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Introduction

Foot and mouth put a halt to many events and fieldwork plans this year but IQUA managed at the last minute to organise a field meeting in Connemara. By all accounts it was a successful gathering thanks to the efforts of Pete Coxon and the other participants. This edition of the Newsletter contains an account of the field meeting and details of the forthcoming IQUA Annual Symposium.

Contributions for the next Newsletter should be sent to me (address below) by early April 2002. Apart from the usual contributions, such as recent publications, research reports and theses abstracts, feel free to send in an account of your favourite Quaternary web site, details of new research projects, conference reports and/or announcements etc.

I would like to thank Catherine Dalton for help with the production of this Newsletter.

Janice Fuller

IQUA Annual Field Meeting Report

Western Connemara,

13th-14th October 2001

Few areas of Ireland have been so obviously glaciated as that of Connemara and so it was an ideal choice for the 2001 IQUA Field Meeting. Despite the relatively short notice of this meeting, there was an excellent turnout of more than 20, with most meeting in the Station bar in Clifden on Friday evening. Although Friday had been a decidedly 'soft' day, Saturday saw mostly glorious weather, at least for Connemara. Pete Coxon had the inspired idea of hiring a 24-seater bus for the day, greatly easing the logistics of travelling and parking, while also allowing everyone to look at the landscape en route without the constant worry of inadvertently driving off the road through being distracted by some particularly interesting feature.

First stop was a brief look at the so-called 'Coral Strand' of Mannin Bay, actually a fine

gravel of lithothamnoid algal and shell debris which accumulates in places on the Galway coast where there is very little fine-grained siliciclastic material.

Drumlins are a rather scarce feature of Connemara but at Ballyconeely Bay Pete Coxon had stumbled across a remarkable longitudinally-sectioned drumlin which must be one of the finest exposed anywhere in Ireland. The drumlin swarms of Ireland, focussed on the major bays of Donegal, Clew, Galway, Bantry and Dundalk, are thought to be a product of glacier surges linked to unloading of the ice dome margins associated with rising sea level around 14 ka. Many of the features visible in this drumlin provide an astonishingly clear insight into drumlin formation and the associated mechanisms of sediment transport. The main mass of the drumlin is of lodgement till but on the lee slope are steeply-dipping foresets of obviously water-lain gravels. A distinct surface-parallel layer along the stoss side of the drumlin appears to represent the route that the water lain deposits in the lee side travelled, perhaps moving as a slurry beneath the ice. Supposed shear planes within the main mass of the lodgement till actually dip to the west, suggesting that they perhaps formed in a manner broadly analogous to cross beds. Clearly there is much still to be discovered about drumlin formation, with this example perhaps proving an important source of

information. Certainly it demonstrates that drumlin formation was far from merely the passive moulding of till by ice and that vast volumes of sediment were being transported westwards during late glacial ice-surge episodes.

Approaching Roundstone we stopped at Dog's Bay, where Louise Hildebrand outlined the mechanism of formation of the tombolo and the processes leading to rapid erosion of the dunes (grazing and holidaymakers) in the early 1990s, and their subsequent regeneration (of the dunes, not the holidaymakers) following fencing and planting *Spartina* on the unstable areas of sand. The erosion of the mid-1990s had revealed this to be an important archaeological site, with much of the evidence being associated with 3 palaeosols within the dunes. The oldest, no longer visible, was Bronze Age and the youngest, in which shells, bones and charcoal were still very obvious, was Early Christian. The beach sands themselves are remarkable here, in places being composed largely of the tests of foraminifera. Alan Lees described how their remains become preferentially concentrated in the inner part of the bay by wind and wave - associated size sorting which leaves coarser shell debris further out.

Following an excellent lunch in Roundstone Michael O'Connell took us all into a small back garden in Carna to look out across the

lumpy, boulder-strewn landscape around Loch na Chorcail, from where he described the changing fortunes of various plant species through the Holocene as deduced from pollen analyses undertaken at this site and others in Connemara.

A little further north a brief stop was made to look across Bertraghboy Bay and the extensive lowlands ending abruptly against the Twelve Bens. Although obviously heavily glaciated, questions surround the age of this surface. Does it represent a Tertiary surface merely rounded a little by ice movement, or does it represent a Tertiary weathering front perhaps originally lying tens of metres beneath surface and since exhumed by glaciation? Intertidal peat exposures just a few metres from where we stood also raised the issue of recent sea level rise.

The final site of the day, at Gowlan East on the northern flank of Cnoc Mordain, has been the scene of intense investigation by Pete Coxon and perhaps goes some way to addressing some of these issues. Here the granite surface is overlain not directly by glacial till, but by a sequence of unusual deposits including two palaeosols. The lower of these is Neogene and the upper is thought to be perhaps early Pleistocene, the whole sequence being capped by a till assumed to be from the most recent glaciation. This was a fascinating site which elicited much discussion. Is this survival from

pre-glacial times an exception rather than the norm? If so then what features have enabled this material to survive repeated glacial episodes over perhaps a million years or more in a landscape that first impressions suggest has been pretty deeply scoured by glaciation. It raises in microcosm the whole issue of what effect the ice really has had on the Irish landscape, which forms the subject of the IQUA Symposium on November 23rd at the Geological Survey of Ireland.

Sunday dawned with more typical Connemara weather - overcast with intermittent showers - but this did not dampen the enthusiasm of the group. The morning's excursion was led by Michael Gibbons who has helped to highlight the abundance and scale of Neolithic sites in Connemara. Heading out on the Sky Road we stopped briefly to hear about the profound changes that took place around the mid-17th Century, with the local 'industry' of smuggling and wrecking being swept aside by the establishment of the town of Clifden and the siting of coastguards in the area. However, the main stop was out on the end of the peninsula overlooking the small islands of Inishturk and Turbot Island. A rough walk across the moorland gave stunning views onto a landscape little changed by the advent of the 21st Century. An intact turf-roofed, single-roomed, cottage was still visible right on the coast; sadly now abandoned in the last 2 years, its roof almost certainly will soon collapse, as

have other cottages nearby. A rather steep descent into a small valley revealed the largest court tomb known from Co. Galway, though rather bizarrely a tiny single roomed-house had been built in its midst. The walk back to the cars provided an opportunity to examine a turf-roofed house at close quarters, though now sadly collapsed. Thence back to Clifden for lunch before the party dispersed for the various long journeys home.

All in all an excellent excursion and goes to show what can be achieved even at quite short notice. But there is so much to see in Connemara that we could only touch on one or two aspects of the area's Quaternary, and earlier, landscape history. Certainly worth another IQUA visit, with countless opportunities for more detailed fieldwork by anyone with research time to spare.

Mike Simms

Dates for your diary

IQUA Annual Symposium:

'Ice and the Irish Landscape'

Friday November 23rd @10am

Geological Survey of Ireland,
Beggar's Bush, Dublin

It has often been assumed that ice has been a major agent in the moulding of the Irish landscape but continuing discoveries of

Tertiary and early/mid Pleistocene sediments indicate that this may not be the case, or at least that the effects of Pleistocene ice have been very patchy. This year's IQUA Symposium aims to look critically at the evidence for the role of ice in shaping the Irish landscape and in influencing the Tertiary and Pleistocene sedimentary archive.

Aspects that will be considered include:

What is the role of glacial erosion? How widespread or localised is it and what factors determined its distribution? What is the role of glacial deposition? How much of the bedrock landscape do glacial deposits conceal and to what depth? What factors determine the location of deposition as opposed to erosion? How ephemeral are these deposits (are earlier deposits removed and replaced by subsequent glaciations)? What factors have led to the survival of Tertiary and earlier Pleistocene deposits in various parts of Ireland? Why is the interglacial record in Ireland so poor and apparently biased towards earlier interglacials? What factors control the rate of ice erosion, and what are typical rates? How do these compare with interglacial (or periglacial) erosion rates? Can we identify multiple glaciations in Ireland? Is there evidence for stepwise erosion or do later events mask earlier ones? What do glacial sediment volumes tell us of the extent of erosion?

Speakers include the following:

David Sugden - An Antarctic glacial signal in Patagonia and some interhemispheric implications

Jasper Knight - Glaciation and the evolution of the Irish landscape

Robbie Meehan - Subglacial bedforms in Ireland - What do they tell us?

Pete Coxon - Ireland's Late Tertiary and Pleistocene landsurface: Modified or what?

Cathy Delaney - Eskers and the Irish Landscape

Mike Simms - Irish ice meets limestone landscapes: Glaciokarst or just glaciated karst?

Sarah Taylor & Alex Densmore - Glacio-isostatic flexural modelling of the Galtee Mountains, County Tipperary and Comeragh Mountains, County Waterford: A glimpse of pre-Quaternary landscapes?

For more details about the Annual Symposium contact:

Dr Mike Simms, Department of Geology, Ulster Museum, Botanic Gardens, Belfast BT9 5AB; e-mail michael.simms.um@nics.gov.uk

'Natural and Cultural Landscapes: The Geological Foundation'

9th-11th September 2002, Dublin Castle

A conference organised by the Royal Irish Academy, Geological Survey of Ireland and Geological Survey of Northern Ireland.

This conference is designed to stimulate discussion on the future of our landscape and its geological foundation. For more details see the conference web site:

http://www.ria.ie/committees/geog_conf.htm

New Research Projects

Irish Palaeoecological Data Synthesis and Analysis Project (IPAL)

The Irish Palaeoecological Data Synthesis and Analysis Project (IPAL) is an EU-funded research project that commenced in April 2001 and is being carried out in the Botany Department in Trinity College Dublin by Manel Leira and Edwina Cole in conjunction with Fraser Mitchell. The primary aim of this project is to investigate how stable the climate has been in Ireland during the Holocene by using high resolution diatom and pollen analyses. Such information is vital to the understanding of how Ireland responded to climate change in the past and how it may be affected in the future.

The success of this project depends on investigating sediments from sites that are sensitive to small perturbations in climate change. The most suitable sites for this research are high altitude lake sites and although Ireland has produced a wealth of palaeorecords, those from high altitude lake sites are extremely rare. It is proposed to investigate three high altitude lake sites. Two

such lakes have already been cored; Kelly's Lough in Co. Wicklow and Lough Diheen in Co. Tipperary. It is hoped to core a final site in Donegal in early 2002. High quality pollen, diatom and total chrysophyte stomatocyst analyses will be carried out on sediments cored from the three sites. This will be followed by climate modelling using pollen response surface models and palaeoecological reconstructions to provide information on the vegetation response to Holocene variability and lake ontogeny, as well as on the linkage between aquatic and terrestrial systems. From such research it is hoped to obtain a detailed and high quality Holocene record of climate change and subsequent climate models which will be invaluable in predicting how future climate change may affect Ireland. Various multivariate statistical techniques will be employed throughout this research, as both exploratory and explanatory tools for simplifying the interpretation of the data sets. Preliminary pollen and sedimentary results have already been obtained from the Wicklow site while analyses have begun on the Tipperary site. A suitable site in Donegal has not been located to date. Any information on potential sites in Donegal would be gratefully appreciated (contact details: eecole@tcd.ie and leiram@tcd.ie).

Edwina Cole, Department of Botany, Trinity College, Dublin 2.

Recent Publications on Quaternary Research in Ireland

- Corr, J.F. 2000: A Holocene non-marine mollusc fauna from Co. Mayo, Ireland. *Verh. Internat. Verein. Limnol.* 27(3), 1183-1186.
- Dalton, C. 2000. Organic acidity in lake waters in Connemara, W. Ireland: a preliminary investigation using diatom analysis. *Verhandlungen Internationale Vereinigung für Theoretische und Angewandte Limnologie Vol 27*: 1193-1198
- Knight, J. 2001. Glaciomarine deposition around the Irish Sea Basin: some problems and solutions. *Journal of Quaternary Science*, 16 (5), 405-418.
- Knight, J. and Burningham, H. 2001. Formation of bedrock-cut ventifacts and late Holocene coastal zone evolution, County Donegal, Ireland. *Journal of Geology*, 10 (5), 647-660.
- Pilcher, J. and V.Hall. 2001. *Flora Hibernica*. Collins Press, Cork. pp.203
(Described by Michael Viney in *The Irish Times* (October 13th) as an 'expert and stimulating book'.)

Thesis Abstract

Corr, J. 2001. *Late-Glacial and Early Holocene non-marine mollusc biostratigraphy and palaeoecology in Ireland*. University of Huddersfield, PhD Thesis unpublished.

This thesis examined Late-Glacial and Early Holocene freshwater mollusc biostratigraphy and palaeoecology in Ireland. The investigation focuses on the interpretation of mollusca from six study sites across Ireland (White Bog, Co. Down; Carran Lough, Co. Fermanagh; Mannin Lake, Co. Mayo; Lurga, Co. Clare; Lough Boora, Co. Offaly; Tory Hill, Co. Limerick). The majority of the sites have also been investigated for palynological and sedimentological analysis, aiding identification of perceived climatic and site specific events.

Freshwater molluscan palaeoecological studies in Ireland have been under-researched, prior to this thesis only four studies have been undertaken. This thesis shows these investigations to be limited and, with one exception, outside the time period investigated. In spite of a detailed history of investigations into the modern Irish freshwater molluscan fauna, there are still uncertainties regarding their habitat requirements, tolerances and limiting factors. A survey of 34 lakes through Counties Sligo, Mayo and Galway was undertaken to provide

information on factors influencing contemporary and historic distribution patterns.

Results are analysed for patterns of molluscan distribution through time across Ireland. This provides the basis of a molluscan biostratigraphy for the Irish Late-Glacial and Early Holocene. To facilitate dating immigration and migrational trends, a review of the Irish Late-Glacial and Early Holocene pollen biostratigraphy is undertaken. Published pollen diagrams with corresponding radiocarbon dates are reviewed in relation to data from this thesis. A revised pollen biozonation for the Irish Late-Glacial is proposed. Radiocarbon dates from the pollen zones have been incorporated into this thesis, enabling the dating of molluscan events.

Molluscan immigration dates c. 15,300 – 15,000 Cal. yr BP have been identified for Carran Lough and White Bog, with later immigration for sites further south. Through the Late-Glacial three distinct climatic deterioration events have been identified, displaying similar results to the GRIP ice-core and Coleopteran reconstructed temperatures from the British Isles. The Younger Dryas is noticeable with the localised extinction of mollusca at four sites. White Bog (Cores A and C) and Mannin Lake had continued molluscan presence though the Younger Dryas. The transition to the Early Holocene is

recorded with rapid re-colonisation and expansion of molluscan communities across Ireland. *Valvata cristata* and *Bithynia tentaculata* immigrated, coinciding with the extinction of *Gyraulus laevis* and *Gyraulus crista* c. 11,000 Cal. yr BP.

Molluscan migration and dispersal across Ireland has been compared with dispersal across four mainland European sites and six studies across Britain through the Late-Glacial and Early Holocene. Comparative sites were

selected for good dating control and taxonomic reliability. These show a spread from southern Europe, free from glacial influences, northwards following deglaciation. Records from Sweden, Germany and Britain indicate similar molluscan faunal immigration patterns comparable to those for Ireland. A comparison with Late-Glacial migration patterns is made with the pattern of immigration of *Potamopyrgus antipodarum* in the last 150 years.

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Contributions for the next IQUA Newsletter should be sent to:

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