



Editor: Catherine Dalton

1. Introduction

Last year IQUA delivered its three annual events:- the IQUA Spring Meeting and AGM organised by Pete Coxon; an autumn fieldtrip to the Sperrin Mountains (organised by Steve McCarron); and a very successful Autumn symposium at the GSI in early November, again organised by Pete Coxon. The turnout at the events was poor in general (with the exception of the symposium. It is not a question of people not being interested, but perhaps of people not being informed in time. IQUA presently has 115 fully paid up members, 3 honorary members and 8 corporate members. In an effort to boost numbers the two upcoming field meetings will be jointly hosted with IAH and QRA (see items 2 and 5).

An interesting development at the Royal Irish Academy will see the National Committee for Geophysics and Geodesy and the National Committee for Geology being replaced by the establishment of a new Geosciences Committee as part of an overall effort to invigorate its network of National Committees (see item 10). This development presents an opportunity to clarify the role of IQUA with the RIA and may provide for stronger links between the RIA, IQUA and INQUA.

2. IQUA Fieldmeeting 2004



IQUA

2004 IAH/IQUA fieldtrip Fieldmeeting

IQUA and the IAH (the Irish Association of Hydrogeologists) are planning a joint fieldtrip in September/October to the North West Mayo area (date to be announced). The proposed itinerary

includes a visit to the Pollathomiah landslide area; the proposed gas terminal site area as well as taking in a visit to the Ceide Fields. We also propose to visit local areas of geomorphological/geological interest, i.e. glacial deltaic deposits at Ballycastle and coastal exposures of marine muds. The meeting is being organised by Pete Coxon (IQUA & TCD) and Fionnuala Collins (IAH & RPS-MCOS). Field meeting leaders are still being organised. More details will be supplied soon via the IQUA and IAH websites.

3. IQUA Spring Meeting & AGM

IQUA Spring Meeting and AGM 2004

Saturday, 3rd April, 2004 Museum Building, Trinity College Dublin

10.25	Steve McCarron (TCD): Introduction
1. CURRENT POSTGRADUATE RESEARCH IN QUATERNARY STUDIES	
10.30-10.50	Tony Brooks (TCD): Late Devensian and Holocene Relative Sea Level in Ireland
10.50-11.20	Karen Sheeran (TCD): Late Quaternary Environmental Change in the Western Mediterranean
11.20-11.40	Lisa Baldini (UCD): High-resolution speleothem records and the link between solar variability and Holocene climate change
11.40-12.00	Coffee
2. GENERAL RESEARCH FORUM	
12.00-12.30	Cathy Delaney (Manchester): Sediments from palaeolake Lough Ree
12.30-2.00	Lunch
3. GEOHAZARDS : WHAT QUATERNARY RESEARCH CAN ADD TO THEIR STUDY	
2.10-2.40	Roy Tomlinson (QUB): Upland blanket peat in Ireland - extent, types and origin
2.40-3.10	Pete Coxon (TCD): Some lessons from 1980's bog bursts
3.10-3.40	Koen Verbruggen (GSI): The Geohazards workgroup: Basis, partners and research
3.45- 4.00	Tea
4.00-	IQUA AGM

4. IQUA Autumn Symposium

2004 Autumn Symposium

Topic still to be decided

2003 Autumn Symposium

Selected abstracts from 2003 Autumn Symposium on *Ireland after the ice: early migration and landscape development* (organized by Pete Coxon) are included below. In addition Michael Gibbons has kindly expanded on his abstract 'Mapping the Mesolithic in Western Connacht' and contributed his draft paper for the 32nd IQUA newsletter.

Tree migration into Ireland

Fraser Mitchell, Botany department, Trinity College Dublin.

fraser.mitchell@tcd.ie



North-west Europe has a depauperate flora compared to temperate North America while within Europe, Ireland has a significantly restricted flora. Restrictions associated with Postglacial migration may be primary causes of these disparities but ecological limitations also play a significant role (Webb 1983). The impact of the isolation of Ireland sometime after deglaciation was the focus of the Irish Biogeographical Society meeting in Cork in 1983 (Sleeman *et al.* 1983). Twenty years later there is still speculation as to when Ireland became isolated and when or where land bridges existed. The mechanisms of tree migration over long distances is also still unclear.

In this paper pollen and genetic data will be reviewed to explore the migration dynamics of trees into Ireland during the Postglacial. Birks (1989) produced pollen isochrone maps for Britain and Ireland which illustrated migration routes of trees into Ireland across the Irish Sea and from the south. When these maps were produced, Birks (1989) had adequate data points in Ulster but only had access to data from four sites covering the lower two thirds of the island of Ireland and the dating control of two of these sites was inadequate. A significant

increase in the number of radiocarbon dated pollen sites in Ireland during the 1990's means that we can now draw on data from 32 dated sites spread throughout Ireland to create new isochrone maps (Mitchell 2002). These maps indicate that hazel was an early postglacial colonist which may have migrated from both the east and south. Elm, oak and pine all migrated in from the south with no evidence that that they crossed the Irish Sea. Pine moved fastest along the west coast and this may reflect reduced competition from other trees in this more extreme environment. It is interesting to note that lime and beech, two trees that were late colonists to Britain, migrated from south east England to the Welsh coast but have not managed to cross the Irish Sea. Lime arrived at the Welsh coast 7,000 years ago and beech some 6,000 years later (Birks 1989).

Isochrone maps for oak across Europe based on data from the European Pollen Data Base indicate that oak had glacial refugia in the Iberian, Italian and Balkan peninsulas (Brewer *et al.* 2002). Genetic analysis of contemporary oak populations across Europe have identified a number of genetic haplotypes which can be used to infer their glacial refugia (Petit *et al.* 2002). British oak populations contain haplotypes of both Iberian and Italian origin (Petit *et al.* 2002). In Ireland only two haplotypes have been found and this has been confirmed by more concentrated sampling by Kelleher *et al.* (in press). The two haplotypes found in Ireland have the most western distribution in Europe and they are also found in Britain. The other British haplotypes have more eastern distributions in Europe and have not crossed over the Irish Sea.

The genetic data for oak appear to confirm the interpretation of the pollen data that oak migrated into Ireland from the south and did not cross the Irish Sea. There are, as yet, insufficient genetic data available on a European scale for the other trees to make similar comparisons but their pollen data also suggest that they migrated in from the south (Huntley & Birks 1983; Mitchell 2002). It is probably safe to assume that Ireland was already isolated as an island at the time of their arrival. The migration mechanisms that enabled them to cross bodies of open water has not been elucidated but it is clear that the sea around Ireland should be considered as a migration filter rather than a barrier.

Developing a Irish tephrochronological framework for the last glacial-interglacial transition (LGIT; 14-9 ka ¹⁴C BP).

Chris Turney, Karen van den Burg, Nicki Whitehouse, Phil Barratt, Chris Callaghan & John Lowe



The last glacial cycle drew to a close in a series of very abrupt and pronounced climatic oscillations, terminating in a sustained shift to warmer conditions at the start of the present (Holocene) interglacial. High-precision correlation of ice, marine and terrestrial sequences from this period is hampered by problems inherent in radiocarbon dating, especially because of marked fluctuations in atmospheric ¹⁴C content. Tephrochronology offers the potential to solve some of the geochronological and correlation problems, because it provides time-parallel horizons that can test ideas about the correlation of sequences independently of the radiocarbon method. It can also be used to establish the magnitude or errors associated with the radiocarbon method. Recently, innovative new approaches have been developed for the detection of tephra horizons within sedimentary sequences that are not visible to the naked eye (microtephra or cryptotephra horizons) (See <http://mediator.ads.qub.ac.uk/ms/virtualconference/>) As a result, the provenance of known eruption events have been significantly expanded. Furthermore, these methods have led to the detection of previously unidentified eruptive events, which increase the scope for using tephrochronology for correlation purposes. Here we report on the application of these approaches to the investigation of LGIT sites in Ireland. Data are presented for three LGIT sequences in Northern Ireland: Roddans Port, Long Lough and Loch Nadourcan. Several tephra horizons have been detected, some of which are new finds for the British Isles. These tephras include the Vedde Ash (10.3 ka ¹⁴C BP). and the Askja Tephra (10 ka ¹⁴C BP). The potential for correlating Irish palaeoclimatic datasets to those developed throughout the North Atlantic region will be discussed.

Irish postglacial vegetation dynamics - a necessarily complex model

Robert Marchant, Fraser J.G. Mitchell, Andrew Craig, Michael Connolly, Elizabeth Vokes, Bill Watts

Irish pollen data have been collated within a pollen database as part of the Irish Palaeoecological Analysis (IPAL) project. Palynological data from twelve sites that encompass a range of locations offer an interesting insight into the spatial character of Irish post-glacial vegetation dynamics and the likely forcing mechanisms driving vegetation cover. To standardise the pollen data, and allow inter and intra site comparison, results are portrayed as affinity scores to biomes against from the base of the records to the arrival of mixed broadleaved vegetation characteristic of the early Holocene in Ireland, such an approach allows a direct comparison of change and indicates the nature of the communities that were formed and how these changed in response to climate change.

The earliest record extends to approximately 15,000 radiocarbon years before present (yr BP), shortly after the late glacial maximum when the Irish flora was dominated by the steppe and tundra biomes. A surprising outcome of the analysis is the common occurrence of arboreal biomes in the oldest sediments, particularly the cool evergreen forest biome that is dominated by *Pinus*. Although often attributed to long-distance transport, given the heterogeneous nature of this signal, particularly with greater amounts being recorded along the eastern seaboard it is suggested there may be a relatively local source for the pollen, such as some of the steeply sided canyons present within the Irish Sea. A number of rapid climatic fluctuations characterise the transition into the Younger Dryas; sites located on the West coast, for example Ballinloghig, appear to carry a signal of rapidly fluctuating climate, likely to reflect Atlantic Ocean circulation, the site being particularly sensitive to record changes in position of polar fronts. The transition to the Holocene at a number of sites is characterised by a distinct two-phase shift as the tundra and steppe biomes decrease associated with the increased importance of broadleaved deciduous biomes; again, such a transition may have been driven by changes in Atlantic circulation. The pollen data indicates that the vegetation differed considerable in different areas and that the ensuing transition to arboreal biomes of the early Holocene, although a common trait, is influenced by site-specific phenomena.

Mapping the Mesolithic in Western Connacht

Michael Gibbons, Jim Higgins, Myles Gibbons

Western Connacht, which includes the coastal counties of Galway and Mayo, is ecologically diverse with a wide range of eco-systems with large upland, coastal, lacustrine and island components. The finest salmon rivers in Europe run through the area and end in the estuaries of the Corrib and the Moy. Between these river systems there is a chain of large lakes; Lough Conn, Cullen, Carra, Mask and Corrib. Off the coast there are numerous and varied island groups, from the Karst landscapes of Aran in the South, the more mountainous islands of Achill and Clare to the West and the machair dominated islands of the northwest, the Inishkeas. There are also a large number of low-lying, inter-tidal and inter-drumlin islands. Many of these, including the small archipelago known as Ceantar na nOilean off the South Connemara coast and the inter-drumlin islands in Clew bay, may have emerged as islands in post-Mesolithic times after the rise in sea levels inundated coastal districts.

During the Mesolithic the area is likely to have become progressively more forested and ultimately all the major mountain ranges and upland areas; Ox, Nephin-Beg, Sheefry, Partry, Bens and Maamturks, with the exception of exceptionally steep or sharp peaks above 600m, would have been blanketed by forests. Evidence from gradually eroding blanket bogs shows that renewed forest-cover extended above 500m on mountain slopes by the early Bronze Age. This is likely to have been present in the late Mesolithic also. Intermediate range hills such as the Ox and Curlew mountains with their more rounded profiles would certainly have been covered. This is important as Christina Fredengren has suggested recently that the higher mountains around Lough Gara might have broken through the tree cover and hence had a significant visual signature during the Mesolithic (Fredengren pg. 113) whereas this is actually unlikely.

The number of findspots for Mesolithic material in western Connacht, while still small, is nevertheless significant and a number of general trends are emerging. The material seems to be later Mesolithic in date, however a number of early Mesolithic axes may have been identified in central Roscommon and Clare and these are also likely to have had a wider distribution than is at present visible in the record. The distribution of Mesolithic material reflects the area's geographical diversity and available food resources; in particular fish and fowl.

Site locations range from river mouths, both on lakes and deep bays, to lacustrine and coastal, and one significant discovery from a turlough site at Belclare near Tuam. Turloughs are a common topographical feature of the karst lands of east and south Galway. Despite the large upland regions of western and northern Connacht there is a notable absence of Mesolithic material from these areas. This may indicate an actual lack of Mesolithic settlement due to the shortage of exploitable species in the upland regions of Mesolithic Ireland. Large prey animals such as cattle and deer were unavailable in Ireland as compared to Britain due to the early flooding of the land bridge between the two islands. Wild Pig was available however and a proper programme of archaeological monitoring on forestation projects, particularly on the hundreds of miles of forestry roads, in these uplands would almost certainly bring at least some material to light. Similarly there is a lack of material from entirely landlocked areas but this may simply reflect the absence of a tillage economy in the West. Almost all of the later Mesolithic material comes from locations where there was intensive subsequent Neolithic activity.

The failure to identify any Mesolithic material from the large number of coastal middens in the region, may reflect the rise in sea levels and the change in the shape of the coast over the intervening period. One possible exception may be a pebble hammer mace head from Omev island on the west Connemara coast. Pebble hammer mace-heads have been found in Mesolithic contexts in Britain but none have been found to date in Ireland. Mesolithic material has often been found elsewhere in association with midden or cave deposits. The best documented of these are the middens at Ferriter's Cove in the South West and there are similar sites at Ocan in western Scotland. However, a number of midden sites containing *Nucella lapillus* (Dog Whelk) shells have been identified in Galway and Mayo (McCormick et al 1996). While these have been considered to be of early historic date others such as a recently identified coastal site at the mouth of the Culfin River (NGR. 637 743) on the North Connemara Coast (see below and also Gibbons and Gibbons, in press) may be earlier in date. The Culfin site contains thousands of Dog Whelk shells. Dog Whelk dominates the marine mollusc assemblage of the Mesolithic shell middens at Ferriter's Cove.

Mesolithic Findspots from West Connacht

- 1: Streamstown (2 miles north of Clifden, coastal,

a terrace overlooking the inner reaches of Streamstown Bay close to the entry point of the Glenbricken River).

A Bann flake was discovered here during topsoil removal. It is not clear whether Streamstown Bay was already a bay during the Mesolithic. (Its inundation by the sea may be a relatively recent event (O'Connell, IQUA Field Guide) In the event that the site was in fact on the shores of a bay at the time it represents a good location from a hunter-gatherer perspective, at the interface of river and the sea, close to a fording point and on a bay rich in shellfish, in particular scallops periwinkle and razor clams. The site is located in the midst of a dense concentration of Neolithic sites focused on Streamstown bay which includes Megalithic tombs and related structures. This site is the most westerly of the confirmed Mesolithic findspots in Connacht.

2: Burrishroole (2 miles west of Newport, County Mayo on the Lough Feagh/Furness river system).

A Bann flake has been found close to the tidal reaches of this important river and lake system (Burrishroole) which consists of a short tidal river and sea lough (Lough Furness) with a deeply knifing lake (Lough Feagh) which, together with its associated rivers and streams, cuts deep into the Nephin Beg mountains. The Burrishroole fishery was, until lately, an extremely prolific salmon and sea trout fishery. It is located on the NE corner of Clew Bay one of the largest bays on the west coast.

3: Belderg, North Mayo Coast.

A group of Bann flakes and related lithics were discovered close to the mouth of a small river on the cliff-bound and extremely exposed coast of North Mayo. The location is significant in that it has a relatively narrow coastal zone due to the steepness of the surrounding cliffs and sub-surface topography which would have made shell-fish procurement, in particular, somewhat difficult. It has a high energy and extremely exposed coastal environment which is nevertheless rich in coastal fish stocks, in particular wrasses. That material is present at such an exposed site at the mouth of such a small river with a relatively small number of migrating salmon points is testament to the huge potential for Mesolithic discoveries of the larger river estuaries on the North Mayo coast. In particular the Moy and Carrowmore estuaries with their extensive stocks of fish would seem to be prime candidates

4: Lough Lannagh (Castlebar)

A Bann flake was found on the shore of Lough Lannagh. The lake has several crannogs on it and is part of a small group of interdrumlin lakes on the upper reaches of the Moy river system. The ecological context of this site is similar to that of a

Bann flake found at Urlar in East Mayo and to similar sites in the upper Shannon basin.

5: River Island (Lough Corrib, at the mouth of the Owenriff River near Oughterard).

A single Bann Flake was found on the stoney shore on the north side of the island in 1975 (Higgins 1997/8). Subsequently in 1984 two further flints were found – a non-diagnostic scraper and a piece of waste worked flint – in the same area. The three flints would seem to have been weathered out of a shoreline deposit (as yet unlocated) in the vicinity, rather than coming from the upcast resulting from 19th century drainage operations. This discovery highlights the importance of interface zones between rivers and lakes. The Owenriff River is rich in Salmon and provides access to the hill country of east-central Connemara. It may have been one of a series of river sites utilised by a group working their way around the river mouths which enter Lough Corrib. The location of this site, on the shore of Ireland's second largest lake, can be paralleled with material from Cormanaghan on the east shore of Lough Allen where Aidan O'Sullivan (1998) has suggested a similar seasonal movement may have taken place.

6: Dangan Lower and Menlough (the river Corrib. 1-2 miles north of Galway city, between Menlough Wood and Terryland Castle but mainly between the former and Menlough castle).

A large body of stone artefacts of later Mesolithic and perhaps early Neolithic type was found in the late 1970s in the River Corrib. Much of the material has come from an area called the Tail of the Wood near Menlough Graveyard. Dispersed over a wide area they have been recovered over a period of several years. Some of the material has been found mixed with later medieval and modern material. The disturbed nature of this site makes it a difficult one to interpret however it is similar in location to the Coolnagranshy discoveries on Lough Gara. As at Coolnagranshy the Corrib at this point is wide and slow moving and would have been even more-so prior to drainage and deepening operations in the 19th century. The sheer volume of artefacts discovered here, running into many hundreds, points to a major Mesolithic camps site in the marshes adjoining the River Corrib at this point. This site may have had a significant ritual component. The material includes a variety of Bann Flakes, hammer stones, axe-heads etc., but it has not yet been analysed or published and its significance remains largely unrecognised.

7: Town Parks (Galway City, the site of the former "Untitled" building on the junction of High Street and Cross Street Lower).

Roughly half of a Bann Flake (the lower half) and a quantity of chert were found here during construction. Little could be ascertained about the nature of the site because much of it had already been destroyed when the finds were made. Some six pieces of chert were recovered but of these only one appears to have been worked. This area was once a series of small individual islets in the river. These would have provided an ideal basis for hunting migrating fish, fowl and small animals and could also have acted as a camp for larger foraging expeditions; both into Galway bay and northward into Lough Corrib. Galway City was also known as *Baile an tSruthán* (the hamlet of the streams) and the river was tidal for a considerable distance upstream.

8: Turloughnaroyey (on the site of Belclare Turlough or Turloughnaroyey near Belclare (between Tuam and Headford)).

A complete Bann Flake and a large number of pieces of chert – all seemingly unworked though some may have been chipped – was found on a low knoll which projects into Turloughnaroyey or Belclare Turlough. The chert may not be of any great significance as large quantities of it, some of it chipped although not certainly worked, are found in the glacial till and in the underlying limestone and field walls of the locality. The finds were made in the course of a visit to the Belclare Birdhide which was constructed on a low knoll which projects significantly into the turlough. Finding Mesolithic material in a turlough is important as this is yet another eco-system which could be utilised, if only seasonally. Turloughs are a feature of karst landscapes and provide an important winter feeding ground for large numbers of fowl, notably ducks. It is probable that Mesolithic populations utilised these resources on a seasonal basis as part of a varied round of food procurement.

9: Ballinrobe (sewerage scheme, Co. Mayo)

A Bann Flake was found near Claremorris, close to the Robe river, during sewerage work in the Lough Mask catchment area in 1994 (Anderson 1995).

10: Oranmore (sewerage scheme, Co. Galway)

Half of a butt timed, honey flint Bann Flake was found here and identified by one of the authors (Higgins) at site 31 on the route of the Oranmore to Galway sewerage scheme. (Higgins and Morihan Excavations 1999-2000)

11: Claddagh (Galway City)

Two ground stone axes and a bi-conical [vessel] were found in the foundations of a modern dwelling.

The material came from Fare Hill Road in the Claddagh on the west bank of the Corrib in present day Galway city (pers. comm. Jonathan Margaret).

Finds 9, 10 and 11 are in similar types of locations to the previous eight sights i.e. on major water bodies, lakes etc. The Oranmore find may throw some light on the cultural context of some of the very large volumes of stone axes found on the shores of Galway Bay around Tawin island. Some of these may be Mesolithic as it appears that the natural shape of the pebble is being exploited and it appears that this opportunistic use of pebbles may be more a feature of Mesolithic than Neolithic axes.

Nucella lapillus and the Pre-Historic World

The use of *Nucella lapillus* (Dog Whelk) in the Mesolithic has been highlighted by Woodman et al (1999) in their excavations at Ferriter's cove where, unusually, it dominates several of the midden deposits. The deposits were originally considered to have developed as a result of the collection of edible shellfish but an altogether different interpretation is worth considering. This would take into account the less directly utilitarian potential of this shellfish, one not considered by Woodman et al (1999) in spite of the incongruence of their dominance at Ferriter's cove. The vivid purple dye known as Purpura, much valued in another and much-later cultural context by the Phoenicians, Roman and the early Irish, can be extracted from *Nucella Lapillus*.

Purple dye, Tyrian Purple or the *Vera Purpura*, was valued in the Middle Ages as a badge of rank and was used for clothing for Popes, Cardinals and Emperors. We know from excavations of Mesolithic sites such as the burials at Vedbaek in Denmark and from the discovery of individual stone artifacts such as those from Mas d'Azil in Southern France that the use of vibrant colour (red ochre in this case) was an integral part of burial and ritual traditions in some areas during the Mesolithic. It is not too far-fetched to suggest that other colours might also have been used for ceremonial and ritual purposes and that the extraction of Purpura may have been an important component of the Mesolithic activity at Ferriter's cove. We might also consider a slightly more outlandish hypotheses. Perhaps the hunter-gathers at Ferriter's Cove and perhaps elsewhere were removing large numbers of Dog Whelks due to their predatory and cannibalistic behavior towards other, more valuable and succulent, shellfish in an early example of Irish mariculture.

Mesolithic Settlement in West Connacht

Mesolithic Material has now been identified from a wide range of sites in western Connacht with material being identified on the major river and lake systems. The Corrib river area stands out as an area of outstanding importance for looking at both Mesolithic settlement and the Mesolithic/Neolithic transition as well as an interface zone between the marine and lacustrine environments. The location bias, would suggest that the Lough Corrib catchment area was a major population centre, in the later Mesolithic period at least. This is unsurprising when one considers the fact that it is the second largest lake system in the country and possesses large salmon stocks. The identification of Mesolithic material at the mouths of a number of small streams and rivers, at Bellderg, Burrishroole and Streamstown highlights the presence of Mesolithic population centres on even minor river systems. In the case of Bellderg this is true even in an area with an extremely limited resource base. Most sites except the Bellderg site would seem to have a wide range of marine and land based resources and would have been able to maximise these due to the large intertidal zones that exist around many of them. The discovery of Mesolithic material at Lough Lannagh on the upper reaches of the Moy system is also significant as this river drains much of north central Connacht and is the most prolific salmon river in Europe today. This is likely to be indicative of Mesolithic activity right along the river system to the coast at Killala bay.

The later Mesolithic sites on the short stretch of the river Corrib offer perhaps the best opportunity for identifying a major Mesolithic base camp given the wide range of fishing, foraging and hunting opportunities available on Lough Corrib itself and on inner Galway Bay. The sheer volume of prehistoric artefacts from the Corrib area is paralleled by a similar concentration of finds from inner Galway Bay some of which are possibly of later Mesolithic date. The finding of the Bann Flake at Oranmore confirms that there was a human presence here in the late Mesolithic and this makes it more likely that much of the Tawin Island material may also be Mesolithic in origin. Research could usefully be focused on the three mile stretch of river between the Corrib and the sea. The cultural context for the very large number of artefacts recovered already from what appear to be intact, although now submerged and eroding, settlement horizons on the bed of the river Corrib between Wood Quay and Menlough Castle.

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5. Upcoming Events

Irish Geological Association Fieldtrip

Michael Philcox is leading a fieldtrip for the Irish Geological Association in April on the topic of "*Glacial Lake Blessington: deltas, outflow and downstream deposits*". The fieldtrip will take place on Saturday & Sunday, April 24th-25th. Meet in front of the Downshire House Hotel at 10 a.m. Saturday. Enquiries to Michael Philcox, 045-865 535 or mphilcox@tcd.ie. IGA non-members welcome.

An abstract on this topic has recently been published in the IGA Newsletter and they have kindly agreed to allow us to include it in this newsletter

Glacial Lake Blessington: deltas, outflow and downstream deposits

Michael Philcox

At an the early stage in the north-westward retreat of the last icesheet the ice front stabilized for a time along the line of the Slievethoul ridge (west of Blessington and Brittas) and blocked the Liffey in the Poulaphuca area, to form Glacial Lake Blessington. Lake level was controlled by

the col at Toor Glen (277 m O.D.), whence water drained southwards between the ice and mountains towards Baltinglass. Melt-water from the ice, and streams coming off the mountains built a number of deltas into the lake, of which the largest lies just north of Blessington.

The Blessington delta complex consists of the following major parts:

1. The Delta Facies: a Gilbert-type delta with top-, fore- and bottom-set deposits some 60 m thick.
2. The Deerpark Facies: Notably varied deposits from laminated clays to boulder gravels in close juxtaposition and locally highly deformed. This facies lies NW of the delta and post-dates it. It formed as the static, sediment-laden ice on the ridge melted in situ.
3. A narrow "Transition Zone" between the Delta and Deerpark Facies consists of cross-cutting fine gravels and sands in sediment cones and ridges, which grade upwards and outwards into delta foresets. Low-angle thrusts and beds that have prograded up the back of the ridges reflect the close proximity of the ice front. The Transition Zone represents the initial, subsaqueous fan stage of delta development.
4. Carnegie's Channel: both Delta and Deerpark Facies are cut across by a channel 30 m deep, which was eroded during a fall in lake level due to temporary retreat of the ice at Poulaphuca. The channel was subsequently completely buried by younger deltaic sediments.
5. In the lower ground closer to Blessington there is an earlier suite of ice-proximal deposits, lying directly on bedrock, including probable deltaic beds and a 3-m till. Deformed beds, including multiple thrust sheets, are truncated by an unconformity at the base of distal bottomsets of the main delta.

Water draining from the lake cut a number of ice-marginal and sub-glacial channels in bedrock downstream from Toor Glen, including Hollywood Glen. Further south, where the ice diverged away from the mountains, the streams built a series of river terraces and flat-bottomed channels in open ground. In the Whitestown area alluvial and lacustrine deposits lie beneath the terraces, and formed when temporary obstructions further south controlled a higher base level than today's. Flood deposits at the bottom include granite boulders >1 m across, which may have been derived from the Hollywood area during channel-cutting.

Update on Proposed QRA Annual Field Meeting 2005 to Western Ireland (joint with IQUA)

Late March /early April 2005

Organisers: Michael O'Connell and Pete Coxon

Check out the IQUA guide available as a pdf file at http://www.tcd.ie/Geography/PC_04.html to give you an idea about the content of one day of the proposed trip.

Location/Accommodation venue: Galway City. A vibrant and fascinating place to stay with a myriad of cheap hostels and restaurants. Check out <http://www.galway.net/>

It is hoped that the main group can be accommodated at one hotel (cheaper accommodation can be sought out in, for example, Salthill on the western suburbs –but we will check this out) whilst postgrads and others financially challenged can seek hostel accommodation

<http://www.galway.net/galwayguide/acc/hostel/>

Travel. Participants from the UK can fly direct to Galway from a number of UK airports. This will change over time but at present this is a viable option from Manchester and Luton. The alternative is to get on a ferry/plane to Dublin and catch the Galway train/bus. Inexpensive.

Provisional Outline

Day 1: Arrive in Galway. Orientation.

Day 2: The Burren.

Day 3: Limestone lowlands north of Galway City, drumlins on the outskirts.

Day 4: Connemara.

Day 5: To be decided

6. Current Research

Early Mesolithic features at Hermitage, Castleconnell, Co. Limerick

Tracy Collins & Frank Coyne

T.Collins@ucc.ie

Aegis Archaeology Limited undertook an archaeological excavation of several features in 2001 in advance of a new rising water main project for Limerick County Council, adjacent to the River Shannon at Hermitage. The features were initially found after a phase of test trenching

(in an area approx. 400m by 10m) by the archaeological unit of Limerick County Council.

While archaeological features from all periods of Irish prehistory were excavated (Neolithic, Bronze and Iron ages) as well as several post-medieval features, the most unusual dated to the Early Mesolithic period.

Three cremation pits with varying amounts of cremated remains were excavated and subsequently dated to the Early Mesolithic period. Burial pit A was the most impressive. It was a sub-circular pit, with a basal posthole, cut into the natural boulder clay. This pit contained a well-processed cremation, weighing 1979g and represented a single adult (probably male). A large stone axe blade down was deposited in the pit, set against a possible post that would have stood in the basal posthole. Two burnt microliths were found within the cremation remains. A radiocarbon date was returned for this feature of 7550-7290 cal. BC (Beta 177370).

Cremation B was deposited in a larger pit, measuring over 2m in diameter. The cremation, weighing 179g, represented a single adult individual of indeterminate sex. A radiocarbon date of 7030-6630 cal. BC was returned (Beta 177369). The final cremation feature, C, did not yield enough cremated bone to facilitate analysis. The pit returned a radiocarbon date of 6610-6370 cal. BC (Beta 177377).

The artefactual evidence from the site is substantial. Twelve stone axes, including an adze axe were recovered as well as over a hundred pieces of worked flint and chert. Chert is local to this Limerick region and flint can be sourced from the gravel riverbed of the Shannon in pebble form.

It is clear from the excavations that this site was used intermittently over a long period of time. The strategic location of the site on the left bank of the Shannon has a twofold benefit for the occupants. They controlled a fording point across the Shannon and also a diverse catchment area for food and other resources, leading right into the interior of the country via Ireland's Longest river.

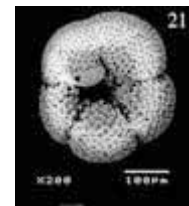
In regard to the Mesolithic material from Hermitage, to date it is unique to the Irish archaeological record. Deliberate burials of the early Mesolithic are extremely rare, with only a few examples from Britain being recorded. In Ireland the burial evidence for this period is sparse with occasional human remains been found in shell middens, or caves. Cremations are known from the Later

Mesolithic period in Europe, predominately southern Scandinavia.

The features from Hermitage show a sophisticated and highly developed treatment of the human remains. The ritual deposition of stone axes may also have begun in the Early Mesolithic period, rather than in the Neolithic. These features at Hermitage illustrate the importance of ritual in the lives of Early Mesolithic peoples, an activity, which has been difficult to demonstrate in the archaeological record until now.

The writers wish to acknowledge Limerick County Council's funding of the excavation, and their colleague Ms L. Lynch, osteo-archaeologist, Prof. G. Cooney and Prof. P.C. Woodman for specialist analysis. They also wish to thank IQUA for the opportunity to present this information.

Foraminifera Researchers in Ireland



Recent surveys have shown that deep-sea ecosystems possess an unexpectedly high species abundance and diversity. The deep seabed off Ireland's Atlantic seaboard supports an amazing abundance and variety of life including cold-water corals, sponges, sea slugs, sea urchins, starfishes, deep-water fishes and many other benthic organisms. In 1998, researchers from the University College Cork found cold-water coral reef structures some 350m high and several kilometres across at depths of up to 900m along the shelf edge west of Ireland. These seabed mounds are composed of deep foram sand sediments (the microscopic shells from trillions of dead phytoplankton).

Two foraminifera researchers now working in Ireland include Dr. Robin Edwards (Depts. Geography & Geology, TCD) and Dr. Angela Hayes (Dept. Geography, MIC-University of Limerick). Both are marine micropalaeontologists, specialising in

quantitative palaeoenvironmental reconstructions using planktonic and benthic foraminifera. A brief outline of current research projects and some recent publications are included below.

Dr. Robin Edwards (Depts. Geography & Geology TCD)

edwardsr@tcd.ie

Current Research: *Holocene sea-level change and glacio-isostatic adjustment in Ireland*

Postglacial relative sea-level records from Ireland are unique, reflecting a delicate balance between rising ocean level and glacio-isostatic adjustment. Quantifying these changes is an essential component of coastal analysis and management. Irish relative sea-level changes are currently poorly constrained in time and space due to a lack of quantitative data. This project seeks to redress this situation by collecting new, high-resolution sea-level data from western Ireland. These will be used to validate a new geophysical model capable of predicting patterns of Irish relative sea-level change, and evaluating parameters employed in ice and Earth models. This research is funded by an Enterprise Ireland Basic Research Grant

Edwards R.J. (2003) Constructing chronologies of sea-level change from salt-marsh sediments
In: Buck C.E., Millard A.R. (eds.) *Tools for Constructing Chronologies: Crossing Disciplinary Boundaries*. Springer Verlag (London) Ltd. pp 191-213.

Horton B.P., **Edwards R.J.** (2003) Seasonal distributions of foraminifera and their implications for sea-level studies. *SEPM Special Publication 75* 21-30.

Dr. Angela Hayes (Dept. Geography MIC-University of Limerick)

angela.hayes@mic.ul.ie

Current Research: *Reconstructing Mediterranean paleoenvironments from fossil faunal counts*

The Mediterranean Sea being a semi-enclosed basin with well-constrained hydrological balance is an ideal ground for testing mesoscale climate- and ocean circulation models. During the last glacial cycle the Mediterranean has experienced several episodes of oceanographic conditions markedly different from today, including periods of sapropel formation. These intervals represent true no-analog conditions and may serve as ideal modelling targets to test reliability and robustness of the numerical models. For this purpose, detailed two-dimensional maps of ancient sea-surface properties must be developed. This project uses an advanced computational technique – Artificial Neural Networks (ANN) – to reconstruct paleotemperature and paleosalinity of the Mediterranean at several time-

slices from relative abundance data of planktonic foraminifera. This technique has shown a great promise in providing more reliable paleoestimates than any of the conventional computational techniques. We believe that it will allow us to develop a more accurate picture of the ancient Mediterranean than ever before and provide much more reliable and comprehensive target for testing numerical climate models.

Hayes, A., Kucera, M., Kallel, N., Sbaffi, L., Rohling, E.J. (in press) Glacial Mediterranean sea surface temperatures reconstructed from planktonic foraminifera. (*Quaternary Science Reviews*)

7. Postgraduate Research

Meriel McClatchie (m.mcclatchie@ucl.ac.uk)

PhD candidate at the Institute of Archaeology, University College London.

Supervisors: Dr. Dorian Fuller & Prof. Ken Thomas

This thesis will investigate arable agricultural systems of Bronze Age Ireland, based primarily on evidence from the macro-remains of cultivated plants. Limited research has been previously carried out in this area, usually focusing on the types of crops that were cultivated. Previous studies have suggested that barley was the dominant crop of this period, with wheat playing a very minor role in arable economies at this time. Arable agriculture has been interpreted, or often merely assumed, as being carried out on a localised subsistence level, while inter-community arable production and trade was not seen to be a significant element of farming-based economies at this time. Much of this evidence was based on seed impressions in ceramic vessels. The collation for this thesis of data on plant macro-remains from Bronze Age sites represents the first study of arable agricultural systems in Bronze Age Ireland based mainly on actual plant macro-remains. Data from most of the sites were obtained from previously analysed, but mostly unpublished, assemblages. Plant-macro-remains have also been examined and identified from a small number of additional sites. Using this newly expanded database, this thesis will examine the types of crops that were being cultivated, as well as exploring issues relating to how crops were being cultivated and who they were being cultivated for.

This research is funded by the NUI Travelling Studentship in Archaeology.

Long-term environmental change in lower Lough Corrib and its catchment: a multidisciplinary palaeoecological study

Ann Bingham (ann.bingham@nuigalway.ie)
 College: Department of Botany, NUI, Galway
 Supervisor: Prof. Michael O'Connell

Lough Corrib, the largest freshwater body in the Republic of Ireland, is noted particularly for its fishing, wildlife and wetland habits and so has attracted considerable scientific research, particularly as regards its present-day limnology. The present project is the first serious attempt to document long-term changes - both natural and anthropogenic - in Lough Corrib and its catchment. The project involves pollen and macrofossil analyses, and stable isotope investigations on thick marl and peat deposits in the lower Corrib basin with a view to reconstructing, as comprehensively as possible, palaeoenvironmental change over the course of the post-glacial. Special attention is being paid to limnic changes, including lake levels and trophic status, and also the effects of climate change and human activity on the limnic and terrestrial environments.

Funding: EPA, Environmental RTDI Programme 2000-2006, Phase 3.

- **Anthony Brooks (TCD)** Holocene sea-level change and glacio-isostatic adjustment in Western Ireland.
- **Francis Ludlow of TCD** The use of the Irish Annals as a source for the study of climate and climate change.
- **Elizabeth McNicholas (UCD)** Geomorphology of the Slaney River.
- **Barry O'Dwyer (TCD)** An examination of recent environmental change in the Lough Tay.
- **Rod Teck (NUI, Maynooth)** Changes in the location and frequency of intense North Atlantic winter storms: the confounding anthropogenic factor.
- **Peter Wise (NUI, Galway)** Penetrating the past: Recognition of hidden archaeological monuments and landscapes using a GIS and synthetic aperture radar.

Thinking of Publishing?

Irish Geography is the premier peer-reviewed journal devoted to the geography of Ireland. It is published by the Geographical Society of Ireland (GSI) since 1944 (<http://www.geographical-society-ireland.org/>).

The scope of the journal is wide and the only criterion (other than quality) is that papers deal substantially with some aspect of the geography of Ireland. Papers from 2000 printed in *Irish Geography* are made available on the web in PDF format.

<http://www.geographical-society-ireland.org/>

8. Postgraduate Notices

Irish Postgraduate Training Consortium for Geography

The 5th Irish Postgraduate Training Consortium (IPTC) for Geography took place in Glencree, Co. Wicklow on the 20-22nd February 2004. A total of 40 geography postgraduate students attended. The largest ever proportion of physical geography students (25%) were in attendance reflecting a welcome upsurge in the discipline. The weekend was organised by Rob Kitchen (NUI Maynooth) and Denis Lenihan (UCC) with additional inputs from geography academic staff from UCD, TCD, NUI Galway, MIC Limerick, GMIT, AICH, and four international visitors.

Some examples of students embarking on the initial stages of their projects include:

9. Recent Publications

The PAGES PEPII (Australia-Asia transect) synthesis work is now being advertised on the QI website as published:

J.R.Dodson, **D.Taylor**, Y.Ono, P.Wang (eds) (2004) *Climates, human, and natural systems of the PEPII transect*. Quaternary International. Volumes 118-119

10. News items

New Geosciences Committee

The Royal Irish Academy (RIA) has recently adopted a Strategic Plan with the aim of modernising its various functions and assisting it to better deliver on its core mission to promote research and scholarship. An important part of this plan involves the invigoration of its network of National Committees. Towards this end, several new multi-disciplinary committees are being created, replacing older committees and with terms of reference which will ensure that they can act quickly and effectively in pursuit of their agenda.

As part of this strategy, the Academy is establishing a new Geosciences Committee which will replace the National Committee for Geophysics and Geodesy and the National Committee for Geology. Invitations were sent out nationwide for expressions of interest and to be included on the electoral register. Approximately 200 expressions of interest were received by the closing date of Feb. 25th 2004.

The Academy is now inviting nominations for election to its Geosciences Committee. All persons who are entered on the Electoral Register are eligible to nominate or be nominated for election. Valid nominations must be received on this occasion in the Academy by email (r.gageby@ria.ie) by noon on Tuesday 30 March 2004.

A summary of the terms of references of the Geosciences Committee are outlined below:

The Geosciences Committee of the Royal Irish Academy

1. Aims of the Committee

- Advise the Academy on formulation of policy at national, European and international levels
- Contribute to areas of strategic importance, especially research priorities, at national, European and international levels
- Address, in a proactive manner, issues of public concern relevant to its expertise
- Foster excellence in the Geosciences throughout the island of Ireland
- Promote co-operation with other subject areas and be represented on the Board of Science

- Sustain and exploit linkages with relevant international unions
- Promote and support education in the Geosciences

2. Membership of the Committee

The Committee will be comprised of:

- (1) eight members elected through the process described above.
- (2) one member each from ICCG, and the Academy's committees of Geography and Astronomy
- (3) up to two members nominated by the Council of the Academy; and
- (4) such other members, up to a maximum of four, as may be co-opted by the Committee

3. Term of Office

Membership of the Committee will be for a four-year term.

The following is the list of persons/organisations who were requested to circulate the invitation to register to interested persons:

The Deans of Arts, Engineering and Science at each of TCD, UCD, NUI-Cork, NUI-Galway, QUB, UU.
 The Director of each Institute of Technology
 The Directors of the GSI and the GSNI
 The Directors of Met Éireann and the NI Weather Service
 The Institute of Geologists of Ireland
 The International Association of Hydrogeologists (Irish Group)
 Institute of Petroleum
 Royal Dublin Society
 Ordnance Survey
 Dublin Institute for Advanced Studies
 Enterprise Ireland
 Museum (Roi and NI)
 Teagasc
 Irish Mining and Quarrying Society
 Irish Geological Association
 Irish Association for Quaternary Studies
 Irish Association for Economic Geology

International Polar Year (IPY)

An International Polar Year (IPY) has been declared for 2007-8 and a Planning Group, chaired by Prof. Chris Rapley (BAS) and Dr Robin Bell (Lamont), was formed in early 2003

by the International Council for Science Unions (ICSU) in Paris (<http://www.icsu.org/>). Ideas were solicited from national committees and the broader scientific community in September 2003, in response to which 140 submissions were received on the designated overarching themes of Change, Exploration and Decoding Polar Processes. A second call was issued in February 2004, in advance of a Planning Group meeting in Paris on 1-3 April, where an outline Science Plan will be developed "to articulate the overarching science questions to be addressed in the IPY". The Science Plan will be circulated for discussion and feedback at international meetings, prior to a meeting in September 2004 at which a Final Science Plan will be established and the Planning Group replaced by an International Implementation Group.

Ireland is a member of the ICSU through the Royal Irish Academy.

New Member - Royal Irish Academy

Pete Coxon and the IQUA Committee would like to convey the congratulations to Prof. Marshall McCabe who was elected as a Member of the Royal Irish Academy (MRIA) at the Academy Stated Meeting on 16th March 2004. Marshall's work is known to all of us and he has been elected on the basis of his renown research in Quaternary studies and in particular in acknowledgment of his internationally famous studies on Irish glacial geomorphology, geology and sedimentology.

Pete Coxon

11. Forthcoming Conferences & Workshops

TRACE-meeting (Tree Rings in Archaeology, Climatology and Ecology), 22 - 24 April, 2004
Birmensdorf, Switzerland
<http://www.wsl.ch/land/dynamics/TRACE2004/TRACE2004Homepage.ehtml>

PAGES Open Science Meeting

The PAGES Open Science Meeting (scheduled for May 2004) has been postponed to August 10 - 12, 2005.

AGU/CGU 2004

Montreal May 14th to 17th, 2004.
<http://www.agu.org/meetings/sm04/program.shtml>

Paleosols: memory of ancient landscapes and living bodies of present ecosystems

7-11 June 2004, Florence, Italy
<http://www.issds.it/paleo/>

International Palynology Congress.

Granada July 4-9 July 2004
www.11ipc.org/

Climate Change and Aquatic Systems, Past, Present & Future

21 - 23 July, 2004 University of Plymouth, U.K.
<http://www.biology.plymouth.ac.uk/climate/climate.htm>

The International Congress of Limnology (SIL) congress to be held in Lahti, Finland, 8-14 August 2004

<http://www.palmenia.helsinki.fi/congress/SIL2004/>

32nd International Geological Congress (32IGC)

20 - 28 August, 2004, Florence, Italy
<http://www.32igc.org/default1.htm>

International Symposium On Arctic Glaciology

23 - 27 August, 2004 Geilo, Norway
<http://www.pages.unibe.ch/calendar/2004/geilo.html>

The past, present and future of Ireland's Native Woodlands Galway-Mayo Institute of Technology, Galway City, 8th - 11th September 2004

International conference for Quaternary Geology (DEUQUA). August 30th to September 3rd 2004 in Nijmegen, The Netherlands
www.deuqua.de

International Conference on Paleocyanography VIII

6 - 10 September, 2004 Biarritz, France
<http://www.icp8.cnrs.fr/>

Workshops

Chironomid Workshop to be held in Barcelona (Spain) on May 13th and 14th, 2004.
Contact: mrriadevall@ub.edu

12. Training Courses

Stable Isotopes and Environmental Change

(Dr Melanie Leng, *NERC Isotope Geosciences Laboratory, Keyworth*, Dr Mark Maslin and Professor Tim Atkinson, *Earth Sciences, UCL*), 15th - 19th March 2004

Introduction To Diatom Analysis

(Dr Viv Jones and Professor Rick Battarbee) 7th - 11th June 2004

Quantitative climate reconstruction and data-model comparisons. ESF-HOLIVAR training course. Monday June 21st to Friday July 2th, 2004. Ghent University, Ghent, Belgium

Research Experiences for Undergraduates at the Department of Geosciences at the University of Arkansas USA (sponsored by the National Science Foundation) for Summer 2004. Details of this program are available online at <http://www.uark.edu/depts/geology/geos-reuinfo.htm>

and landscape evolution, vegetation history and human/environment relations, sediment dating, ice sheet dynamics and high-latitude environmental change.

For informal discussion in confidence about the post, please contact Professor Ash Amin, Head of Department - telephone +44 (0) 191 334 1850, Email Ash.Amin@durham.ac.uk.

Closing date for the receipt of applications is 14 April 2004. Further details and an application form are available on our website: <https://jobs.dur.ac.uk>, telephone 0191 334 6499, or fax 0191 334 6495.

Postdoctoral position is available for a diatomist in the Department of Geosciences, University of Nebraska. To apply, please send a curriculum vitae, a statement of research interests and goals, and arrange to have 2 letters of recommendation sent to: Dr. Sheri Fritz, Department of Geosciences, University of Nebraska – Lincoln, Lincoln, NE 68588-0340. For additional information, please contact Dr. Fritz by email at sfritz2@unl.edu or by phone (402-472-6431).

13. Job Opportunities

Two Posts in Quaternary Environmental Change

Department of Geography, University of Durham

The successful Quaternary applicants will contribute to one or more of the Quaternary Environmental Change research group's areas of activity which are: with sea-level change and coastal evolution, climate history from marine records, fluvial archives

IQUA Sponsors

http://www.nhm.ac.uk/	http://www.roadstone.ie/	http://www.gsi.ie/	http://www.epa.ie/
			