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# IQUA

Cumann Staidéar Ré Cheathartha na h-Éireann

Irish Association for Quaternary Studies

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## Introduction

In this issue we have details of the most recent IQUA events. These include accounts of the Annual Symposium in November, the joint IQUA/IGA lecture in February and of course the AGM/Discussion Meeting which took place in March.

We also have details of the next two IQUA happenings. The first is a one day field meeting to be organised by Mike Philcox and the second is the Annual Field Meeting which this year is to be centred in the Midlands and will be organised by Fraser Mitchell and Cathy Delaney.

With the Spring issue also comes the reminder that its subscription time of year - again. Please note that the year shown on the top right of the Newsletter address label shows the year for which the subscription was last paid!

I am sure that many members will be participating in interesting field events/discussion meetings over the summer period which other IQUA members would be interested in. Any member wishing to contribute to the next Newsletter should send their material to me by September 30th.

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## IQUA Annual Symposium 1996: Human Interactions with the Irish Quaternary

The 1996 annual symposium in the GSI, Beggars Bush drew from a range of Quaternary disciplines including archaeology, ecology, palaeoecology, and hydrology. Speakers came from both Ireland and Britain.

Interaction by humans with the Quaternary environment in Ireland was the topic of interest, and the audience was presented with diverse material which spanned all time periods from the Mesolithic to modern Ireland.

**Peadar McArdle**, director of the Geological Survey of Ireland welcomed the speakers and audience.

**Fraser Mitchell**, the symposium organiser, presented an introduction to the Quaternary environment in Ireland, stressing the need to differentiate between human impact and climatic impact. Climatic changes in Ireland during the Holocene were probably more pronounced than the ice cores would suggest.

**Kevin Edwards**, the keynote speaker, presented an overview of the Mesolithic in Scotland, his current research in Uist, Shetland, Lewis and Orkney, and the problem of interpreting the pollen and charcoal records. The question of charcoal being a product of climate or of human activity was discussed. Humans would have had to adapt their behaviour as forests developed. Forests may have prevented the machair from moving inland until they were cut down. Much evidence of forest cover and early human activity may have subsequently been lost through soil erosion.

**Michael O'Connell** presented a paper on landscape development in NW Connemara and NW Mayo. Evidence exists in pollen diagrams from both regions for human impact from the Neolithic to the Christian era. Indicators of both arable and pasture occur. There is a clear landnam phase in the Neolithic and a lull in human impact during the Iron Age. These events are common to all the sites, but are not synchronous.

**Billy O'Brien** gave a talk on mining for copper in the past and its impacts on the environment. Methods used included firing of rock and the subsequent use of charcoal for smelting. This must have consumed a lot of timber. The site at Ross Island was used to illustrate the mining process at this time.

**Tim Mighall** talked about pre-historic mining culture at Mount Gabriel in Co. Cork. This area supported mining from approximately 3500–3100 BP, but unlike other sites in the region, there is no apparent impact on regional forest cover during the mining episode. There is no evidence of smelting at the site. Forest

decline only occurs after the mining has been completed, and was associated with agriculture and an expansion of bog taxa. Whether this result really reflects occurrences at the mine is the subject of further study.

**Aidan O'Sullivan** introduced the rich world of archaeology in the Shannon estuary. A thin sided poplar-wood canoe from the environs of Bunratty was found, and has been dated to the late-Mesolithic. It is unique in Ireland and is similar to Danish examples. Bronze age material in the estuarine sediments included wooden stakes, posts and a trackway, which were submerged by peats, and subsequently by estuarine sediments deposited by the rising sea-level. Medieval fish-weirs have been found in several locations and are related with medieval settlement on the estuary. The area is very rich archaeologically and was probably intensively managed and inhabited in the past.

**Barry Raftery** spoke about the large numbers of trackways known from Irish bogs. Some of the constructions are very complex, such as that at Corlea Bog, while others are simple and utilitarian. The geographical distribution of these constructions is widespread, but temporal distribution is quite restricted. Most toghers are from the early to late Bronze Age, and these are found throughout Ireland. Very few date from after this time. The trackways also provide evidence of woodland management. Younger trackways may have been destroyed while older trackways may yet be discovered, as Bord na Móna continue harvesting peat.

**Mick Monk** spoke about the interaction between medieval societies and the environment. Ring forts are associated with a time of change

in Ireland, and are loosely grouped on better soils. Woodlands declined and agriculture expanded, possibly with the introduction of new technologies. There is evidence for a variety of animals and crops being farmed at this time.

**Valerie Hall** gave a talk about the vegetational changes of the middle ages and the lack of information for areas such as Fermanagh and Leitrim. Documentary records from this period are heavily relied on, as sedimentary records within convenient distance of human settlements have often been damaged. Conventional dating of the changes found in pollen records from the remaining peatlands is difficult, but using tephrochronology or dendrochronology it is now possible to assign relatively accurate dates to major vegetation changes. In Northern Ireland these records reveal much activity in the early medieval with considerable impact on lowland forests although documentary evidence of large-scale agricultural expansion is not available.

**Paul Dowding** presented a paper on the current state of Irish peatlands, and in particular how the areas of peatland which were previously being exploited are being managed. While a few raised bogs are now being conserved, most new exploitation of peat is now occurring on blanket bog. Management of the cutover areas is difficult. The time required for plant propagules to reach the centre of large cutover areas is considerable. A consistent long term policy will be needed to reclaim these desert areas.

**Dónal Ó Suilleabháin** outlined the processes involved in the selection of suitable landfill sites. This involves studying the aquifers in the area and the potential for contamination. A controversial topic.

Three posters were presented at the symposium. Kevin Barton, Yvonne Brennan, Joe Fenwick and John Waddell presented new geophysics data from the Rathcroghan/Carnfree site in Co. Roscommon. Tom Cooney and Fraser Mitchell presented some of their work from the Ross Island site in Co. Kerry. Alyson Heery presented techniques for examining finely laminated sediments and some of the results obtained through their application at a lake site in central Ireland.

This was an extremely successful and well attended symposium. Congratulations are due to the organisers of the symposium in particular Fraser Mitchell. Thanks also to the speakers and the GSI.

**Andrew Connolly and Sebastian von Engelbrechten** (Department of Botany, TCD)

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## Joint IQUA/IGA Lecture

The joint IQUA/IGA lecture entitled *Dendrochronology Opens the Door on Environmental Triggers: Humans Feel the Draft* was given by Professor Mike Baillie at the Geological Survey of Ireland and in the Department of Geology, University College Galway. This thought-provoking and entertaining lecture was well attended at both venues, however for the benefit of those who could not attend the abstract is included below.

### Abstract

Although dendrochronology in Belfast was developed to allow calibration of the radiocarbon time-scale, the bonus has been a year-by-year record of mean Irish Oak growth

for the last 7,500 years. To this can be added equivalent precisely-dated tree rings from England, Germany, Fennoscandia and America, with new chronologies coming on line all the time. We can now interrogate trees as to what they thought of past conditions on a macro scale. The answer is that when trees suffered in the past, human populations also suffered. This implies that some severe environmental downturns affected both trees and humans. The question is: what caused the environmental downturns? That question opens a veritable Pandora's box, because it shows that we know almost nothing about the causes of abrupt environmental change. The talk will explore the hazards associated with volcanic activity, cometary and undersea outgassing. Not suitable for those of a nervous disposition!

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## **IQUA Annual Discussion Meeting 1997 - Abstracts of Papers**

### **The PEP III Transect: what's in it for Ireland?**

**Fraser Mitchell, Department of Botany,  
Trinity College Dublin**

The PANASH project has been established within PAGES, a core project of IGBP (see description of acronyms below). PANASH represents the organisational vehicle to implement research on interhemispheric climatic mechanisms and coupling. This will be conducted on a series of PEP (Pole-Equator-Pole) transects. The PEP III transect runs through Europe and Africa. Ireland is located at the western margin of the northern part of PEP III. This paper will report on the proposed

activities within PEP III and outline some of the contributions that Ireland can make.

PEP III activities are divided into two time streams: **Time Stream 1**: Seasonal to century-scale climatic variability over the last 2,000 years and **Time Stream 2**: Climatic dynamics over the last two glacial/interglacial cycles. The scope for research in Ireland into Time Stream 2 is extremely limited but substantial opportunities arise within Time Stream 1.

The rationale behind PANASH was reviewed by Bradley *et al.* (1995) and details for PEP III were proposed by Gasse (1995). A PEP III workshop in Paris (Sept. 1996) identified research priorities and formulated data acquisition protocols. The report from this workshop will be published shortly by PAGES.

All PAGES publications are available from:  
PAGES Core Project Office, Bärenplatz 2, CH-3011 Bern, Switzerland  
e-mail: pages@ubeclu.unibe.ch

#### Acronyms:

IGBP: International Biosphere - Geosphere Programme  
PAGES: Past Global Changes (IGBP)  
PANASH: Palaeoclimates of the Northern and Southern Hemispheres  
PEP: Pole - Equator - Pole

#### References:

- Bradley, R.S., Dodson, J., Duplessy, J-C., Gasse, F., Liu, T-S. and Markgraf, V. (1995). PANASH-PEP science and implementation. In: *Palaeoclimates of the Northern and Southern Hemispheres*, pp1-22. PAGES series 95-1.
- Gasse, F. (1995). PEP III: the Afro-European Transect. In: *Palaeoclimates of the Northern and Southern Hemispheres*, pp 65-88. PAGES series 95-1.



## Late Quaternary vegetation history of the Sierra de Urbión, Spain

Sebastian von Engelbrechten, Department of Botany, Trinity College Dublin

The Sierra de Urbión is located in the Northern Iberian Mountains. *Quercus pyrenaica*, *Pinus sylvestris*, *Fagus sylvatica* and *Erica arborea* are the dominant elements in its vegetation today. Palaeoecological investigations of two sediment sequences are used to reconstruct the vegetation history of the region. The earliest phase recorded is pre-lateglacial in age and consists of herb pollen assemblages dominated by Gramineae and *Artemisia*. The Lateglacial period is characterized by two main phases; an interstadial phase in which *Juniperus* shrub communities were replaced by an open *Betula* and *Pinus* woodland, followed by a stadial phase (Younger Dryas) during which there was a re-expansion of herb communities. The Holocene began with a brief period of *Juniperus* followed by *Betula* and *Pinus*, and at c. 9600 BP by the spread of deciduous *Quercus*. After c. 8700 BP forest vegetation diversified with the widespread expansion of *Corylus* and more local expansions of *Fraxinus* and *Ulmus*. A significant expansion of *Taxus* took place at c. 6600 BP and shortly afterwards the first palynological evidence of human activity in the region is detected. From then on there was a progressive intensification of human influence in the region. The later part of the Holocene is marked by the spread of *Fagus* and ericoid taxa, especially *Erica arborea*, and in the most recent period, especially since the time of Roman occupation, vegetation change was marked by an increase in *Pinus*.

## The vegetation history of the Killarney region: a new perspective

Tom Cooney, Department of Botany, Trinity College Dublin

The vegetation history of the Killarney region has possibly received more attention from palynologists than any other area in Ireland. The majority of these studies have however concentrated on the Old Red Sandstone (ORS) areas which occur to the south of Lough Leane. Results from these investigations have demonstrated quite clearly that *Pinus* was a particularly important component of the early Holocene woodlands in the region. In comparison, *Ulmus* pollen values reported are extremely low. Preliminary results from Ross Island and Sheheree Bog, which occur on the Limestone areas to the north and east of Lough Leane, suggest a slightly different vegetation history. In particular the pollen evidence from Sheheree Bog suggests that *Quercus* replaced *Pinus* as the dominant taxon and that *Ulmus* was a significant component of the woodlands on these base rich soils. Although *Pinus* pollen values do not exceed 20% of total pollen throughout the Holocene there is good evidence to suggest that they grew locally at values as low as 3%. The first woodland clearance occurred in the Sheheree area at 3,800±60 BP. This is significant as it occurred at about the same time as the earliest phase of copper mining on Ross Island. This supports the view that there was a supporting agricultural base for the miners on Ross Island.

## **Depositional History of Blessington Delta Complex: Evidence for Oscillating Lake Levels and Ice-Front Positions**

**Mike Philcox, Red Bog, Blessington**

The Blessington delta complex consists partly of a Gilbert-type delta with foresets <60 m high, deposited while Glacial Lake Blessington was at c.280 m O.D. Other facies are present on the iceward side (NW) of the delta. These include the preceding sub-aquatic, ice-contact fan with associated glaciotectionic thrust-fold complexes, which reflect minor oscillations of the ice front. Immediately to the NW, the former ice position is occupied now by the younger, entirely different "Western Facies", characterized by highly irregular, lenticular sediments from poorly sorted boulder beds to interlaminated clays and silts; widespread distorted bedding probably reflects collapse above melting buried ice, and soft-sediment loading. The facies seems to indicate a major phase of ice-melting and rapid sediment dumping.

Both Western Facies and delta foresets are cut by a deep, narrow channel perpendicular to the ice front, "Carnegie's Channel", which seems to reflect a fall in lake level to 240 m O.D. or below. Such a fall might be linked to the preceding melt phase (Western Facies) via the temporary unblocking of the Liffey drainage in the Ballymore-Hollywood area. Lake level was subsequently restored, and both channel and Western Facies were buried by further deltaic deposits. Within these late deposits are two thin (<4 m) clayey diamicts, interpreted as tills, which reflect short-term ice readvances across only the proximal part of the gravel complex.

Following the final fall in the lake from the 280-m level, a set of erosional channels was cut into the surface of the deposit.

### **References:**

- Cohen, J.M., 1979 a. Deltaic sedimentation in glacial Lake Blessington, County Wicklow, Ireland. In: Schlüchter, Ch. (ed.) *Moraines and Varves*, pp 357-367. Balkema, Rotterdam.
- Cohen, J.M., 1979 b. *Aspects of Glacial Lake Sedimentation*. Unpublished Ph.D. thesis, University of Dublin (Geography Department), 3 vols.
- Synge, F.M., 1979. Glacial Lake Blessington. In: *Field Guide to East Central Ireland*, pp 40-48. Quaternary Research Association, April 1979.

## **The Knocknacran interglacial site: preliminary investigations**

**Fraser Mitchell<sup>1</sup>, Andrew Connolly, Pete Coxon<sup>2</sup>, Cathy Hayes<sup>1</sup>, Robbie Meehan<sup>1</sup> & Sebastian von Engelbrechten<sup>1</sup>**

<sup>1</sup>Department of Botany, Trinity College Dublin,  
<sup>2</sup> Department of Geography, Trinity College Dublin, <sup>3</sup> Geological Survey of Ireland, Haddington Road, Dublin

The expansion of the Knocknacran open cast gypsum mine in Co Monaghan has required further excavation of the drumlin that overlies the gypsum deposit. Cutting back the drumlin face in summer 1996 revealed massive timbers embedded in organic deposits at the base of the drumlin. Field examination of the site has identified three separate organic deposits. All three are probably from one original unit that has been sheared glaciotectionically and redeposited prior to or during drumlin formation. Initial

examination of the massive timbers revealed that they are *Taxus* (yew) and smaller fragments of *Quercus* (oak) have also been identified. Leaf, seed and bryophyte macrofossils have also been found in the deposits. Preliminary pollen analysis from two of the organic units indicate temperate climatic conditions. Pollen of *Picea* (spruce) which is characteristic of other Irish interglacial deposits has not been found at Knocknacran. Fragments of a large mammalian tooth and invertebrate remains are preserved at the site. The preliminary biostratigraphy of the organic deposits are unlike any previously described Irish interglacial sites. AMS radiocarbon dating of cellulose extracted from fragments of *Taxus* and *Quercus* have returned dates of >47220 BP and >48490 BP respectively. Funds have been secured to conduct a uranium-thorium disequilibrium dating series this summer. This paper will review the results of the preliminary investigations and outline proposed future work at the site. Site access, facilities and support from Gypsum Industries Ltd. are gratefully acknowledged.

### **Limitations of Irish Palynology**

**Andrew Connolly, Department of Botany,  
Trinity College Dublin**

Ireland is in a favourable position with regard to sites which are potentially suitable for palynological investigation. These include lakes and peat deposits of various sizes, small hollows and other organic deposits (including those dating from the Pleistocene).

A considerable body of work now exists for much of the Ireland consisting of studies over the last 70 years. The development of new

techniques (e.g., dating techniques) and theories relating to pollen analysis (e.g., theory of pollen source areas) makes it difficult to say that the palaeoecology of Ireland is known to everyone's satisfaction.

### Theory

Over the past 30 years or so there have been significant steps to putting the basics of palynology on a sound theoretical base, and towards the empirical testing of the developed theory. This has included explaining the relationship between vegetation proportions, source and pollen deposition (e.g., Davis 1963; Prentice and Parsons 1983; Sugita 1994).

These developments have:

Explained the roles of pollen productivity and dispersal (Prentice 1985);

Established a good relationship between pollen proportions and vegetation (Prentice and Webb 1986);

Explained the effects of depositional basin area on pollen source area (Prentice 1985; Prentice 1988; Sugita 1993);

Highlighted the importance of background pollen for interpreting fossil pollen spectra (Andersen 1970; Webb *et al* 1981; Sugita 1994).

### Problems

Lakes and bogs are not directly comparable in terms of source area (Jacobson and Bradshaw 1981; Sugita 1993). These models define the relationship between modern vegetation and pollen deposition. While it is plausible to assume that a site might not change in size over a given period of time, it is not possible to assume static background pollen deposition (Schwartz 1989). Sites which are much larger than vegetation patch size will give a picture of homogeneous

vegetation when several sites are compared (Sugita 1994). These problems with the theory have effects on our ability to understand changes in Ireland's past vegetation. This talk will deal with some of these, including: changes in basin size; pollen source area and resolution; gaps in our knowledge of past vegetation.

#### References:

- Andersen, S. T. H. 1970. The relative pollen productivity and pollen representation of north European trees, and correction factors for tree pollen spectra. *Danmarks geologiske Undersøgelse, Series II* **96**, 1-99.
- Davis, M. B. 1963. On the theory of pollen analysis. *American Journal of Science*, **261**, 897-912.
- Jacobson, Jr., G. L. & Bradshaw, R. H. W. 1981. The selection of sites for palaeovegetational studies. *Quaternary Research*, **16**, 80-96.
- Prentice, I. C. 1985. Pollen representation, source area, and basin size: Toward a unified theory of pollen analysis. *Quaternary Research*, **23**, 76-86.
- Prentice, I. C. 1988. Records of vegetation in time and space: the principles of pollen analysis. In: *Vegetation History* (Ed. by B. Huntley and T. Webb III), pp17-42. Kluwer Academic Publishers, the Hague.
- Prentice, I. C. & Parsons, R. W. 1983. Maximum likelihood linear calibration of pollen spectra in terms of forest composition. *Biometrics*, **39**, 1051-1057.
- Prentice, I. C. & Webb III, T. 1986. Pollen percentages, tree abundances and the Fagerlind effect. *Journal of Quaternary Science*, **1**, 35-43.
- Schwartz, M. W. 1989. Predicting tree frequencies from pollen frequency: an attempt to validate the R value method. *New Phytologist*, **112**, 129-143.
- Sugita, S. 1993. A model of pollen source area for an entire lake surface. *Quaternary Research*, **39**, 239-244.
- Sugita, S. 1994. Pollen representation of vegetation in Quaternary sediments: theory and method in patchy vegetation. *Journal of Ecology*, **82**, 881-897.
- Webb, T., III, Howe, S. E., Bradshaw, R. H. W. & Heide, K. M. 1981. Estimating plant abundances from pollen percentages: the use of regression analysis. *Review of Palaeobotany and Palynology*, **34**, 269-300.

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### Annual General Meeting 1997

Date: March 22nd Venue: Trinity College Dublin

The meeting which was chaired by F. Mitchell (Chairperson) was attended by 13 members. The minutes of the 1996 AGM were read and accepted as an accurate record of that meeting and signed by the Chairperson.

The Secretary could not be present and the Secretary's report which covered the main items which had arisen over the year was read.

The Secretary had represented IQUA on the RIA National Committee for Geology (NGC). The NCG brochure is nearing completion and each IQUA member will be circulated with a copy.

The secretary reported on the activities of the past year which included the very successful annual two-day field trip to Central Kerry which was well organised by Cathy Delaney and Peter Coxon. The Annual Symposium was on the topic of *Human Interactions with the Irish Quaternary* and was organised by Fraser Mitchell. It was extremely interesting and well attended. The IQUA/IGA Lecture was organised by Fraser Mitchell and was given by Mike Baillie



(Queen's University Belfast). The lecture entitled *Dendrochronology Opens the Door on Environmental Triggers: Humans Feel the Draft* was given in Dublin and Galway and was well attended by Earth scientists, archaeologists and botanists.

On the membership front IQUA currently has 6 Corporate members, 2 Honorary Members, 76 Ordinary members and 22 Student members. The continued support of our corporate members is gratefully acknowledged.

Finally the Secretary thanked all Committee members for their help over the year. He also acknowledged the immense contribution Fraser Mitchell has made to IQUA in his four years as Chairperson.

The Treasurer's report indicated that IQUA is financially healthier than ever mainly due to Corporate membership. The suggestion was made that some money might be used to bring in more keynote speakers from abroad to IQUA meetings. The Newsletter Editor encouraged members to submit items of interest to the group - abstracts of theses, outlines of new postgraduate research etc.

The 1997 Annual Field Meeting is to be organised by Fraser Mitchell and Cathy Delaney and will be to the Midlands. Mayo was one of the suggestions for the 1998 Field Meeting. The possibility of one-day excursions was also considered. Mike Philcox volunteered to lead a trip to Blessington Gravel Pits. Various themes were put forward for the 1997 Symposium including the broad areas of climate change/interglacials.

The Committee's nominations for the 1997 Executive Committee were accepted and are as follows:

Chairperson: Mike Philcox

Secretary: Kevin Barton

Treasurer: Peter Glanville

Newsletter Editor: Karen Molloy

Ordinary Members: Eamon Cody, George Dardis, Andrew Connolly and Robbie Meehan

The outgoing Chairperson thanked all Committee members past and present for help during his years of office. He also acknowledged the role the late Barbara Miller had played in IQUA.

Finally congratulations to Tom Cooney who was awarded a prize for the best postgraduate paper presented at the Annual Discussion Meeting.

**Karen Molloy** (Palaeoenvironmental Research Unit, Department of Botany, UCG)

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## **Forthcoming Events**

### **IQUA One Day Field Trip to Blessington Gravel Pits**

**Leader: Mike Philcox**

**Sunday 1st June 1997**

Meet at 10.30 am at the Downshire Hotel, Blessington, Co. Wicklow. This will be a full day event so come prepared with a packed lunch etc. For information about the gravel pits see the abstract of Mike Philcox's Discussion Meeting presentation.

## **IQUA Field Meeting 1997: The Midlands, 4-5<sup>th</sup> October**

Fraser Mitchell and Cathy Delaney are organising this year's IQUA field trip. The trip will be centred in the Irish midlands and will run on the week-end of 4th and 5th October 1997. Ten years ago IQUA ran a field trip to Offaly and west Kildare (cf. IQUA Field Guide no. 10). The justification for returning to the midlands is that there has been a considerable amount of new palaeoecological, geomorphological and archaeological work carried out since 1987; it is also intended to cover areas to the north and west of the 1987 trip.

The original intention was to use Athlone as an accommodation base but as our field trip clashes with the Ballinasloe Horse Fair, there is no accommodation available there even at this early date. The national ploughing championships will be held in Birr during the preceding week - those of you who travelled from Dublin to last year's field trip in Killarney will recall the frustration of getting on the wrong side of a ploughing championship! Consequently I have moved the accommodation base to Mullingar. The Greville Arms Hotel still has plenty of beds but you are advised to book early. Accommodation details are listed below.

I suspect that some IQUA members will plan to arrive on Saturday morning while others will spend Friday night in Mullingar. Consequently we should meet at the first field site on Saturday morning rather than at the accommodation base. We intend to spend most of Saturday in the Clara area so **we shall meet on the green in Clara village (behind the church) at 10.00**

**a.m. on Saturday 4th October (grid ref.: N 256 327 (7°36'40"W 53°20'30"))**.

The sites to be visited will be covered by OS sheets 12 and 15. You are expected to make your own accommodation arrangements. I list two options below and can forward the B&B listing for the Mullingar area to anyone who wants it.

Greville Arms Hotel, Pearse St, Mullingar. Tel: (044)48563, Fax: (044)48052.

B&B: £33/night(sharing), Evening meal: £8-10, Week-end: £65 (B&Bx2 + one evening meal)

Farrah House Hostel, Bunbrosna, Mullingar. Tel: (044)71446 / 71502. £6.50-8.50/night

Fraser Mitchell  
Botany Dept, TCD, Dublin 2  
Tel. (01) 6081811  
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E-mail: [fmitchll@tcd.ie](mailto:fmitchll@tcd.ie)

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## **RECENT PUBLICATIONS ON QUATERNARY RESEARCH IN IRELAND**

- Dwyer, R.B. and Mitchell, F.J.G. 1997. Investigation of the environmental impact of remote volcanic activity on north Mayo, Ireland, during the mid-Holocene. *The Holocene*, **7**, 113-118.
- Mitchell, F. and Ryan, M. 1997. *Reading the Irish Landscape*. 3rd edn. Country House, Dublin.
- Pilcher, J.R., Hall, V.A. and McCormac, F.G. 1996. An outline tephrochronology for the Holocene of the north of Ireland. *Journal of Quaternary Science*, **11**, 485-494.

- Williams, D.M. and O'Connell, M. 1996. Cave-like tunnels within boulder clay in Galway City, western Ireland. *The Irish Naturalists' Journal*, **25**, 263-266.
- Wilson, P. and Braley, S.M. 1996. Nature, chronostratigraphy and origin of late Holocene coastal sands at Portrush, Co. Antrim. *Irish Geography*, **29**, 96-105.
- Woodman, P., McCarthy, M. and Monaghan, N. 1997. The Irish Quaternary fauna project. *Quaternary Science Reviews*, **16**, 129-159.

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GeoArc Ltd, Coillte Teo, John A Wood Ltd,  
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County Library and Ex Libris, Frankfurt.

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Contributions for the next IQUA Newsletter to be sent to: Dr Karen Molloy, IQUA Newsletter Editor, Palaeoenvironmental Research Unit, Department of Botany, University College Galway

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