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BRISC
BIOLOGICAL RECORDING IN SCOTLAND

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Recorder News

THE SHORE THING PROJECT

By Fiona Crouch

We need your help to monitor the rocky shores of Scotland.

Our seas are changing. Scientists predict that by 2050 the temperature of our coastal waters could rise by 2°C. Why should we be concerned? The findings from a four year project undertaken by scientists from marine institutions throughout the UK discovered that species were on the move. Between 2002 and 2006 scientists working on the Marine Biodiversity and Climate Change Project (MarClim (www.marclim.ac.uk)) resurveyed over 400 shores for which data existed from the 1930s. The results of MarClim demonstrated that 'warm' water species such as limpets and barnacles had moved further north and east, and equivalent 'northern' species had shown a reduction in abundance and some retraction in their southern limits. Added to this is the threat from invasive species such as wireweed *Sargassum muticum* and the pacific oyster *Crassostrea gigas* that could thrive in warmer waters, to the possible detriment of our native species.

To help monitor these changes the Marine Life Information Network (MarLIN), based at the Marine Biological Association (MBA) in Plymouth, devised a project to encourage students and volunteers to monitor their local rocky shore to provide data that will help scientists to monitor change.

Volunteers surveying Coldingham Sands ©Fiona Crouch

The Shore Thing project (www.marlin.ac.uk/shore_thing) began in 2006 with the support of the Heritage Lottery Fund. In four years over 2,000 students and volunteers have surveyed 71 sites around the UK. Surveys are undertaken using the project protocol that has been adapted from the methodology used by MarClim. Groups are asked to follow this protocol so that the results can be compared. The survey protocol and recording forms can be downloaded from the project website above. The survey is divided into two parts, a transect survey and a timed species search.

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Chairman's Column

In the last Newsletter there were two very important points that I advised to the Membership. Firstly that we were reviewing the direction that BRISC should aim to follow over the next few years and, secondly, that I was stepping down as Chair of BRISC at the next AGM. They are, putting it mildly, of considerable importance to the future of BRISC, and I will keep the membership advised on them.

As far as the future direction of BRISC is concerned, we started discussing this at the last Committee Meeting. We ran through the role that BRISC has played to date, progress with and future relevance of the Business Plan, and went on to the current status of recording, recorders and recording societies and how all of these are impacting on the role that BRISC can and should play in the future. I set out below some salient points that were minuted:-

- We have achieved a number of projects from the business plan, but it seems less relevant to continue working to it.
- We do not want to re-write the plan, just to clarify our remit.
- There is overlap with other organisations (National Federation for Biological Recording (NFBR), Association of Local Environmental Records Centres (ALERC), National Biodiversity Network (NBN), and other recording societies) in terms of what is being offered. So where do we fit in?
- One of our overall aims is to support Local Recording Centres and promote the setting up of more. The former is hopefully moving forward with the formation of ALERC and the latter is receiving greater attention through BRISC's e-petition.
- It is good to have a Scottish umbrella organisation rather than just a UK-wide one.
- We used to bring recorders together but now this happens on a more local or society based scale.

From that we moved on to identifying roles and services that BRISC could usefully provide. These included:-

- Provide training courses on less available/recorded groups,
- Help new recorders with where to do field work, who to talk to,
- Produce Scottish ID guides rather than for Europe /Britain,
- Support for new recorders to help them continue and progress,
- Link up training sessions with local groups/mentors,
- Bring together LRCs and recorders for meetings,
- Run member recruitment drive to provide a broader membership base,
- Look at our name and consider whether, for instance, our role would be clearer by changing to Biological *Recorders* in Scotland.

The intention is to produce a first draft of the future direction of BRISC for our next meeting.

My second point was the need for a new Chair, and it is imperative that a new one is identified as soon as possible. I feel it is important that they have a better understanding of 'recording' than I do as there are all sorts of initiatives and consultations going on at a UK level and I cannot adequately represent the interests of Scotland. Please consider standing yourself or, as an alternative, putting forward a name I can approach.

Patrick Milne Home

Editorial

Who does not enjoy a day at the seaside, but how many of us are able to put names to more than the commonest organisms we see? Now Fiona Crouch and MarLIN offer a golden opportunity to get to know more about the biodiversity of rocky shores, a diverse and frequently hidden and mysterious habitat. It is also well to remember that a lot of marine organisms are regularly washed up on the shore for everyone to study. and record, at their leisure – all without becoming a diver .

David Pickett is greatly to be congratulated for his excellent piece on What's Special about Flanders Moss. This is a very interesting site, both as regards its history and its biodiversity, and today it is happily getting some of the attention and sensitive management it deserves. Access is limited, but David is offering to guide specialist groups to normally inaccessible parts of the Moss in return for the records collected. This is an offer BRISC should certainly take him up on, so watch this space.

A substantial part of this issue is given over to reporting on the annual conference at Montrose back in March, and I am most grateful to all four speakers of the morning for letting me publish summaries of their talks. The theme this time was aimed at biodiversity in the past and it thus differed markedly from the talks we usually have at our conference. It is therefore particularly helpful to remind those members who were present of what was said, and also to let all those who were not present know how much they missed. Archaeology is critical in telling us how life on Earth was in the distant past, and new exciting discoveries are constantly being made, such as the discovery of the fossilized remains of a 17m long monster giant sperm whale armed with fearsome teeth which has recently been unearthed in Peru. Thank you also to the members who kindly sent me photos of the afternoon's excursions.

The e-petition has been very successful in so far that it has at least brought the issue to the attention of the Scottish Government's Science Committee, and the committee has now come up with some very positive recommendations (p.14). How much will actually happen on the ground, given these days of belt-tightening, is of course uncertain, but the petition has at least produced a step in the right direction.

As editor I am always on the look-out for contributions to this newsletter, and articles or short notes on any relevant subject are always most welcome. The offer to write a review of relevant publications will be particularly welcome, as it seems to be more and more difficult to obtain review copies from publishers. Please do not be shy. My contact details are below. Anne-Marie Smout

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Continued from p.1.
Voluntary groups can choose to do the whole survey or just the timed species search. The latter involves searching an area of rocky shore for 20 minutes. Participants record the abundance of twenty-two target species in one of three habitats: rockpools, open rock or overhangs/crevices/boulders or open rock. To help with identification 'Flash' cards with photographs and the key features of each species can be down-loaded from the website (look under 'Teachers' resources' at http://www.marlin.ac.uk/shore_thing/documents/Species_search_cards.pdf)

Each volunteer will search for just one or two of the target species during each 20 minutes. Once the survey has been completed the results are uploaded onto the project website and, once they have been verified, passed on to the National Biodiversity Network (www.nbn.org.uk).

Invasive Wireweed in rockpool, one of the target species © F. Crouch

The value of the Shore Thing has been recognised by Scottish Natural Heritage (SNH) who have provided grant aid to take the project forward in Scotland in 2010.

The impact of climate change on Scotland's marine biodiversity is of great concern to SNH as highlighted in 'Impacts of climate change on seabed habitats in Scotland', an illustrated document available for download on the SNH website (www.snh.org.uk). By organising surveys around the coast of Scotland the Shore Thing project will not only provide valuable data for SNH, but will also highlight the potential impacts of climate change on Scotland's rocky shore species and the need to conserve Scotland's marine biodiversity.

Above: Invasive Wireweed under water. © Fiona Crouch

We are looking to increase the number of monitoring sites around Scotland. We would be very interested to hear from anyone who would like to get involved in the project, or know a group of volunteers who would be interested in carrying out a survey. I will be running a training course in Scotland in September for volunteers and teachers. I will also be available to give a presentation to interested groups and to help with surveys.

If you require any further information on the project or would like to register your interest in attending the training course, then please contact Fiona Crouch (Shore Thing Project Officer), Marine Biological Association, Citadel Hill, Plymouth, Devon. PL1 2PB. Telephone: 01752 633336 or email ficr@mba.ac.uk

Shore Thing survey sites in the UK

(Some sites too close together to be distinguished on map)

Scottish Sites

1.	Coldingham Sands	Scottish Borders
2.	Linkum Shore	Scottish Borders
3.	Yellowcraigs	East Lothian
4.	Stonehaven	Kincardineshire
5.	Rosemarkie Beach	Ross-shire
6.	Gairloch	Ross-shire
7.	Glenuig Bay	Inverness-shire
8.	Ganavan	Argyll
9.	Largs	Ayrshire
10.	Millport	Isle of Cumbrae

What's Special about Flanders Moss

By David Pickett

The Earth really does move when you step out onto Flanders Moss National Nature Reserve (NNR). Formed on the Carse of Stirling over 7000 years ago Flanders Moss is one of the last fragile remnants of the great bogs that were once dotted across Scotland. It is now one of the largest and most intact lowland raised bogs in the UK, but even Flanders has had a rough and damaging history, and it is only in the last fifteen years that its fortunes have started to improve.

Rainbow over Flanders Moss© David Pickett/SNH

The story of Flanders started towards the end of the ice ages, when the fluctuating ice-accumulation and changing sea levels resulted in the Carse of Stirling being inundated by the sea several times. When the sea retreated back down the Carse for the last time 7000 years ago it left an estuary of marine clays and sediments that provided the perfect conditions of pools and waterlogged soils for bogs to form. A number of lowland raised bogs formed along the Carse, the deeper and larger ones lying in the west, where they had more time to develop as the sea retreated east. Flanders Moss formed between the slow flowing water of the Goodie water and the river Forth. It had a head start as in this area a peat island from a previous peat growing period had kept growing fast enough to remain above the sea level as it rose. This peat island spread as the seas finally retreated and is of great interest to scientists today. By looking at soil cores into the sediments on the edge of this island, metres under the existing surface, researchers can study the speed of sea-level rises due the historical melting of ice caps, and this can help them in creating models for future melts, something that is especially relevant in the current times of climate change.

Flanders Moss grew over the years to fill the space between the flood plains of the two rivers, its structure being a series of domes of peat merged together to form one entity of peat. These flood plains, with the rich peat-free soils, were the areas utilised by man, but the mosses would also have been used. Certainly by 1750 we know from archive research that Flanders Moss was grazed daily across the domes by flocks of sheep and around the edges by cattle. Heather was cut for a range of uses like thatching and rope making, and many of the other bog plants would have had their uses. The Moss would have also provided cranberry harvests and gulls eggs. Around the edges of the Moss relatively small scale peat cutting provided fuel for neighbours and villages.

However from 1750s onwards the land owners started looking at Flanders with different eyes: they were interested in the productive clay farmland that lay under the peat. And so started the huge peat clearance schemes that for about 100 years changed the landscape of the Carse forever. Huge efforts were made to remove the peat. For example George Moir cleared eleven acres of 6ft deep peat that, when wet, would have weighed 91 000 tons, all done by hand. By the early 19th century nearly all of Blair Drummond Moss (600ha) had gone as had about 40% of Flanders Moss. The work only stopped with the downturn of agricultural economics, when it made more sense to make your existing land more productive than to win more land. While this was happening around the edges of the Moss, on the Moss grazing was being excluded as the landlords started to manage Flanders for a grouse moor. But eventually even this management died out and for much of the 20th century Flanders Moss was just left to slowly dry out. It was only in 1970 that its conservation value started to be recognised, and a small part finally became an NNR. But by then a 40ha part had been planted up as a conifer plantation and a 100ha section had been scraped and ditched ready for peat extraction. By the early 1990s Flanders Moss was at its lowest, driest ebb. The large scale loss of peat had affected the internal water table of the remaining peat. It was drying out so losing the special bog vegetation, trees that had been kept in check by grazing and burning were rapidly spreading, and the peat companies' ditches were contributing to the drying out.

This is when Scottish Natural Heritage instigated a restoration plan to quite simply make Flanders Moss wetter and bring back the special bog wildlife. And this work is still at the core of what management is carried out on Flanders.

Today the remaining part of Flanders Moss covers 860ha and is owned by nine different landowners, of which SNH is one but owns only 12% of the bog. Restoration management in the NNR is now carried out over 95% of the bog following agreements with four of the private landowners. The first step was to buy out the peat planning permissions from the peat company at a cost of £1.8 million . Large scale conifer plantation and ditch-damming followed, and today about 40km of ditches have now been dammed on Flanders Moss.

A tracked chipper at work © David Pickett/SNH

Knocking in a plastic piling dam © David Pickett/SNH

Damming techniques have evolved over time, and now principally we use either peat itself to plug up ditches or interlocking piling sheets made from recycled plastic. Another strand of restoration management is dealing with the birch and pine trees that have invaded the drying bog. There are so many trees that the plan at the moment is to keep the open areas open and deal with the other area in the future.

Tree removal involves cutting and chipping the trees, the chips are put into the ditches to help with the slowing up of the water flow, while the stumps and any re-growth are treated with herbicide. However, a longer term method of keeping the trees in check involves the reintroduction of sheep. A small area is currently grazed by the Scottish Wildlife Trust's flying flock, and over the next year or two large areas will be grazed. Bogs are fragile and cannot take a high stocking rate so the intention is to reduce seedlings over a long period of time. In the old days of bog management trees were not considered to be welcome on bogs, but we now think that, like on European bogs, trees can exist on wet bogs in a stunted form and a scattered distribution, and this is what we are aiming for on Flanders Moss. Put simply, by making the bog as wet as possible, i.e. bringing the water table as close to the surface as possible, and with the impact of grazing animals, we hope sometime in the future to reach an equilibrium of a wet bog with scattered stunted tress.

So is the restoration project working ? Well we have twenty-two water level monitoring stations across the moss that are read four times a year. The recovery of some 300 years of damage and mutilation is going to be slow, but certainly in some places we can see the water table has bounced back to the surface and bog species are recovering. Other parts of the moss suffered less from the drying out and many of the special species are still present.

Round-leaved Sundew at Flanders Moss © David Pickett/SNH

On the least damaged parts of the moss the main bog vegetation mosaic is made up of the higher plants: ling *Calluna vulgaris*, cross leaved heath *Erica tetralix*, and the two species of cotton grass *Eriophorum vaginatum* and *E. angustifolium.* Dotted amongst these are other special bog plants such as cranberry *Vaccinium oxycoccus*, sundew *Drosera rotundifolia*, and rarer plants such as bog rosemary *Andromeda polifolia* and white beaked-sedge *Rhynchospora alba*. These all sit on a surface of sphagnum mosses that form a beautifully coloured carpet. The main peat forming-species are there such as *Sphagnum papillosum*, *S. magellanicum*, and *S. capillifolium* as well are rarer species such as *S. fuscum* and *S. austinii;* in all fourteen species of sphagnum have been recorded.

One plant of interest found far out onto the Moss is the Labrador tea-plant, *Ledum groenlandicum.* Originally this plant was thought to be left over from glacial times, but it is now thought to have been introduced by one of those over-zealous Victorian naturalists.

As one would expect, a number of special invertebrates have been recorded. There is a fine assemblage of moths, with the Rannoch brindled beauty *Lycia lapponaria*, the argent and sable moth, and a rare micro-moth *Lampronia fuscatella* being of particular note. The butterfly fauna is less diverse, but there is a strong population of the bog specialist: the large heath *Coenonympha tullia*. Perhaps the rarest (or most under recorded) invertebrate is the jumping spider *Heliophanus dampfi* which is only found on three sites in the UK.

Left: flightless female of the Rannoch Brindled Beauty and
Right: Large Heath butterfly © David Pickett/SNH

There can be good numbers of dragonflies on the wing at Flanders Moss but the range and distribution of species on Flanders has been little studied. Black darters, common hawkers, and four-spotted chasers are the most common species, but of most interest is one recent record of northern emerald that needs further investigation.

The bird population of Flanders in the summer offers a huge contrast to the surrounding farmland. The intensively managed green fields are very silent compared with the Moss in full voice. A number of declining bird species breed in good numbers on the moss, with whinchat, skylark, tree pipit, reed bunting, grasshopper warbler and redstart all there in numbers. It is as good a place as any to hear a cuckoo and a few waders such as snipe, curlew and for the first time this year redshank breed. In winter it is quieter but patience can be rewarded with hen harrier, merlin, peregrine and raven while dawn and dusk see huge numbers of pink-footed and greylag geese heading to and from the Lake of Menteith.

The boardwalk has been adopted by common lizards, and on a good day up to twenty individuals can be seen on a quiet walk around. Adders also seem to be still thriving but we still know very little about their life on the Moss.

As for mammals both red deer and roe deer help us with our scrub control, otters are increasingly using the reserve but are rarely seen and there is one recent record of a pine marten.

Flanders Moss is a difficult site to get around, being huge and though flat presents extremely difficult and uncomfortable walking, and there are hazards like a large number of hidden deep water-filled ditches ready to spoil your day. Also the surface is delicate and easily damaged. For this reason we do not encourage people to visit the main part of the Moss. However we do guide specialist groups to further parts of the Moss, and this is often the best way to add to our knowledge of what is out there, so if there is a group that would like to help us survey aspects of Flanders Moss then please do not hesitate to contact me.

View of Viewing Tower © David Pickett/SNH

For the bulk of visitors to satisfy their curiosity and encourage learning about bogs we have opened a ½ mile long path and boardwalk. This gives people a chance to get a taste of Flanders, and all the common bog specialists can be seen from this path. A new viewing tower gives a fantastic panoramic view across the whole of the moss and saves people getting wet trying to find out what is there. The path and tower are open all the time and are worth a visit at any time or season of the year.

How to get there

By train and bicycle: The nearest train station is Stirling, about 11 miles from Flanders Moss. It is possible to cycle from Stirling: the route between the station and the reserve is fairly flat and longer diversions along quieter lanes can be made for part of it. There is a bicycle rack in the reserve's car park,

View from Viewing Tower © David Pickett/SNH

By bus: Buses to Thornhill can be caught from Balfron, Stirling and Aberfoyle (Bus company 'First in Scotland East' Service number C11). From Thornhill it is about a 2km walk along the B822 to the reserve entrance.

By car: From the A811 (Drymen–Stirling road) turn north at the Kippen roundabout on to the B822, following the brown tourist signs. After 3km, turn left at the Flanders Moss NNR sign and follow the track to the end. From the A873 (Blairdrummond–Port of Menteith road), turn south in Thornhill village onto the B822, follow the brown tourist signs and after 2km turn right, down the access track at the Flanders Moss NNR sign. There is a car park at the end of the track.

Maps: Landranger OS 57, Explorer OS 366

For more information about Flanders Moss look on the www.nnr-scotland.org.uk website where there are downlodable leaflets, fact sheets, the Flanders Moss Bog Blog, the Flanders Moss NNR Story and Management Plan, and other research reports about Flanders Moss.

Alternatively contact myself David Pickett, Reserves Manager at the SNH Stirling Office, Beta Centre, Innovation Park, University of Stirling, Stirling, FK9 4NF, tel 01786 450362, email David.Pickett@snh.gov.uk

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BRISC's 2010 ANNUAL CONFERENCE

Minutes of BRISC 2010 Annual General Meeting
Held on Saturday 27 March 2010 at 12.40
At The George Hotel, Montrose

Present. Chairman, 20 Committee and Other Members.

1. Apologies

Apologies were received from Craig MacAdam, Brian Boag, Louisa Hancock, Mark Simmons, Anne-Marie Smout, Barbara Ballinger and Brian Ballinger.

2. Minutes of 2009 AGM

These had been circulated previously and copies were also tabled. Their adoption was proposed by Duncan Davidson and seconded by Richard Weddle and were approved by the meeting without corrections.

3. Matters arising

There were none.

4. Chairman's report

The Chairman's Report for 2009 had been circulated previously and no questions were raised.

5. Annual Accounts

The Annual Accounts had been circulated with the Annual Report. The Treasurer, Duncan Davidson, amplified on some points raised and the accounts were approved by those present. No proposal was made for any change to the Annual Subscription.

Mr Kenn Watt asked if a list of paid up members could be made available so that members knew whether or not they had paid their annual subscription. The Treasurer explained that he did contact late payers so there was no need for members to fear that they would be struck off without due warning.

6. Membership

Membership remains similar to last year at 98 individual and 32 corporate.

7. Projects Update

- **E-Petition**. The Chairman explained that the Science Group to the Scottish Parliament had considered the matters raised by the Petitions Committee and had called for evidence from BRISC, SNH, NBN and COSLA. Their report was awaited and it was anticipated that BRISC would have the opportunity to comment on it. The fact that the matter was still active indicated that the e-petition had received general support.
- **Bursary**. Four bursaries had been awarded for 2010, two by BRISC and two by the Glasgow Natural History Society, to:-
  - Maureen Potter, Introduction to NVC
  - Kirsty Kennedy-Wylie - Introduction to Stoneflies and Mayflies
  - Henriette Koubakouenda - Identifying wildflowers
  - Ann Morgan - Identifying wildflowers
- **Data Scoping Project**. This was a follow on from the project completed at the end of 2008. The original project was considered to have been too detailed and costly to enable its roll out to be undertaken across Scotland and the new or revised project was to see if a simpler project could deliver the desired result of identifying electronically where all non-computerised records were held throughout Scotland.

8 Committee Members

The Chairman advised that the following names had been put forward for re-election or election to the Committee and he would be happy to take any other names directly from the floor:-

Re-election.	Proposer	Seconder
Duncan Davidson	Mark Simmons	Claire Seymour
Louisa Hancock	Richard Weddle	Andy Wakelin
Election		
Peter Slater	A-M Smout	Patrick M H
Glenn Roberts	Duncan Davidson	Patrick M H
Samantha Ranscombe	A-M Smout	Richard Weddle

It was also proposed to co-opt Gill Dowse, Murdo Macdonald and Jonathan Willet.

No other names were put forward from those attending the meeting and all these **proposals were carried** accordingly.

8. AOB

There being no other matters raised the Chairman thanked Andy Wakelin for his organisation of the day, Anne-Marie Smout and Mark Simmons for contacting the speakers for the Conference and the four speakers for their contributions.

The meeting closed at 13.15

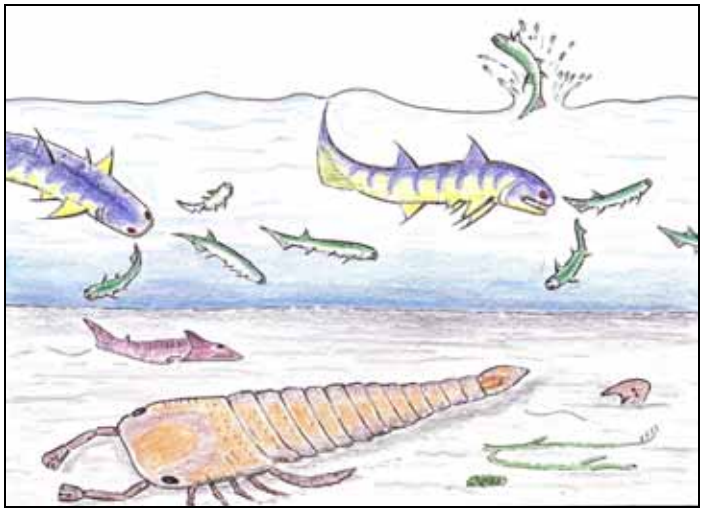
CONFERENCE PROCEEDINGS
Biodiversity and Environments in Angus
410 million years ago.

By **N**igel H Trewin, University of Aberdeen

In the Early Devonian, about 410 million years ago, the Caledonian mountain chain was undergoing rapid erosion and a large river flowed to the SW through the Midland Valley. The gravel, sands and muds of the river now form the conglomerates, sandstones and shales of the Lower Old Red Sandstone exposed on the coast and in quarries between Stonehaven and Dundee. There were also large active volcanoes, particularly near Montrose, and in the Sidlaws and Ochils. Sometimes the river drainage was blocked and large lakes formed. Lake Forfar is the name given to a lake that periodically existed in the Dundee-Forfar area.

In the landscape of lakes and rivers, with volcanoes and mountains to the NW, an early terrestrial and freshwater biota flourished. Small primitive plants such as *Zosterophyllum*, *Cooksonia* and *Parka* flourished near water, but plants had not invaded uplands at this time in geological history. Air-breathing millipedes and other small arthropods lived amongst the plants. In the rivers and lakes the fauna consisted of fish and arthropods. The largest animal at over a metre long was *Pterygotus*, a predator with large pincers designed like shears to catch and cut prey. The fish of the time were probable prey items, ranging from small acanthodians (spiny-finned fish related to later sharks) and agnathans (jawless fish) such as the cephalaspid fish *Zenaspis* with its distinctive crescentic headshield. Over 12 genera of fish are recorded, and their ancestors probably entered river systems from the sea and then evolved into forms adapted to rivers and lakes. There is some evidence of palaeoecology such as the fish coprolites containing *Mesacanthus* scales and spines; the small *Mesacanthus* was probably the main prey item of *Ischnacanthus* which had jaws equipped with sharp teeth.

Only a small fraction of the Early Devonian biota has been discovered as fossils. Many forms would have lacked hard parts suitable for fossilisation, and others would have been rare. Some of the animals are only known from single fossil specimens, and trace fossils of trackways exist for which the makers have not yet been found. However, continued searching can still produce new forms to add to our knowledge of Early Devonian ecosystems.



Cartoon of an Early Devonian scene in Lake Forfar with *Ischnacanthus* chasing *Mesacanthus* while a solitary *Zenaspis* ploughs along the lake bed where a *Pterygotus* lurks waiting for prey to grab with its pincers. Reproduced with permission from Trewin, N.H.(2008) *Fossils Alive.* Dunedin Academic Press.

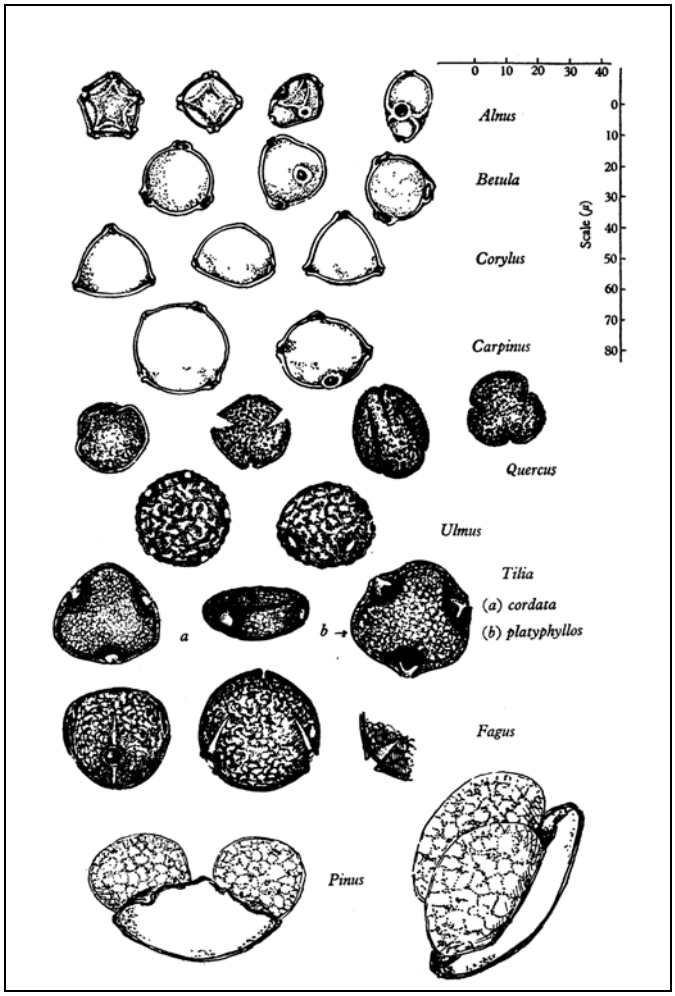
Linking Then with Now: Palaeoecology and Nature Conservation

By Richard Tipping, School of Biological & Environmental Sciences, University of Stirling

Within the discipline of palaeoecology, the ecology of the past, pollen analysis is often described as the most powerful scientific tool. Most commonly applied to problems in environmental history or historical ecology, an increasingly important new audience for our data is the restoration ecologist. They try to link then with now – and to maintain the 'then' into the future, and palaeoecologists provide the link with the past, telling them how different things were then and sometimes advising caution in their restorations.

Pollen analysis works by the preservation of pollen grains and spores in a continually accumulating sediment that excludes air, sampling sediment cores, taking very thin slices of sediment, getting rid of all the muck and counting the different types of grain to produce a pollen diagram – simple, as they say!

The most fundamental limitation is our taxonomy: many species simply cannot be distinguished from their pollen. Nevertheless, our contributions are significant. Recent case-studies raise a number of issues for, in particular, the nature conservation community. As we try to describe past ecological processes that have relevance to future landscapes, we sometimes find the information we provide at variance with the 'myths' conservationists hold about the past, and sometimes maintain to justify their work.



Drawing of the chief types of pollen found in British Flandrian deposits drawn to a common scale of size

For instance: along Loch Tay there was in the 19th century a striking loss of herb diversity in grazed grassland. What was to blame? Sheep, most people argue, so reduce grazing densities before it is too late. But when the change is very closely dated, the loss is seen to have occurred from the 1860s, 60 years after sheep were introduced in large numbers, and the loss coincides with the appearance of soot from new factories in the Midland Valley, suggesting air pollution to be the culprit. Restoration of native woodland is often based on the myth that woods have been lost only recently, destroyed by rapacious industrialists. This is justification alone for the restoration, it is argued, but when woodlands were lost not hundreds, but thousands of years ago, and by natural climate change rather than by people, the justification becomes tenuous. In eastern Sutherland, woodland management sought to restore the original, 6000-year old woodland, but pollen analyses showed that nothing of that wood remained to restore – restoration would mean total deforestation before starting from scratch. And aiming to restore woodland that existed in the past raises all sorts of problems, because it is a moving target. Woods in the past constantly changed, as species migrated and were in turn replaced. Wise conservationists recognise the need to let go, to let the future landscape become what it will, but behind every wise conservationist is a land manager: can they too let go? Can we?

Beetles in Ice Age Scotland

By Russell Coope, Emeritus Prof. University of Birmingham.

I started my professional career as a respectable geologist dealing with real fossils: the insignia of office being a stout hammer. However, I was gradually seduced by a fascination with mega-mammals of the ice age; mammoths and woolly rhinoceros and such like, and from there I graduated (if that is not the wrong word) to the smaller and even smaller mini-beasts that occurred in the same deposits as the bones of these huge animals. Whilst a great deal was known about the ice age plants, little seemed to be known about the ice age insects whose remains were both plentiful and beautiful. Most abundant of these were the remains of beetles whose robust exoskeletons resisted the normal processes of decomposition, provided that the sediment in which they were found had remained waterlogged since its deposition. Fossil bearing sediments laid down during the glacial periods and their intervening interglacials were, and are, abundant in gravel workings and coastal sections where abandoned channels of ancient rivers have been infilled with flood refuse. The fossil bearing deposits are soft and unconsolidated so that, although they are often referred to as 'peats', many are more like grey organic silts and clays. Thus the insignia of office has become a spade rather than a hammer.

When I started this work, I assumed that the beetle fossils would represent extinct species just as so many of the large mammals with which they lived are now extinct. The first surprise was to find that most of them were still living in the British Isles though some were very strange and did not match any species with which I was familiar. The temptation to view these as extinct species was almost overwhelming. But they were not. Through the fruitful friendship of Prof. Carl Lindroth of the University of Lund in Sweden, I learned that these strangers were in fact living species but found today in such exotic localities as the high arctic, eastern Siberia or even the Tibetan plateau. We were seeing changes in their geographical ranges on an enormous scale that could not have been envisioned without the evidence of these fossils.

It appears that in response to the fluctuating climates of the glacial/interglacial cycles the beetles (and no doubt other less well preserved species) changed their geographical ranges in order to track acceptable environments across the continents. Thus from the point of view of a species, the environment remained the same – it was the geography that changed. Out of several thousand species from the past million years or so we have seen no evidence of either evolutionary change or extinction. It seems that at times of climatic change, most invertebrate species move out of trouble rather than evolve out of trouble.

A word of caution needs to be introduced here. The fossil evidence that we have uncovered so far has been largely confined to the continents in the northern hemisphere; to areas that have suffered the most from widespread glaciations and where species could change their ranges on an enormous scale as the climates dictated. It is possible that the situation in the tropics where glaciations were less severe or on remote islands (or on mountain tops) where the option of tracking climatic changes is not available, the evolution of insect species and associated extinctions may have taken place more rapidly and frequently than at the middle latitudes. Only the fossil evidence will tell.

The fact that fossil beetle assemblages make ecological sense even back many hundreds of thousand years ago (species kept the same company in the past as they do today) indicates that their demonstrable morphological constancy was accompanied by a similar degree of physiological constancy reflected in their environmental tolerances and preferences. Thus a mosaic picture can be built up of the past environment at a specific locality from the present day ecological requirements of the species in a fossil assemblage from that site.

One of the most dramatic interpretations that can be made from these fossil beetle assemblages is the reconstruction of past climates. The most important factor in the physical environment governing the distribution of beetle species is an appropriate temperature for their survival. The climatic events in Scotland during the past 50,000 years were indeed dramatic and included several major oscillations from intensely cold to temperate and back again.

Glacial events saw the ice sheets cover all of Scotland and England down to the Midlands. Along their southern margins there were vast expanses of tundra inhabited by a large insect fauna that included many species that have exclusively arctic distributions at the present day. Our fauna at that time included others that are now confined to eastern Asia. At about 40,000 years ago the central valley of Scotland was free of ice and the extensive beetle fauna at that time indicates mean July temperatures of about 10°C and mean January temperatures of -20° C. After this the glaciers returned and a great ice sheet reached its maximum southern extent at about 18,000 years ago. At this time the insect fauna of Britain was almost completely exterminated, along with most of the plants. Then, about 14,000 years ago the climate warmed up, relatively speaking, permitting the return of many arctic species that indicate temperatures similar to those just before the last ice advance. Then, at about 12,800 years ago there was a sudden and intense warming that raised the temperatures here to levels similar to those of the present day, if not rather higher. All the old arctic species were suddenly eliminated to be replaced by temperate ones, some of which are now found only south of these islands. We know that this temperate interlude included at least southern Scotland and probably extended well to the north as well. In the early stages of this warm period the country was without trees because the climatic amelioration had been so rapid that they had not had time to migrate from the refuges in the south. However, it was only a matter of a few centuries before birch and pine trees extended northwards establishing extensive woodlands here. Curiously, the beetles indicate that the temperature at this time was again deteriorating but not sufficiently to inhibit the spreading forest. By 11,000 years ago sufficient ice had accumulated in the Rannoch Moor area to form a valley glacier that filled the whole of Loch Lomond and reached almost as far as Glasgow. The beetle fauna from this period saw a return of the arctic species, completely replacing the temperate ones. After this cold interlude (known as the Loch Lomond re-advance) there was another sudden and intense climatic warming when temperatures rose rapidly to present day levels in a matter of decades. With it came a return of relatively southern beetles to

much of Scotland. This was the foundation for the present day fauna of this country.

This dynamic view of the history of our fauna shows that the present day climatic warming is not something new to insect species. By their past ability to track the whereabouts of acceptable conditions across the continents in response to rapid climatic changes, present day species are adapted to their historical context as well as to their contemporary environments. (Each species carries its own historical baggage in its genes.) Faced with the present day climatic changes, one could almost hear them saying to one another "here we go again" but you need the ears and eyes of a Quaternary Entomologist to understand their language.

Bird Bones from Archaeological Sites in North-East Scotland

Catherine Smith, Archaeozoologist Alder Archaeology Ltd

Alder Archaeology is a small excavation unit, based in Perth, which carries out archaeological investigations throughout Scotland and also provides post-excavation services like bone identification to other units. The unit deals in all time periods, from the prehistoric to the post-medieval but has particular expertise in the medieval period. Alder's main business is in *Rescue Archaeology*, in response to building works, which are referred to us through the Planning Process. Funding comes from the developers of the site, less often from local authorities. Historic Scotland might provide funds for specific research projects.

Types of new development that we may be asked to investigate before planning permission is given are new building works on schools, town shopping centres and housing as well as gas pipelines, windfarms, power supply renewal and road widening. Currently much of this is still on hold because of the effects of the financial recession, with knock-on effects for archaeology. We are often asked to investigate sites by local authority planning departments: historical survey or past discoveries will have flagged up sites where archaeological remains may be expected, but there are still surprise finds, such as unexpected burials.

What do we find on site when we start digging?

Rural: Rescue archaeology in the countryside might expect sites ranging from prehistoric burials and habitations to post-medieval sheep fanks and clearance-era farmtouns.

Urban: Sites in town centres often produce a wealth of evidence from the medieval period. Perth is a case in point: frequent flooding leads to anaerobic conditions of preservation of organic finds, so as well as inorganic materials (pottery, stone objects, metals such as iron or copper alloy) organic materials (leather, botanical remains, feathers, eggshell, bone from mammals, birds and fish) might be recovered. Mainly the finds are evidence of activities carried out by the people who lived in the burgh towns around 800-900 years ago, as well as physical evidence of the animals themselves. However, organic remains may also provide clues as to past environmental conditions.

Bird remains.

If only all organic remains were recovered in perfect, articulated condition. Unfortunately, as found, bones may have been reduced to fragments: extracted from a midden, they are excavated as broken or butchered pieces. Some may be weathered through lying about on an exposed surface or leached by acid in the soil. However, if they come from a waterlogged deposit (towns) or the middle of a calcareous shell-midden (coastal) they may be in reasonable nick. The bones need to be washed and sorted. The birds are separated from the mammals which make up most of the assemblage. They are then separated into types of bone – all the humeruses together and so on, then separated into family groups or species if possible, by comparison with modern, known, named specimens. A large comparative collection exists at the National Museum of Scotland Granton store, but as this is not really convenient for Perth I have been collecting my own 'deid things' over the years. These are acquired from Road Traffic Accidents (good for pheasants, partridges, jackdaws, crows, even a great black-backed gull once, on the road at Helmsdale); woods (owls), freezer breakdowns at the museum, scrounging from wildlife parks and beach-combing. However problems with decomposition, and a lack of personal expertise means the species is not always beyond doubt, so it is preferrable if they are already conveniently labelled, as in specimens ringed by the British Trust for Ornithology.

The species occurring most frequently in archaeological assemblages is the domestic fowl, *Gallus gallus*. There are, however, identification problems even with hens. Bones of galliform species are very similar, which is possibly one of the reasons why so few pheasants and grouse are reported from archaeological sites. Another non-native galliform found in deposits post-dating the 16th century is the turkey (*Melleagris gallopavo*).

Perth High Street (PHSE)

The Perth High Street excavation ran for two seasons from 1975-77. This site was the first really large scale urban excavation in Scotland, but it has unfortunately been in post-excavation ever since. However, the bird bones were written up and the report is very much forthcoming.

Bird Bones from the Perth High Street Excavation

Species		**Number of bones**
Red-throated Diver	*Gavia stellata*	2
Grey Heron	*Ardea cinerea*	10
Stork (?White)	*Ciconia ciconia*	1
Whooper Swan	*Cygnus cygnus*	1
Pink-footed Goose	*Anser brachyrhynchus*	14
Greylag/Domestic Goose	*A. anser*	337
Wigeon	*Anas penelope*	1
Mallard/Domestic Duck	*A. platyrhynchos*	19
Shoveler	*A. clypeata*	1

Species		Number of bones
Eider	*Somateria mollissima*	1
Goosander	*Mergus merganser*	1
Small Duck *sp*		1
Buzzard	*Buteo buteo*	2
Golden Eagle	*Aquila chrysaetos*	3
White-tailed Sea Eagle	*Haliaetus albicilla*	2
Eagle *sp*		1
Domestic Fowl	*Gallus gallus*	798
Black Grouse	*Lyrurus tetrix*	6
Ptarmigan	*Lagopus mutus*	2
Peafowl	*Pavo cristatus*	1
Crane	*Grus grus*	2
Crow/Rook	*Corvus corone/frugilegus*	7
Raven	*C. corax*	80
Indeterminate species		3
Total		**1295**

The most frequent species found in Perth is the domestic fowl, closely followed by geese. The PHSE geese may be either domestic, or wild greylag, but it is impossible to tell on size and morphology alone. Disconcertingly, even recent DNA studies have not sorted out large pink-footed geese from small greylags (both *Anser* species), so my claim that some of the Perth High Street birds are pinkfeet may yet prove to be wrong. Ducks at PHSE could be either wild mallard or its descendant, the domesticated duck. As all excavated bones are of wild size (smaller than domestic ducks), it is fairly impossible to tell. Other duck species found in Perth included eider, wigeon and shoveler, but notably, not in large numbers.

Mute swan surprisingly was absent, but a whooper swan sternum was present. Other edible species were: heron, stork and common crane, the last one not being common at all at the present day and not particularly common in medieval Perth either. These last were all referred to in contemporary documents as 'crans' so care has to be taken when interpreting these as they may simply be herons. However, they were all destined for the table.

Contemporary 16th century evidence of fowling comes from the Rental Books of Coupar Angus Abbey. A fowler was employed by the Abbey (John Sowter of Mylnhorn); the price to be paid by the cellarer for 'ilk wild guiss, tuay schillingis'. Ducks were naturally cheaper: fourpence for each 'duik', but swans, being much larger, were worth 5 shillings.

However the range of wild species found is also an indicator of available habitats as much as it is of man's dietary preferences. Although waterfowl are economically important, there are also moorland and mountain birds such as black grouse and ptarmigan. This was echoed by the botanical finds from the site: seeds of cloudberry, a mountain species, were recovered, possibly transported in the droppings of a goat, as well as blaeberry seeds. Moorland mosses were used to make ropes to hold down thatch, which was often made of heather. Bog plants such as bog cotton, yellow flag iris, tormentil and so on were also found in soil samples from the site. So it is not surprising that birds like red-throated diver, which breed on inland lochs, were also collected on forays outside the town.

Interestingly, there are raven bones from Perth. We think that, along with buzzards, they made a good living scavenging off the open middens of the medieval burghs. We have to understand that rubbish disposal was dealt with differently in the medieval period. Towns were probably very smelly and squelchy places: rubbish from domestic sources and activities such as butchery, fish gutting, fat rendering, leather tanning, candle making and so on, was all teemed out on to the backlands, or indeed any available outdoor space. Perth and Aberdeen both have evidence of extensive midden spreads in the centre of the burgh. Ravens and buzzards must have circled overhead, just as herring gulls do over today's municipal coups, carrying off bones and any other off-cuts they could scavenge. It is interesting to see buzzards begin to colonise the edges of towns like Dundee again after many years of persecution, and it is interesting to wonder whether they might move back to scavenging from landfill sites.

Red kites have not yet been identified from Scottish sites, although these crop up in medieval London, where presumably they also filled a scavenging niche.

Crows and jackdaws are also common medieval finds, although not in large numbers. The greatest quantities of jackdaws I have seen came from a garderobe chute (an indoor toilet) in Dairsie Castle, Fife. I assume that they nested there, along with a large number of doocot doos, also found in the garderobe. (This can not however account for the large number of cat bones found there too.)

Also found at PHSE were a few eagle bones, both golden and white-tailed sea eagle. They may have been hunted down as 'foulys of reif': in the 15th century a bounty was payable for killing raptors by an act of James II of 1457. 'Reif' has the same root as 'reiver' and means theft or spoliation. It is very unlikely that golden eagles were scavengers on Perth's middens, although it is thought that the white-tailed sea eagle may have ventured into towns in the middle ages. The feathers of both species would have been sought after for arrow flights.

Skilmafilly

I was asked to look at some bones recovered along with a Bronze Age human cremation burial from Skilmafilly in Aberdeenshire. Unlike modern cremations, where bones are put through a mechanical grinder and pulverised, prehistoric cremations are not so finely macerated. This means that many small fragments, like teeth, and pieces of joint articulations, may still be recognisable. Accompanying the human remains in the pit burial were a small number of eagle talons, probably golden. They may have been part of a necklace, or perhaps an entire 'lucky eagle's foot', like those grouse foot brooches sometimes worn with Highland dress. Or there may originally have been an entire eagle – after the

cremation, the bones would have been scooped up and perhaps not all were recovered and buried.

The burial pit in which they were found contained the remains of two adults but were particularly associated with a child of about nine years old – it is thought they may all have belonged to the same family. The eagle may well be indicative of status, or perhaps with the magic of the eagle's wings, which gave extra symbolic power to arrow flights. They may represent the fact that the person was a falconer or was even a chieftain. A lot of mythology has been woven around eagles and this seems to be a significant burial. It has been suggested that sea eagle bones found in Orkney's Isbister Neolithic chambered tomb may be totemic, the special emblem of the families buried there, although other bird and mammal species were found there too.

Isle of May

This excavation was very definitely a research site. Carried out by Peter Yeoman, then of Fife Council, now Historic Scotland, and Heather James of Glasgow University Research Division (GUARD) for several seasons from 1992-1997, its purpose was to investigate the early Christian monastery of St Ethernan known to have existed on the Isle of May in the Firth of Forth. Abundant evidence of medieval activities, including the monastic buildings and a cemetery associated with them were indeed found.

A significant find was the burial of a young man, buried within the church building, in front of the high altar. A scallop shell had been placed in his mouth, as recognition that he had made the pilgrimage to the shrine of St James at Santiago de Compostella. He was radiocarbon dated to between the 13th and 15th centuries and the token shell was identified as *Pecten maximus.*

As well as mammal bones, a most interesting assemblage of bird remains was recovered from the excavations. They were dated into three phases for convenience of comparison: early medieval, medieval and post-medieval, the last being roughly from 1500 onwards. The local economy of the island was very different from the Perth High Street site, which was affluent by comparison, and we should really think of human life on the May as very much one of subsistence. The people who lived there after the Reformation, when the monastic buildings were dismantled, would not be leading the religious life, and one of their main occupations in the 17th century would have been to tend the light beacon. (Period 3 in the table below is post-medieval) Apologies for the outmoded name of the gannet in the table: (should be *Morus bassanus*).

Most of the wild birds were, as might be expected, coastal or wild fowl. With the exception of one bone, none were small passage migrants (which is just as well as they are very difficult to tell apart and usually they are referred to as 'small Passerines'). Domestic fowl were present in quite large numbers, as were domesticated cattle and sheep, which warns us that some of the geese may have been domestic too.

We do, however, seem to find pink-footed geese having been exploited, although there was only one specimen in Period 3. This was a small humerus so there is also a possibility it could have come from a bean goose, which was apparently more common in Fife in the past than it is now.

The commonest duck was the eider. This bird is still present in the Forth today, and the name of another Forth island, 'Fidra', has been said to mean Feather Island, after the eider feathers used to line nests and exploited by man. Birds were of course exploited not only for their meat, but for feathers and eggs too. We tend to forget today that anything other than a hen's egg can and has been eaten in the past, and in the absence of man-made synthetic materials, clothing and bedding was padded with bird feathers for warmth. Rentals for people like those living on St Kilda were paid in feathers.

		Number of fragments	MNI
Gannet	*Sula bassana*	34	4
Cormorant	*Phalacrocorax carbo*	84	6
Shag	*Phalacrocorax aristotelis*	145	10
Cormorant/Shag	*Phalacrocorax* sp.	31	
Goose (domestic/Greylag)	*Anser anser*	30	5
Pink-footed Goose (or ?Bean Goose)	*Anser brachyrhynchus (or Anser fabalis)*	1	1
cf Mallard	*Anas cf platyrhynchos*	4	1
cf Shoveler	*Anas cf clypeata*	1	1
Scaup/Tufted Duck	*Aythya marila/fuligula*	1	1
Eider Duck	*Somateria mollissima*	21	3
Duck sp.	Anatidae	1	
Buzzard	*Buteo buteo*	1	1
Domestic Fowl	*Gallus gallus*	182*	11
Curlew	*Numenius arquata*	1	1
Wader	Family Scolopacidae	5	
Black-headed Gull	*Larus ridibundus*	11	4
Herring/Lesser Black-backed Gull	*Larus argentatus/fuscus*	109	10
Greater Black-backed Gull	*Larus marinus*	17	2
Gull sp.	*Larus* sp.	10	
Black-headed Gull/ Kittiwake	*Larus ridibundus/ Rissa tridactyla*	10	
Kittiwake	*Rissa tridactyla*	68	8
Guillemot	*Uria aalge*	599	54
Razorbill	*Alca torda*	21	2
Guillemot/ Razorbill	*Uria/Alca*	63	
Puffin	*Fratercula arctica*	2	1
Black Guillemot (Tystie)	*Cepphus grylle*	1	1
Small Auk sp.		2	
Great Auk	*Alca impennis*	5	1
Rock Dove	*Columba livia*	19	4
Blackbird	*Turdus merula*	1	1
Thrush sp.	*Turdus* sp.	2	1
Small Passerine		1	1
Jackdaw	*Corvus monedula*	1	1
Raven	*Corvus corax*	20**	1
Indeterminate Bird species		201	
Total		**1705**	

Isle of May: Numbers of bird bones and minimum numbers of individuals (MNI) in post-medieval Period 3

Other ducks not shown on this table were shelducks, which were only found in the medieval period (2 bones), as was possibly scaup, which used to over-winter in the Forth but unfortunately scaup and tufted duck are very similar and the bones might have been from either.

Both immature and adult gannets were found. I should perhaps say at this point that the definition of immature is based on the development of the bones, which is complete at a much earlier age than in mammals. The articular ends of long bones of young

birds are formed of cartilage – you only have to look at a cooked chicken to see this. The gristle at the end of the bone in the drumstick is cartilage, which becomes fully ossified, or turned to bone, by about 6 months of age in the chicken. This happens much earlier in the life of the gannet and the newly fledge guga has adult sized bones. So it becomes osteologically mature long before it is capable of breeding. When I say immature gannets, therefore, I mean very young birds.

Whether this indicates that they bred on the May is open to debate – however, the great authorities on the birds of the Forth, Baxter and Rintoul, say that gannets attempted to breed there in the 1920s, so it is possible the birds were breeding in the 15th century or earlier.

Surprisingly, fewer gannet bones were found than might be expected for a coastal site, so it is possible that it was not thought worthwhile to take a potentially dangerous boat trip to the Bass Rock in order to collect gugas. I have also found gannet bones at medieval sites in both St Andrews and North Berwick, and they are known to have been sold in the Lothians until fairly recent times but previously it had been assumed their source was the Bass.

Shags and cormorants were more commonly eaten on the May than gannets – both immatures and adults went into the pot. The number of shags on the island seems to fluctuate with time. In the post-medieval period they were common, but at the beginning of the 20th century they were scarce, but increased again. This has been related to a fluctuating food supply, but evidence from the May indicates there was also pressure from hunting which might have been a factor in the decline – the fewer adults able to breed, the smaller the population.

Gulls were a very popular food species on the May. Again there are difficulties in separating herring gulls from lesser black-backed gulls – I should really say it is impossible to do this by eye as they are closely related. However, even more distant relations like the black-headed gull and the kittiwake are also practically impossible to separate. Given the difficulties, we can see that all gulls were exploited mercilessly. The age structure changed with time: more young gulls were killed in the earlier period than in the post-med period. The population then went into a decline, which may have carried on until the 19th century, when numbers started to rise to their present day levels. We can speculate that humans killing and eating gulls, and probably also collecting their eggs, prevented their numbers rising.

Most of the auks that we find around or on the May today were found in the excavation assemblage. Guillemots were the most common, followed by razorbills. However, puffins were not at all plentiful, which was a surprise, given that today they are very common. Although they are smaller than the other auks, it would be surprising if, had they been present, they had not been exploited. (They are still enjoyed as a food on the Faroe Isles at the present day.) So it is possible that food supply was a factor in their absence from the assemblage.

The saddest sight on my identification table for the Isle of May has to be the bones of the great auk. Sad because we have to take the blame for eating it to death – we can not blame the climate, or food supply for this one. As it only laid one egg per year, if that egg was collected for food, the parents would breed no more that year. Coupled with the fact that it was flightless, it may have been that much easier to catch when it was on the breeding site. And it was a big bird, which made it well worth the energy expended in catching it. It is not uncommon to find it on prehistoric sites all around Europe's coasts. It has been found on sites in the northern Isles (Orkney and Shetland) and the Hebrides. It has also been found on Norse sites, such as Buckquoy on Orkney, and I have come across it at Iron Age Dunbar in East Lothian.

The early travel writer Martin Martin recorded it on his trip to St Kilda in the mid 17th century, calling it the Gairfowl.

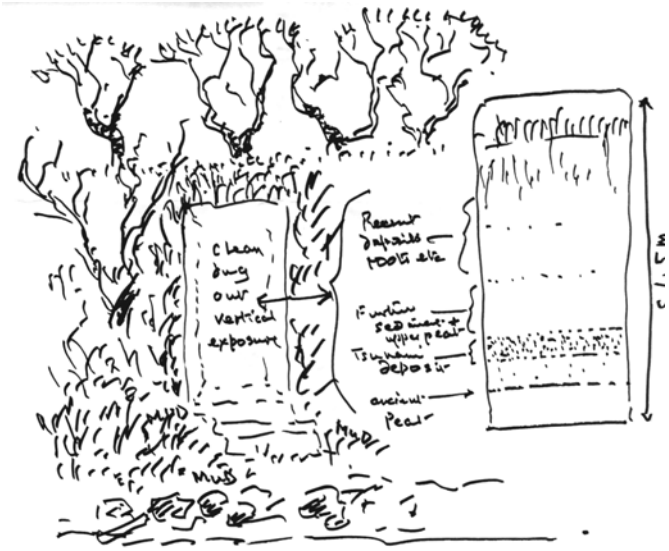
The few bones from the Isle of May possibly represent the most recent finds from Scotland, dating as they do to the middle of the 16th century.

The species is known to have declined greatly in numbers until the 19th century. With the destruction of its largest breeding colony, Funk Island off Newfoundland, about 1800, there was little chance for the species' recovery. The last Great Auk seen off the British coast was an individual killed on Stac an Armin, St Kilda, about 1840. Sadly it was time up for the Gairfowl.

Three different excursions in the afternoon followed the indoor proceeding.

Boddin point, the goal for one of the excursions © Gordon Corbet

Barbara Hogarth (facing) had kindly agreed to lead the conference excursion to Boddin Point © Gordon Corbet



The Tsunami Site at Montrose Basin – drawing by Thomas Huxley


The third excursion went to Balgavies Loch © Andy Wakelin


The party at Balgavie Loch, and the Osprey which was one of the highlights © Andy Wakelin

BRISC's E-petition UPDATE

730 people signed the e-petition which BRISC lodged on the Scottish Government's e-petition website in December 2008. The petition attracted a good deal of interest at committee level and after due consideration and consultation it is was eventually passed to the Scottish Government's Science Committee. A team of BRISC members were invited to meet the committee to elaborate on the issues raised in the petition and to answer questions. A response from the committee has now been received, which includes the positive recommendations listed below: The full text of the response can be viewed at www.brisc.org.uk

Commentary and Recommendations from the Biodiversity Science Group Sub-Group on Petition PE1229:

"..to urge the Scottish Government to establish integrated local and national structures for collecting, analysing and sharing biological data to inform decision-making processes to benefit biodiversity."

The Biodiversity Science Group (BSG) was asked by the Environment Minister to consider the issues associated with Petition PE1229, and make observations and recommendations for future action to be provided to the Petitions Committee. A sub-group of BSG met with the petitioners, National Biodiversity Network (NBN) and SNH staff, and other interested parties in a forum meeting on 22 January 2010. We have considered the information provided in advance, on the day, and in a number of subsequent submissions in collating this short report.

We list our recommendations first; then follow them with a brief analysis of the issues which led us to these recommendations:

Recommendations

1. All parties concerned with the collection and use of biological data in Scotland should support and contribute through the National Biodiversity Network (NBN) Gateway as the prime (only) UK data repository.
2. Scottish Government should become the key subscriber / contributor to the NBN on behalf of the Scottish public sector, to maximise access to, benefit from and use of information provided through the NBN Gateway. Key parties within this will include SG DG Environment, SNH, SEPA, other CAMERAS[1] partners, SG planners, as well as FCS and Local Authorities.
3. The NBN and SNH should encourage all National Schemes and Societies (NSS) to join the NBN process and provide data for the NBN Gateway, which will ultimately benefit the conservation of the species concerned.
4. Full involvement with and contribution of data to the NBN should be a requirement of any financial support from SG or SNH to any NSS.
5. SNH / SG should also consider the need to support some NSS at a UK level; especially the smaller societies with limited numbers of experts who work at a UK level, but provide a key Scottish resource.
6. The Scottish Government, SNH and others should establish a **Scottish Environmental Information**

[1] The SG Co-ordinated Agenda for Marine, Environment and Rural Affairs Science

Forum (SEIF), whose membership should be cross-sectoral and whose role should be to develop a strategic approach (by consensus) to the collection, collation and sharing of biological data across Scotland. This forum must work in close partnership with the NBN to provide maximum mutual benefit. The forum should develop an Action Plan with a clear schedule for implementation. The provision of modest funding for secretariat functions from SG would ensure that this work develops at a reasonable pace and is properly co-ordinated.

7. SNH and/or SEIF should review the means by which data for key and priority Scottish species are provided to the NBN and made available to organisations that need them. This review will highlight any gaps in data submissions and should provide recommendations for strengthening the datasets available for key Scottish species.

8. If a Scottish Renewable Energy Environmental Data Centre is to be developed as an SG–industry partnership, every effort should be made to ensure it is fully integrated as one of the "nodes" of the NBN and contributes its data to the process.

9. All Local Records Centres (LRCs) and Centres for Biological Recording should be encouraged to contribute their data to the NBN Gateway; this should be a specific condition and requirement of any ongoing or new SNH or SG funding.

10. SEIF should review the role, funding and coverage of LRCs and other local options for biological data management across Scotland as part of the process to ensure that the necessary structures are in place to collect and disseminate biological information across Scotland.

11. In the light of this review, SG and SNH should consider establishing a fund for LRCs similar to those developed by Defra and the Welsh Assembly Government. This could provide a proportion of the establishment funding for agreed new LRCs or data hubs for the medium term, to provide a degree of security to their establishment, and, potentially, ongoing contributions to the running and management of LRCs.

12. SNH should review its current funding of LRCs based on area requirements and species priorities. In the longer term, funding from both SG and SNH should be transparent, strategic and prioritised to ensure the best value for money from funding of LRCs.

13. All parties involved in biological data management in Scotland should work to agree on either a common GIS platform, or common inter-operability standards and GIS data standards.

14. SG should ensure that all their relevant staff are aware of, and have the necessary access to, biological data (through the NBN Gateway) in their decision-making. We believe the NBN would be keen to help with the establishment of platforms for specific uses of NBN data.

15. SG should work with Scottish Local Authorities (LAs) (through CoSLA?) to develop a parallel relationship with NBN to the Scottish National agreement proposed in recommendation 2.

16. SG and SNH should work to engage Local Authorities, perhaps through the SEIF, in reviewing how they meet their biological data needs for the implementation of local BAPs, their biodiversity duty and the Single Outcome Agreements. This may lead to the establishment of new LRCs or data hubs, changes in management or prioritising of the work of existing LRCs to help to meet their needs.

17. LAs (through CoSLA?) should have an active role as partners in the SEIF; and should make their data needs and priorities clear to LRCs and the NBN. The agreement of these needs and priorities would seem to be a prerequisite for LA involvement in funding their relevant LRCs.

18. SEIF should investigate the means and possibilities of enabling the addition of developers' data to NBN. This will be a complex and difficult issue to address, for a wide range of reasons, but unless it is addressed, much valuable data collected by developers and consultants as part of the environmental assessment process will be lost to public use. One approach to tackling this issue might be through the connections provided by the Institute of Ecology and Environmental Managers (the 'industry body' for many environmental consultants), or other professional institutes.

BOOK REVIEWS

Streeter, D., Hart-Davies, C., Hardcastle, A., Cole, F. & Harper, F. (2009). *Collins Flower Guide.* HarperCollins Publishers. Pbk ISBN 978-0-00-718389-0 £19.99

This tome represents what is an extensive and excellent piece of work; it states that it is "the most complete guide to the flowers of Britain and Ireland" and this is certainly true. It also states at the start of the introduction that it is a field guide. Weighing in at 1.25 Kilos and measuring 4.5 cms. thick it certainly will not fit into a pocket; more likely into a knapsack! I would perhaps take it on short and small area field trips but it is too large for any long distance trip; so not a field guide as such but still a useful resource.

Obviously with the descriptions of 1900+ species it is aimed at the expert amateur, professional and those who are ready for a more extensive guide than the "pocket" guides such as the excellent Fitter, Fitter and Blamey or the slightly lighter, manageable and also excellent Rose.

The introduction is very informative and well worth reading. It covers the plant names, how to use the keys, using a hand lens, recording, collecting, other organisations such as the BSBI, Plantlife, Wildlife Trusts and the FSC. Also there are explanations of symbols and a Bibliography. There is a good Glossary with illustrations at the end and the Index is inclusive of the English and Scientific names; I find this more useful than having two separate Indexes.

Keys are always a problem to construct when they are not the purely scientific dichotomous keys. The keys in this book are dichotomous but there has been an effort to minimise all the botanical terms thus making it easier for those who have not had a botanical training. There is always a problem with the terms 'small' and large' in a key without an actual measurement and this can lead to confusion. In some cases the unique features helpful in separating similar groups are noted in the key but not in the ultimate description. (As in Hop Trefoils and Medicks).

In order to pack everything into one book the font is quite small and the italicised parts often difficult to read, especially in the field. Bold type would be better. The illustrations are beautifully done, but rather pale and lacking contrast. Some of the small leaved or flowered plants are hard to see clearly. The water Milfoils, Flax, Cudweeds and Allseed are like this whereas the Bedstraws, Campanulas and Willows are well coloured. Some of the small parts of the plants are highlighted and illustrated which is very helpful but, for example, the seeds of Fumitory are difficult to make out and anyway there are already good line drawings of them in the descriptive text. It is nice to have all the species illustrated rather than just the commonest with the others described in the text. However, why just mention where the subspecies grow, of for example the Common Vetch, and not describe them; even a small illustration would do? There are plenty of subsidiary illustrations in other plants such as the seeds of the Pennycresses.

It of course would be impossible to put all these species into a smaller book. This has resulted in the Sedges being crammed together and the Grasses often as very small illustrations. Having said that, it would be much too large a book if the illustrations were larger, so the sacrifice made from the small size of some of the illustrations and text gives the benefit of having everything together in one volume. So again, it depends who this book is really aimed at.

We mostly recognise plants by what they look like so an illustrated guide is really suited to this visual recognition; the descriptive guides, such as Stace, are invaluable for the wealth of details and other information beyond what can be illustrated. I would certainly use this book, rarely in the field but certainly on the desk where I could look carefully at the illustrations. Also, as such a vast amount of work and expertise has gone into it, it would be a shame to get it wet!

Sandy Edwards

Newton, Ian (2010) *Bird Migration.* Collins New Naturalist Series. London. Hbk ISBN 978-0-00-730731-9 £45. Pbk ISBN 978-0-00-730732-6 £30

Hot on the heels of *The Migration Ecology of Birds*, his first book on bird migration published in 2008, Ian Newton has produced an instantly readable and lavishly illustrated condensed version of that tome for the New Naturalists series. At £30 for a softback it isn't cheap, but at 598 pages and with countless colour photographs supplemented with illustrations by Keith Brockie, along with judicious use of maps and graphs to inform the text without overwhelming it, this book is worth every penny.

At first glance one is struck by the quality and number of the colour photographs – over 200 of them (approximately one to every other page), with Scotland's Edmund Fellowes contributing the largest number (54). With so many pictures one might expect the occasional mistake in the captions, but so far I have found none – suggesting that the New Naturalist editorial team (which included Jim Flegg) have done a very thorough job.

The field of Bird Migration has massive scope, and many previous authors have struggled to capture its many facets, but Newton achieves this with ease. He provides an unsurpassed summary of all the main topics running to 25 chapters, ranging from *Migration Around the British Isles* to *Migration Studies, Weather, Navigation, Fuelling the Flights, Amazing Journeys, Vagrancy, Evolution, Glacial Legacies* and so on. Each chapter is broken down into a number of sections with its own headings, which greatly helps both to structure the presentation and to guide the reader through each chapter. As if that weren't enough, each chapter comes with a final section on *Concluding Remarks*, in which Newton recaps the key points

As well as being more easily readable by the amateur than the *Migration Ecology* tome, *Bird Migration* takes a British and Irish rather than world perspective on migration, therefore increasing its interest to non academics. The book also contains much recent and new information in the rapidly expanding field of migration studies, especially the recent development of satellite tracking studies, such as those of Roy Dennis with Scottish Ospreys and Honey Buzzards. Never the less, with so much information compressed between the covers, I suspect that few of us will be able to read it from cover to cover! Rather, each chapter is a good read in itself, and may take a little time to digest for those new to the subjects being covered

One of the great services that Ian Newton has provided within this book is to clearly define some of the frequently used terms in the field of migration studies. Even in the introduction, he begins this process by describing the six main "types of movement" ranging from routine day to day movements, through dispersal and dispersive migration, to irruptions and nomadism. The book focuses on the seasonal return movements of migration and irruption. Newton is at pains to point out that our simplistic picture of migration as a "south in autumn, north in spring" phenomenon papers over a much more complex and interesting world of bird movements. These vary depending on species, age of individuals, weather, evolutionary history etc. This book explains all! The chapter on irruptions, one of Newton's favourite topics as an authority on finches, does much to explain the comings and goings of our Crossbills and Siskins, and to put the annual changes that we see into a bigger context.

To produce two books on Bird Migration in the course of three years is something of a feat. For both to fill their respective niches so well is a phenomenal achievement. Of the two books, I think that this New Naturalist will be the one that appears on most bookshelves, and will give the most pleasure to its readers. A snip at £30!

Clive McKay

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