huge international news-gathering company. Another article is about Heir Island, a neighbouring island to us in Sherkin, in Roaringwater Bay. The hardships these islanders had to undergo in the past just to survive I found difficult to take. I learned that they made their own oilskin coats from Calico covered with linseed oil. When fishing to the east they were away 3 to 4 weeks and they

slept on board an open 20ft boat. Their bedding was a bit of straw, hay or heather. They slept under a piece of canvas thrown over a pole hanging from the mast.

Other articles include archaeology, fishing, the Great Famine and placenames.

If it wasn't for the *Mizen Journal*, most of these articles would not see the light of day.

This journal is a gem. But to bring such a journal to print takes many hours for its editors; from coaxing people to finish articles and proof-reading, to getting the end product. Their dedication I so admire. This evening I am delighted that one of the editors of the *Mizen Journal* is with us to receive the award. However, before I present the award I will mention two things. Firstly, this wonderful journal is available for £6.00 including postage and the address is, *Mizen Journal*, c/o Fuschia Books, Schull, Co. Cork. And secondly to remind each of you present here this evening, maybe you know of some documents of potential historical treasure that you or your friends have in your possession. Do have them preserved for future generations - get them donated to your County Library or other interested groups.

I was delighted that Mrs. Mary Mackey, Co-editor, accepted our Environmental Award for 1999 on behalf of the *Mizen Journal*.

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