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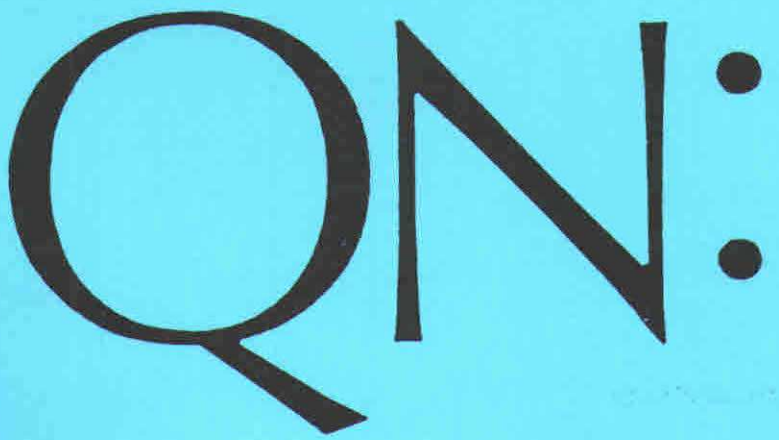

QUATERNARY NEWSLETTER

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Quaternary Newsletter is issued in February, June and November. Contributions comprising articles, reviews, notices of forthcoming meetings, news of personal and joint research projects, etc. are invited. They should be sent to the Quaternary Research Association Newsletter Editor. Closing dates for submission of copy for the relevant numbers are 1 January, 1 May and 1 October.

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Hello everybody!

Beetlemania—and cold climates, past and present

Just prior to Christmas, I took some annual leave and spent it 'working' as an amanuensis with Russell Coope on some arthropod faunas collected by BGS colleagues from sites in Lincolnshire and Scotland. As always, it was a fascinating experience to sit beside Russell as he identified, often faster than dictation speed, the various beetle taxa (and most of these to species, too!) before pronouncing on the palaeoenvironments and palaeoclimates represented by the fossil assemblages.

At times, it was (for Russell, at least) too much like routine—left and right elytra of *Olophrum boreale* or *O. fuscum*, left and right elytra of *Stenus* or heads of *Aphodius*. Then, however, the pace slowed as those specimens thought to be of more significance (like a number of non-British species) were separated out and 30 years of experience was brought to bear on some small fragments of a beast that lived beside a pool or on some open tundra many thousands of years ago.

Then, after careful deliberation, the names of beetles currently indigenous to the northern parts of Fennoscandia and Russia—like *Diacheila polita, Diacheila arctica* and *Agonum sahlbergii*—were announced with some excitement. However, just as a picture of a tundra and uppermost boreal forest zone was beginning to emerge from an analysis of the fossil beetles, so snow showers, heavy at times with drifting in the gale force winds, were forcast for the English Midlands. With some 72 taxa identified and many pages of notes, it was time to retreat to Rutland and hope that our discussions of the past few days regarding cold continental climatic conditions in the Pleistocene didn't become a stark reality in the last few weeks of 1990!

Quaternary at Christmas—courtesy of Claude Berri

—And a Happy and Prosperous New Year to you all. This issue is a slimline version, perhaps because all would-be correspondents are still suffering from the excesses of Christmas which didn't pass without two media references to the Quaternary, namely on Christmas Day and Boxing Day when BBC2 showed Claude Berri's magnificent two-part film '*Jean de Florette*' and '*Manon des Sources*'. Based on the novel by Marcel Pagnol, this epic tale of betrayal, idealism and greed takes place in Provence in the 1920's and much of the splendid scenery depicts outcrops of white calcareous rock. However, the saga revolves around not only Jean de Florette and the Soubeyrans (proud César—played by Yves Montand—and the snivelling Ugolin) but of Jean's need for water—and it is in his search for water to nourish his ailing crops that the Quaternary is mentioned. From the moment when Jean de Florette (played by Gerard Depardieu) arrives on the scene with his wife and child to the death of César Soubeyran, this two-part film deals with the eternal conflict between good and evil—hence it is full of drama and pathos which are manipulated with much panache and control by Berri, who for some addicts at least, provided, as Barry Norman rightly assessed, 'a kind of sumptuous, superior, sophisticated Gallic soap opera, beautifully directed and played and marvellous to look at!'

Editor

Abstracts

LATE QUATERNARY SEDIMENTARY ENVIRONMENTS IN THE VOIDOMATIS BASIN, NORTHWEST GREECE

Jamie C Woodward
PhD Thesis, The Godwin Laboratory, Sub-Department of Quaternary Research, University of Cambridge, 1990

This study investigates the sedimentary and environmental history of the Voidomatis River Basin in Epirus, northwest Greece, over the last ca.30 000 years. The evidence for late Quaternary environmental change is derived from a number of sources. Detailed lithological analysis of the alluvial sedimentary record of the basin has focused upon changes in coarse and fine fraction sediment source areas and river depositional environments. Rates and processes of weathering in the late Quaternary soil-profile environment have also been examined. This work has identified deposits which record at least five major episodes of Quaternary alluviation. One of these, the 'Aristi unit', can be directly linked to glacial activity in the catchment headwaters between ca.28 200 and 24 300 years BP. During this full-glacial interval, the braided, aggrading, pro-glacial river environment was dominated by a massive influx of glacially comminuted (limestone-derived) sediment and the climate of the basin was generally cool and dry. Under full-glacial conditions a steep precipitation gradient existed between the highest and lowest parts of the catchment, restricting surface runoff/erosion and soil development in non-glaciated parts of the catchment at lower altitude. At sometime after 24 300 and before ca.16 600 years BP, glacial activity waned. The soil development evidence and alluvial record suggest an increase in temperature and precipitation during this deglacial interval.

This catchment-wide information is then related to more local environmental signals recorded in rockshelter sedimentary sequences in the basin. Following the climatic amelioration, after ca.17 000 years BP, the rockshelter site of Klithi and the cave-mouth site of Megalakkos show evidence of occupation for the first time by Late Upper Palaeolithic humans. Both sites show absence or rarity of occupation after ca.10 000 years BP. Field and laboratory analyses of the sedimentary sequences at these sites provide an important bridge between the 'on-site' archaeological information and the geomorphological changes expressed in the late Quaternary alluvial and edaphic records. Together, the alluvial and rockshelter sequences provide a composite sedimentary record for ca.30 000 to 10 000 years BP—a critical interval of late Quaternary time covering the last glacial-to-interglacial transition in the Voidomatis Basin. The environmental changes recognised may be broadly representative of late Quaternary conditions more generally in upland northern Greece and the neighbouring montane areas of the wider Balkan zone.

MScs and PhDs please note: what are you doing now and where?

Dr Jamie Woodward, who says he finds the abstracts section of the Newsletter most useful, has suggested that perhaps each abstract should be followed by a sentence or two informing the readership of what the author is doing now.

A good idea, Jamie, which we can initiate with you! Hence, Jamie is now at the Dept of Geography, University of Exeter, where he is working as a NERC postdoctoral fellow with Professor D E Walling on 'the physical and chemical properties of fluvial suspended sediment'.

Editor

HISTORY AND PALAEOECOLOGY OF WOODLANDS IN THE OXFORD REGION

S P Day
Wolfson College, Oxford

Palaeoecological investigations have been undertaken at two sites in the Oxford region, Cothill Fen and Sidlings Copse, in an attempt to reconstruct changes in the extent and composition of woodland over the last 10 000 years. Particular attention has been focussed on the role of human activity in vegetational change, using archaeological and historical sources to complement the biological data.

The sequence from Cothill Fen covers the period from *c.*10 000 to *c.*6500 BP and that from Sidlings Copse from *c.*9500 BP to the present. Sidlings Copse formed part of the medieval Forest of Shotover and is rich in "ancient woodland indicators".

The post-glacial landscape was initially open, with some *Betula and Pinus* woodland. At Cothill Fen, *Corylus* populations began to expand at *c.*9400 BP, followed by *Ulmus* at *c.*9100 BP, *Quercus* at *c.*8800 BP, and *Tilia* and *Alnus* at *c.*6800 BP. *Tilia* probably became dominant on well-drained soils in the region. At Sidlings Copse, *Pinus* declined as populations of *Quercus* and *Ulmus* expanded, but *Pinus* persisted around Cothill Fen until *c.*7700 BP, perhaps connected with human disturbance of the vegetation.

The "elm decline" at Sidlings Copse is suggested to have resulted from a combination of disease and exploitation of leaf-fodder, with no major clearance until *c.*3800 BP. By *c.*1700 BP no woodland remained around the site, but local regeneration began at *c.*1000 BP.

Historical sources suggest that there was more woodland in the Shotover region in the medieval period than today, including a larger area around the present Sidlings Copse. Major clearance followed the repeal of Forest Law in the seventeenth century.

In addition to producing pollen sequences which together provide the first record of vegetational change throughout the post-glacial in the Oxford region, this research has demonstrated that the presence of "ancient woodland indicators" cannot be used to argue for the existence of primary woodland sites.

'QUATERNARY GEOLOGY OF THE HEBRIDEAN CONTINENTAL MARGIN'

Ian Selby BSc, PhD
University of Nottingham

A shelf seismostratigraphy based on high resolution seismic profiles recognises two units within the Quaternary succession on the Hebridean continental margin. A lower unit forms the majority of the outer shelf succession and an upper unit consists of penecontemporaneous subglacial, proximal and distal glaciomarine facies deposited during the last glacial maximum. At least two glacial events have affected the shelf. On the slope, two mudline migrations reflect shelf spillover and infer longer glacial "phases".

Major depositional episodes on the margin result from the sedimentation of glaciomarine muddy diamictons on the shelf and upper slope. "Interglacials" are associated with sediment starvation.

During the last glacial maximum, the iceshed of an independent Hebridean ice cap overlay the inner continental shelf and grounded ice extended to the morainal bank complex lying south of St Kilda. The westerly section of the Hebridean glacier formed a thin, marine-fringed ice cap that was highly susceptible to changes in mass balance and relative sea level. It grew rapidly by windward accretion and similarly decayed by calving.

Radiocarbon dates, amino acid ratios and a tephrachronology suggest that this glaciation occurred during the late Devensian.

Complex crustal movements induced by the Scottish mainland and Hebridean ice caps throughout the Quaternary resulted in the reactivation of passive margin listric faults which triggered mass flows on the slope. Although the outer shelf was not sub-aerially exposed during the late Devensian, relative sea level changes have resulted in the erosion of rock platforms at depths of < -80 m across the shelf during the Quaternary.

QRA ANNUAL DISCUSSION MEETING

3–4th January 1991

'International Research Initiatives and Data-Banks'

ABSTRACTS

Abstracts for the papers presented at the recent QRA discussion meeting held at Royal Holloway and Bedford New College, University of London, are provided below. There are also four abstracts, originally included in the programme, which unfortunately due to last-minute circumstances could not be presented at the meeting (those submitted by Boulton, Dugmore, Shackleton and Smalley). They are included here as they provide important information on international collaborative research programmes that members may find of interest. Members are urged to contact the authors directly if they require information on any of the initiatives referred to below.

As organiser of the meeting, I would like to take this opportunity of thanking all those who helped to make it such an enjoyable and successful event. I am indebted to Professor Brian Funnell (University of East Anglia) for the Opening Address, Professor Jim Rose (RHBNC), Dr Murray Gray and Dr Mike Walker who chaired the three main sessions, and Professor Bill Watts (University of Dublin) who led the final discussion. I was also greatly aided by postgraduate students and technical staff of the Department of Geography, RHBNC, and therefore extend my gratitude to Glynis Read, Clare Watson, Vanessa Norwood, Kathy Roberts, Margaret Onwu, Nick Branch, Jerry Lee, Albert Prince, Li Shi Jie and Colin Whiteman. Finally, I would like to thank all of the speakers who readily volunteered to contribute to the conference in the time-honoured QRA tradition. Especial thanks should be extended on behalf of the QRA to Professor Nat Rutter (University of Alberta) who interrupted a busy schedule to attend the meeting: the presence of the President of INQUA added an extra sparkle to the occasion.

John Lowe
Geography, RHBNC

SWAP, CASPIA AND THE ROLE OF DISCO

Richard W Battarbee
Palaeoecology Research Unit, Department of Geography
University College London

Diatoms are excellent indicators of water quality, especially acidity, nutrient status and salinity. In recent years we have been closely involved with international collaborative projects on lake acidification (SWAP) in which we have been developing

diatom-based transfer functions for pH reconstruction. Central to the success of the project has been our emphasis on harmonised taxonomy, quality control and the development of a diatom database (DISCO). Using a similar approach we are currently developing transfer functions for lake salinity reconstruction to be used in palaeohydrological and palaeoclimatological studies throughout the world. Project CASPIA which aims to link North American and African datasets is now in progress.

WHOLE-CORE MAGNETIC SUSCEPTIBILITY MEASUREMENTS OF DEEP-SEA SEDIMENTS: APPLICATION TO STRATIGRAPHIC CORRELATION AND RESOLUTION OF CLIMATIC CYCLES

Jan Bloemendal[1] and P B de Menocal[2]

One of the main emphases of recent Ocean Drilling Programs (ODP) cruises has been the recovery of high quality, stratigraphically complete, hydraulic piston-cored sedimentary sequences, in order to trace the evolution of the orbital ('Milankovitch') forcing of climate systems during the late Neogene. Whole-core magnetic susceptibility logging has made a significant contribution to this effort, and the technique is now used routinely by ODP. Susceptibility measurements are extremely useful for the high resolution correlation of paired holes at a site, and for the detection of coring disturbances and gaps. By reflecting changes in the proportion of lithogenic to biogenic sedimentary components, susceptibility variations in fossiliferous deep-sea sediments can sometimes be used to resolve earth orbital timescale (10^4–10^5 years) climatic cycles. We illustrate these applications of the technique with results from Legs 108 (eastern equatorial Atlantic) and 117 (Arabian Sea).

1 Department of Geography, University of Liverpool.
2 Lamont-Doherty Geological Observatory, Palisades, New York.

EUROPEAN SCIENCE FOUNDATION PROGRAMMES: POLAR NORTH ATLANTIC CONTINENTAL MARGINS (PONAM) AND EUROPEAN PALAEOCLIMATE PROJECT (EPC)

G S Boulton
Department of Geology & Geophysics, University of Edinburgh

The aim of the PONAM project is to reconstruct the history of the last glacial cycle in the northern Norwegian Sea area. Data collection is based upon a transect at

about 70–77°N from western Spitsbergen to east Greenland. It comprises four principal components:

(a) Work on land in Spitsbergen and Greenland directed to establishing the history of glaciation, relative sea level change and other aspects of palaeo-environment.

(b) Work in Spitsbergen and Greenland fjords, on the continental shelf and slope to establish the history of sedimentation and glaciation.

(c) Core stratigraphy from the deep ocean to establish changes in palaeocirculation, palaeotemperature, isotopic composition and structure.

(d) Studies to determine modern sediment budgets as a means of understanding past sedimentary changes.

The land parties (a) are primarily Scandinavian and had their first major field seasons in 1990. The marine work (b and c) is Norwegian, German, British and Dutch and partly comprises PONAM-inspired cruises and partly on-going programmes which have been cannibalised by PONAM; (d) is a new programme yet to begin. The programme is designed to continue until 1993.
PONAM's main role is to co-ordinate activities of different national groups who must seek science funding through normal national procedures.

The aim of EPC is to establish the 'natural' and anthropogenic components of Holocene climatic and environmental change in Europe. Detailed reconstructions will be attempted within a series of 'time windows' which are thought to be of particular importance: 9500–8500 BP; 7500–6500 BP; 6500–4500 BP; 1800–1400 BP; 1400–600 BP; 600–14 BP.

The particular data sets which will be developed and synthesised comprise: orbital parameters and solar output; sea surface temperatures and circulation patterns; positions of coastlines; isostatic movements of mountains; areas covered by glacier ice; sea ice distribution; surface albedo; snow-cover; heat fluxes through forests and cultivated areas; meteorological conditions over forests and meadows; aerosol fluctuations; forest clearance; alpine and polar tree-limits; displacement of forest-steppe boundary; plant geography; CO_2 and city content of atmosphere; surface pollen spectra/climate relations; enhanced solifluxion processes; glacier equilibrium lines; record of land use; documentary record of meteorological events; phases of coastal storminess; stable isotopes in tree-rings; $\delta^{18}O$ in lake marls; isotope trace elements and wind-blown dust in glaciers; lake-level changes; enhanced paludification; river activity.

The intention is to utilise and synthesise existing data and to stimulate new research where necessary. These data will be used to develop palaeoenvironmental maps and time-series as an aid to modelling whose purpose will be to establish the sources of climatic and environmental perturbation.

Four workshops have taken place and several more are planned over the next two years. The programme is designed to co-ordinate and stimulate new activity, but funding must be sought through normal national channels.

CORINE: A EUROPEAN ENVIRONMENTAL INFORMATION SYSTEM AND ITS RELEVANCE TO QUATERNARY SCIENCE

David J Briggs
Department of Geographical Sciences, Polytechnic of Huddersfield

The CORINE programme of the European Commission was initiated in 1985 with the objective of setting up an information system on the state of the environment and natural resources in the European Communities. Since then, a wide range of information has been compiled, and integrated into a consistent database, covering topography, climate, soils, hydrology, ecology and various aspects of pollution. Although targeted initially at policy applications, this database offers a number of possibilities for Quaternary science. *Inter alia*, it provides a basic geographic framework to which other databases can be registered; a source of environmental data which may be used in modelling and interpretation; and a set of standards for database construction. Experience with setting up the CORINE information system also provides important lessons for attempts to establish similar, international systems. This paper reviews the history, structure and content of the CORINE information system and evaluates its potential for Quaternary science.

THE GANSU LOESS: AN INTEGRATED APPROACH TO THE SCIENTIFIC STUDY OF ITS LANDSLIDES BY A MULTI-NATIONAL TEAM

Edward Derbyshire[1], Wang Jingtai[2], Armelle Billard[3], Yves Egels[4], David K C Jones[5], Michell Kasser[4], Tatiana Muxart[3], Lewis Owen[6], Charles Wagner[4], Tom Dijkstra[1] and Ian Smalley[1]

The European Community, in partnership with the Gansu Academy of Sciences, set up in 1987 a programme to map, monitor, analyse and model the landslides of eastern Gansu Province, China. The project integrates the work of a number of Chinese and European institutions. The Gansu Geological Hazards Research Institute is in charge of field and air-photo mapping at scales of 1:100 000, 1:35 000 and 1:10 000, stratigraphical logging, climatological data, geotechnical testing, and research into ancient literary sources. The European consultants are contributing work on medium and large scale landslide mapping, detailed sedimentology, geomorphological and geotechnical mapping, groundwater regime, water tracing and past and present land utilisation. Modelling of individual slides is designed to provide a classification of slides based on failure mode as a guide to prediction.

1 Centre for Loess Research & Documentation, University of Leicester.
2 Geological Hazards Research Institute, Gansu Academy of Sciences, Lanzhou, China.
3 Laboratoire de Geographie Physique du CNRS, Meudon, France.
4 Institut Geographique National, Paris, France.
5 London School of Economics & Political Science, University of London.
6 Department of Geography, Baptist University, Kowloon, Hong Kong.

INTERNATIONAL TEPHROCHRONOLOGICAL STUDIES IN THE NE ATLANTIC REGION

Andrew J Dugmore
Department of Geography, University of Edinburgh

The extensive dispersal of Icelandic tephras of Quaternary Age in the NE Atlantic region presents a number of exciting research opportunities, best tackled through international collaboration.

A multidisciplinary group at Edinburgh is involved in a variety of tephra-related projects in this region where three main geographic areas of interest can be identified; there is Iceland itself, the offshore areas, and the lands to the west presently known to have been affected by fallout. Increased knowledge of the tephra layers in Iceland is a primary concern in all the collaborative studies in which the Edinburgh group is involved. The link with Gudrun Larsen at the University of Iceland is particularly important because she is currently refining and augmenting established post-glacial data sets. International collaboration focusses on the tephras common to both countries, and on questions of methodology and technique.

Links with Scandinavia involving Drs Cato and Persson of the Swedish Geological Survey are primarily concerned with connecting the tephra and varve chronologies. The aim is to use historically dated tephras to test the varve chronology and to use the tested varve chronology to attach absolute dates to prehistoric tephra layers. Further tephrochronological collaboration is also planned with the Universities of Stockholm and Lund.

In North Germany Dr Merkt of the German Geological Survey is working on Icelandic ashes in lake and bog sequences that may be correlated to both onshore tephra deposits in the UK and Scandinavia, and offshore cores being studied by the British Geological Survey. David Long and BGS co-workers are in close contact with the University of Bergen, where Icelandic tephras are being studied in coastal sites and in offshore sediments. In marine cores, layers dating from around the transition to the present interglacial, and the older ash zones found at the end of a number of previous glaciations are being studied in detail.

The extent to which the Holocene volcanic eruptions responsible for widespread tephra dispersal have affected the environment is of topical interest in archaeology. This question is being investigated by a project co-directed by Dr Kevin Edwards, Dr Paul Buckland and the author, and involving both Icelandic and Faroese scientists.

The volume of data already produced presents a practical challenge in its own right, and so a programme is currently under way aimed at creating an appropriate database using the ORACLE Database Management System.

THE INTERNATIONAL PROGRAMME FOR IMPROVED QUALITY CONTROL AND ASSURANCE IN RADIOCARBON DATING

Douglas D Harkness
NERC Radiocarbon Laboratory, East Kilbride

An 'International Workshop on the Intercomparison of ^{14}C Laboratories' was held at East Kilbride during September 1989. The meeting culminated a three year analytical programme designed and co-ordinated by the East Kilbride group (the NERC and SURRC radiocarbon labs and Glasgow University Statistics Department) and which had confirmed a need for tighter quality control by individual dating laboratories.

The outcome of that meeting has far reaching implications for the future status and reputation of the international radiocarbon dating community. In particular, three proposals towards improved analytical accountability were agreed:

(i) An 'Association of C-14 Laboratories' would undertake the production and publication of a quality assurance protocol to be followed by all dating laboratories that wish to certify their analytical constancy.

(ii) The International Atomic Energy Agency (IAEA) would prepare and archive reference materials to facilitate routine quality control by individual laboratories.

(iii) Blind intercomparison exercises, open to all dating laboratories, would be organised on a regular (ca.3 year) basis. NERC and SURRC will fund the first of these international projects which will be co-ordinated by the East Kilbride/Glasgow University group.

The objectives and time-tabling of the overall programme will be described and discussed with particular emphasis on the role of the typical user of natural ^{14}C age measurements.

PALYNOLOGICAL DATABASES: INTERNATIONAL INITIATIVES AND INDIVIDUAL BENEFITS

Brian Huntley
Department of Biological Sciences, University of Durham

Current concerns about Global Environmental Change provide an additional stimulus for the development of international databases of palynological data. Such databases can also be of tremendous benefit to research by individual Quaternary scientists. A collaborative initiative is underway to develop compatible databases for

Europe, funded by the EC, and North America, funded by NOAA. This initiative depends for its success upon the co-operation and involvement of all European and North American Quaternary palynologists. If successful, the initiative will result in a widely available database that will enable all of these workers to examine and explore data from areas and times that are of interest to them. In this way they will be able more effectively to place their new data in context, as well as to explore the extent to which they provide new information and the nature of this contribution.

PROJECT SALAAM: PALAEOLIMNOLOGY OF HIGH ATLAS LAKES

Henry F Lamb[1], C Duigan[1], J H R, Gee[1], R W Maxted[1], R J Whittington[1], K Kelts[2], G Lister[2], F Niessen[2], A Merzouk[3], M Badraoui[3] and H Chellai[4]

Lake Isli is a 90 m deep lake with no surface drainage at 2270 m altitude in the High Atlas mountains of Morocco. Past higher levels of the lake are evident from at least three terraces with exposures of laminated lacustrine marls, and a former outlet to the northeast. Seismic data show that 100 m of lacustrine sediments are present in the lake, which has a structural origin. A smaller and shallower lake nearby also shows evidence of formerly higher lake levels. The two lakes, located on the northern margin of the Sahara, contrast markedly in their biological, chemical and sedimentary characteristics.

Current research by members of the Project on these lakes aims to decipher the sedimentary archive of past environmental change, focusing on several time windows. Firstly modern limnological data serve as a basis for interpreting the record. Secondly, the impact of lake level changes during the last twenty years may also be useful in calibrating the record of more ancient changes. Thirdly, the links between anthropogenic degradation of the lake catchment during recent centuries and the frequency of local flood events will be examined. Fourthly, evidence for abrupt and potentially catastrophic drought events during the last 2000–5000 years, so far known only from tropical Africa and possibly from one site in the Middle Atlas, will be sought. Finally, the early Holocene record forms a useful comparison to those from other North African sites which show enhanced monsoonal moisture in response to astronomical forcing.

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2 Swiss Federal Institute of Technology, Zurich, Switzerland.
3 Institut Agronomique Hassan II, Rabat, Morocco.
4 Department of Geology, University of Marrakech, Morocco.

IGCP-253 AND THE NORTH ATLANTIC SEABOARD (SUB-)PROJECT

J John Lowe
Department of Geography, Royal Holloway & Bedford New College, University of London

IGCP-253 (*Termination of the Pleistocene*) was initiated in 1989 to encourage co-ordinated international research concerned with global environmental changes during the last glacial-interglacial transition (approximately 18 000–8000 BP). Of particular interest within the project are: (a) the inter-relationships and interactions between climate and the global hydrologic cycle; and (b) the nature and global expression of abrupt climatic changes during the period.

The background to IGCP-253 will be outlined and then an introduction to the 9 formal sub-projects of which IGCP-253 is composed will be provided. These cover a wide range of palaeoenvironmental concerns. There is great scope for UK scientists to become involved in IGCP-253. Most of the sub-projects are still at early planning stages, so there is time yet for new participants to play an important, formative role in their development.

A more detailed introduction to the aims and organisation of the *North Atlantic Seaboard* Sub-Project of IGCP-253 will then be provided. This is a collaborative programme aimed principally at providing a high resolution and high quality stratigraphic and geochronological database for the evaluation of abrupt climatic changes on land areas adjacent to the North Atlantic during the last glacial-interglacial transition (ca.14 000–9000 BP).

COLLABORATIVE PALAEOENVIRONMENTAL RESEARCH PROJECTS IN NORTHERN ITALY AND CHINA

Frank Oldfield
Department of Geography, University of Liverpool

The paper will outline two collaborative programmes with overseas scientists. The main aim of that in Northern Italy is to link together the Holocene palaeoenvironmental records from terrestrial sediment sequences in the Po drainage system and marine sediment sequences in the Adriatic. Particular attention will be paid to the late-glacial/early Holocene and the late Holocene parts of the record. The project is multidisciplinary in concept and offers great scope for inter-institutional collaboration. The Chinese project will focus on the Holocene palaeolimnological record from the major lakes in the mid-Yangtze valley around Wuhan. Its shape and scientific thrust are still to be defined.

THE CELIA PROJECT AND THE IGBP CORE PROGRAM ON GLOBAL CHANGE

Nat Rutter
Department of Geology, University of Alberta, Edmonton

A prime objective of project CELIA is the recovery and synthesis of qualitative and quantitative information on the climate and environment during the last interglacial. This will be accomplished through field and laboratory research on selected high latitude sites where a variety of palaeoecological and proxy climate methods (e.g. fossil pollen, insects, seeds, soil properties, stable isotopes) will be employed. Qualitative information should be important in supplementing and enriching the quantitative data sets. As a result of these qualitative and multidisciplinary inputs, CELIA will provide a broader and more complete view of the palaeoenvironment of the last interglacial than has heretofore been possible.

Project CELIA will deal primarily with the arctic and subarctic regions of North America and Greenland. This is appropriate as northern regions are to be the first to experience future warming and it is here that warming is expected to be greatest. As well, the cold climate of the arctic/subarctic ensures optimal fossil preservation. It is in the arctic/subarctic that many species including trees meet their present-day climatic limits, and permafrost or sporadic permafrost is widespread. These important environmental discontinuities and thresholds ensure that sensitive and accurate palaeoenvironmental records can be established.

The CELIA Project complements Stream II—Glacial/Interglacial Cycles in the Late Quaternary, which is part of the program of IGBP Scientific Steering Committee's core project on past global changes (PAGES). Besides providing proxy data and a record of environmental conditions during the last interglacial in the circumpolar region, we hope to elucidate on the causes of glacial cycles, including orbital forcing, and regional and local controls; the inter-relationships and linkages between the land (biosphere, lithosphere and cryosphere), atmosphere and oceans (hydrosphere) during the last interglacial, and the development of data sets to provide a means of testing and improving global circulation and climatic models. This would be in keeping with many of the objectives of the Core Project.

INTERNATIONAL PROGRAMS IN PALAEOCEANOGRAPHY

Nick J Shackleton
Sub-Department of Quaternary Research, University of Cambridge

It is a common misconception that CLIMAP is an international programme. CLIMAP was the acronym for a NSF-funded project that was operational between about 1970 and 1982. All the Principal Investigators were in US institutions but they invited some outsiders including myself to be "corresponding members". On

the one hand, I provided them (and NSF) with a **huge** amount of data at zero cost; on the other hand, I had the opportunity of a lifetime to work with a marvellous team of generous scientists. Both I and my own funding body (NERC) undoubtedly benefited.

SPECMAP is a similar type of project although in this case I am listed as an in-funded Principal Investigator. Sometimes people ask "why can't **I** be a member of (for example) SPECMAP?" Science is competitive; a research group will not want to share all their hard-earned, high-quality data with you unless you can offer something that they need and cannot generate themselves.

EPOCH, on the other hand, is the acronym for a project more akin to a NERC Special Topic; it represents an opportunity for obtaining funding within a specified area of science; in this case, on climate history in the late Pleistocene. I will describe some of the palaeoceanographic work that is proposed within the current (already funded) EPOCH programme.

ODP, the Ocean Drilling Programme, is different again. Through NERC the UK has a share in ODP. We have opportunities to take part in the drilling legs as shipboard scientists, and to do shore-based research. Any UK scientist can obtain samples recovered provided that he/she makes a good scientific case (so that valuable materials are not wasted). NERC offers Special Topic grants for research using ODP samples so as to maximise the benefits to the scientific community from our membership.

THE INQUA LOESS COMMISSION, THE LOESS 2000 PROGRAMME, AND THE LOESS ARCHIVE/ DOCUMENTATION PROJECT

Ian Smalley
Centre for Loess Research & Documentation, University of Leicester

The function of the Loess Commission is to encourage research on loess and to correlate world-wide activities, and it performs its function largely via a set of working groups. The eight current working groups are Chrono-stratigraphy (based at Palisades NY), Geotechnical (Moscow), Geochemistry (Kiel), Palaeogeographic maps (Budapest and Moscow), Geomorphology and Land Use (Leicester), China (Xian), North America (Champaign IL) and Documentation (Leicester). Programme details are given in Loess Letter 18 (October 1987).

Major research initiatives are discussed and decided on at the main INQUA Congresses and major trends tend to be recognised by the existence of an associated working group. At the Ottawa 1987 meeting it was decided that emphasis should be placed on loess in South America, and on the engineering and practical problems of loess regions. The Loess 2000 Programme represents a very general international effort to identify some major problems and long-term research targets. It was proposed in outline at IGC Moscow 1984 and a modified version should be published in 1990.

The Loess Archive at Leicester attempts four main tasks: (i) a register of loess investigators and institutions; (ii) production and publication of bibliographies for the worlds loess deposits and regions; (iii) publication of a regular newsletter; (iv) preparation of translations of key articles/loess classics. The main linguistic problem is still at the Russian/English interface but enormous progress has been made on the linguistic front in the past few years.

SEA LEVEL RESEARCH INITIATIVES IN IGCP, INQUA & EPOCH II

Michael J Tooley and Ian Shennan
Department of Geography, University of Durham

Ian Shennan and Michael Tooley have been involved since the early 1970s with international sea-level and coastal-change projects, contributing to the formulation of the aims and objectives of the projects, as well as organising, collecting and disseminating relevant data. A bank of sea-level index points has been built up and is maintained at Durham. Sea-level, uplift and subsidence curves can be generated for the UK at different spatial scales for much of the Holocene. The scope and results of IGCP Projects 61, 200 and 274 are summarised and the activities of the INQUA Commission on Quaternary Shorelines during the inter-congress period are described. EPOCH II on climatic change, sea-level rise and associated impacts in Europe begins in January 1991 and runs for 2 years. Attention is given to the objectives of this EC-funded project.

GEOBASE

Ian B Woods
Manager, Elsevier/Geo Abstracts
Elsevier Science Publishers Limited

GEOBASE is the online equivalent of the Geo Abstracts journals, and as such provides a truly interdisciplinary database covering geology, geography and ecology. The information on GEOBASE dates from 1980 to the present day, and currently contains over 380,000 items. In addition to the Geo Abstracts journals, Mineralogical Abstracts is loaded within the file and can either be searched as a separate entity or as part of the main database. Virtually all the records on GEOBASE have an abstract, and by use of free text searching across the title, abstract and keywords, most information can easily be located. GEOBASE will be

available for trial searches by QRA delegates during the 2 days of the annual discussion meeting. Otherwise, it is available through the online hosts DIALOG and Orbit Search Services. In 1991 we are looking towards loading within the ESA-IRS online system, and the potential of a CD ROM product. Further details available from:

Elsevier/Geo Abstracts
Regency House
34 Duke Street
Norwich NR3 3AP
Tel: 0603-626327

Announcements & Meetings

CUMBERLAND GEOLOGICAL SOCIETY EXCURSION PROGRAMME FOR 1991

Full day outings are on Saturdays or Sundays starting 10.30 am. Short mid-week outings are held on Wednesdays at 7.30 pm. Information on the outings is given as follows:

Day and date, Topic and general area, MP—Meeting Place Map Reference with OS 1:50 000 Sheet Number, Leader.

Sunday, April 21
Yew Crag quarries, Honister, MP 225135 (OS 89/90), Mr A Cameron.

Wednesday, May 8
Caldbeck Mining Museum and the Howk, MP 323399 (OS 90), Mr Iver Gray.

Wednesday, May 15
Submarine forest at Allonby, MP 081440 (OS 85), Dr F J Cockersole.

Sunday, May 19
Silurian rocks and glacial features south of Torver, MP 284941 (OS 97), Mr D Kelly

Sunday, May 26
Borrowdale Volcanics and glacial features at Seathwaite, MP 237124 (OS 89/90), Messrs K Bond & M Dodd.

Saturday, June 8
Glaciation of Low Furness and the Irish Sea readvance, MP 304744 (OS 97), Dr R Clark.

Sunday, June 23
Permian in the Dumfries area, MP 996803 (OS 78), Dr S Munro.

Sunday, July 7
Old quarries around Caldbeck, MP 328398 (OS 90), Messrs F Lawton & M Sanderson.

Wednesday, July 17
Iron mines at Moor Row, MP 005142 (OS 89), Mr Dave Banks.

Sunday, August 11
Skiddaw Slates of Sale Fell, Bassenthwaite, MP 174304 (OS 89/90), Dr R Hughes.

Sunday, September 8
Landscapes and rocks in the Lowther valley, MP 519243 (OS 90), Mr T Shipp.

Visitors are most welcome and should be equipped for fell walking including a packed lunch for full day outings. It is recommended that the details are checked before joining an outing.

Excursion Secretary
Mr D A Kelly, BSc
19 Wheatclose Road
Barrow-in-Furness
Cumbria LA14 4EJ
Tel: (0229) 27114

General Secretary
Mr K W Bond, BSc, FGS, FRMetS,
Oak Field Lodge,
Underskiddaw
Keswick
Cumbria CA12 4QA
Tel: (07687) 71051

SYMPOSIUM ON PHYSICAL WEATHERING OF ROCK IN COLD REGIONS

The symposium is a joint initiative of the IGU Commission on Frost Action Environments and the IPA Working Group on Periglacial Environments. It will be held in Caen, France, from 29th April to 1st May 1991. For particulars, please contact the convenor:

Professor J-P Lautridou
Centre de Géomorphologie du CNRS
Rue des Tilleuls
14000 Caen
France
Telephone (033) 31.45.57.08
Fax 31.45.56.00

SYMPOSIUM ON PERIGLACIAL ENVIRONMENTS IN RELATION TO CLIMATIC CHANGE

Like the meeting in Caen, this symposium will take place under the auspices of the two commissions already referred to above. It begins in Maastricht and ends in Amsterdam, both in The Netherlands and lasts from 3rd to 6th May 1991. The programme includes three days of excursion and a one-day paper session.

A Second Circular, containing more details, will be sent on request. The address of the convenor is:

Professor J F Vandenberghe
Faculty of Earth Sciences
Free University
De Boelelaan 1085
1081 HV Amsterdam
The Netherlands
Telephone (020)-548.5585
Fax 020-46.24.57

LOESS-PALAEOSOL SEQUENCES AS RECORDERS OF PALAEOCLIMATIC VARIATION IN CENTRAL CHINA
— a collaborative NERC-funded project

The Natural Environment Research Council (NERC) have agreed to fund this project under the 'Palaeoclimate of the last glacial/interglacial cycle' Special Topic. It will be coordinated from the Centre for Loess Research and Documentation at the University of Leicester by Professor Edward Derbyshire, with Dr John Shaw (Geomagnetism Laboratory, University of Liverpool) and Dr Ann Wintle (Earth Studies, University College, Wales) as the other principal investigators. Drs D Keen (Geography, Coventry Polytechnic), R Kemp (Geography, RHBNC, University of London), T Rolph and A Latham (both Geomagnetism Laboratory, Liverpool University) from Europe and Professor An Zhisheng (Xian Loess Laboratory) and Wang Jingtai (Lanzhou Geological Hazards Laboratory) from China, are associated investigators. The project will sustain two full-time post-doctoral research assistants (one each at Leicester and Liverpool) and one full-time post-graduate research assistant (at Aberystwyth).

The project aims to determine past variations in wind direction and strength and the relative importance of deserts and glaciers as loess sources in a region of severe climatic gradients between the Loess Plateau and the Quinghai-Xizang (Tibet) Plateau. It involves close collaboration with the Xian Laboratory for Loess Research and Documentation (Chinese Academy of Sciences) and the Lanzhou Geological Hazards Institute (Gansu Province Academy of Sciences). Other aims include the establishment of a typology for the palaeosols as a measure of climatic shift, determination of the pedogenic and aeolian flux components of the magnetic susceptibility, and the dating of key sections in this, the thickest known loess on earth (>300 m). These data will be used to construct a climatic curve to compare with the oxygen isotope record and calculated astronomical parameters and to assess any phase lag in the response of magnetic susceptibility to shifts in the climatic zones. Closely-spaced sampling will be undertaken at two key sites and data used from a third site, all sites lying along an altitudinal and climatic gradient. Quantitative fabric analysis will be used to assess the effect of variations in wind regime and the effect of erosion and reworking on the chronometric record. Environmental data will also be derived from soil typology, using micromorphology, and the molluscan fauna. Direct dating will be achieved by a combination of luminescence, U-series, alpha-spectrometry and magnetic susceptibility. Magnetostratigraphy will be used to test for contemporaneous climatic changes at different altitudes across central north China.

Professor Edward Derbyshire
The University of Leicester
Loess Research and
Documentation Centre
Leicester LE1 7RH

MEMBERSHIP PLEASE NOTE:- GRANTS AND CORRESPONDENTS

I have been asked by C R Argent of The Royal Society to draw the attention of the membership to two matters. Firstly, to the availability (via Miss B M deVere) of grants from the X INQUA Congress Fund for the XIII INQUA Congress in Beijing. Secondly, there is the matter of Quaternary-focused IGC projects and those UK correspondents for projects in which the UK is participating formally. Taking the list on p.30 of Newsletter No. 62, the correspondents for those projects continuing beyond 1990 are:

252	Professor E Derbyshire	(Geology, Keele)
253	Dr J J Lowe	(Geography, Royal Holloway and Bedford New College, London)
274	Dr I Shennan	(Geography, Durham)
296	Dr J Shaw	(Geology, Liverpool)

EARTH SCIENCE CONSERVATION IN GREAT BRITAIN — A STRATEGY

In December the Nature Conservancy Council launched a wide-ranging strategy document for conservation of earth science sites in Britain over the next five years. It aims to promote the widest possible participation and includes six principal initiatives:

1 maintaining the SSSI network
2 expanding the network of Regionally Important Geological and Geomorphological Sites (RIGS)
3 developing new conservation tectniques
4 improving site documentation
5 increasing public awareness
6 developing international links.

Copies of the strategy document are available free from the Earth Science Division, Nature Conservancy Council, Northminster House, Peterborough PE1 1UA.

One of the initiatives, Regionally Important Geological and Geomorphological Sites (RIGS), has already attracted considerable interest. RIGS are sites outside the statutory SSSI network that are worthy of protection for a range of interests. The sites are selected and managed by largely voluntary, locally-based groups and safeguarded through local authority planning policies and involvement by landowners. The NCC is promoting the establishment of local RIGS groups and has published an explanatory leaflet which provides further information on what is involved. RIGS groups are already operating in several counties and further information on local contacts or advice on setting up new groups is available from Mike Harley at the NCC address above.

Post Bag

Dear Dr Taylor

I would like to comment on a letter by H Ruszczyńska-Szenajch and T Wysoczański which dealt with my paper "Hoxnian versus Ferdynandovian..." in **Quaternary Newsletter No. 61.**

Let me say at first that there is no place in the **Quaternary Newsletter** for detailed considerations on geological profiles as the Newsletter aims are to provide communicating articles, reviews and discussions. Those papers which discuss in detail the position of the Ferdynandovian Interglacial in Poland have been referred to in my paper. Unfortunately, the work of Ruszczyńska-Szenajch (1978) includes a number of stratigraphic ideas which are neither documented nor argued, e.g. no pollen analyses or gravel petrography from tills and fluvial deposits have been presented. It is for these reasons that I prefer other works which present more useful and much better documented data (e.g. Janczyk-Kopikowa et al., 1981a, 1981b and related papers). Furthermore, Ruszczyńska-Szenajch and Wysoczaski should not argue that the geological background of the problem discussed is incomplete as the detailed stratigraphy of the Belchatów outcrop has been presented several times in Poland as well as in the field, e.g. during the 2nd Quaternary Symposium of the Belchatów region in September, 1987. Later, I presented details during my lecture at the authors' Department of Geology, Warsaw University in April, 1988. In addition, a guide book of the 2nd Belchatovian Symposium is easily accessible in Poland (Baraniecka et al., 1987) and more detailed papers are *in press* (Krzyszkowski, 1990, 1991); however, their data have been presented during different lectures, most recently during the poster session of the INQUA Cromer Symposium at Norwich in September, 1990.

Thus, the objections voiced by H Ruszczyńska-Szenajch and T Wysoczański cannot, in my opinion, be substantiated.

Nevertheless, H Ruszczyńska-Szenajch and T Wysoczański are correct in stating that the Polish Pleistocene stratigraphy is difficult to understand due to many new names. However, their proposal to use the stratigraphy by Rózycki (1961, 1972), which completely disagrees with the widely accepted stratigraphic procedures (Hedberg, 1976), could lead to even greater misunderstanding. Moreover, it is incorrect to say that the terminology of Rôzycki has been widely accepted in Poland because most Polish Quaternary researchers use the terminology of the Geological Survey (Rühle, 1973; Mojski, 1982, 1985).

It is evident, therefore, that the old, poorly documented stages must be abandoned and replaced by precisly and stratigraphically defined and newly-named units. The Belchatów outcrop enables research workers to check upon former ideas as the Pleistocene sediments can be observed in the 200 m deep open-pit and several organic horizons occur in superposition; furthermore, more detailed discussion can be found in my recent paper (Krzyszkowski, *in press*).

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Ruszczyńska-Szenajch, H. 1978. Glacigenic series and buried river valleys of Middle Pleistocene age in Kock region. *Kwartalnik Geologiczny,* 22, 339–359 (in Polish with short English summary).

Rühle, E. 1973. Quaternary Stratigraphy of Poland. In: Rühle, E (editor) Metodyla badań osadów czwartorzedowych. *Wydawnictwa Geologiczne, Warszawa,* 31–78 (in Polish only).

Rózycki, S Z. 1961. Middle Poland. Guide book of excursion from the Baltic to the Tatras. Part II, vol. I. VIth INQUA Congress, Warsaw, 116pp.

— 1972. Pleistocene of the Middle Poland. 2nd edition, PWN, Warszawa, 315pp. (In Polish only.)

OBITUARY FOR PROFESSOR F W SHOTTON

Fred Shotton died peacefully on July 21st, 1990, after several years of gradually declining health which had made walking increasingly difficult and thus deprived him of his numerous field activities that were his passion and entertainment. He always prided himself that he was a natural historian but this should not conjure up any old-fashioned dilettante image since he was above all else a keen observer and meticulous recorder of nature, whether the subject matter be photographs of butterflies, temporary geological exposures or the rate of flow of local streams. His notebooks provide lessons for us all. His broad spectrum view of science meant that he deplored the current tendency for science to become fragmented, especially in his own beloved geology. At Birmingham, he ensured that the undergraduate courses covered all aspects of the subject (but without falling into the trap of superficiality) and his staff experienced his extraordinary knowledge of the subject if they ever carelessly set an examination question which didn't tax the student adequately or was ambiguously worded.

Fred Shotton was educated at Bablake School, Coventry, from which he won a scholarship (the first of many) to Sidney Sussex College, Cambridge, where he graduated with First Class Honours in Geology and won the Harkness Scholarship in 1927. His teaching career began in 1929 when he was appointed assistant lecturer in Geology at the University of Birmingham and he remained there until 1936 when he became lecturer in Geology at Cambridge. In 1940, he obtained leave of absence from Cambridge to take up military service but after the war, he was appointed to the Chair of Geology at Sheffield University and then (in 1949) to the Chair of Geology at Birmingham University, which he held until his retirement in 1974.

He was Dean of the Faculty of Science from 1957–1960 and Pro Vice Chancellor and Vice Principal of the University of Birmingham from 1965–71. In 1956, he was elected a Fellow of the Royal Society and in 1970 was made an Honorary Member of the Royal Irish Academy. From 1964–1966, he was President of the Geological Society of London. He was also President of numerous other societies ranging from local conservation trusts to natural history and archaeological societies. In all of these, he was actively involved in administration because he did not understand the word sinecure.

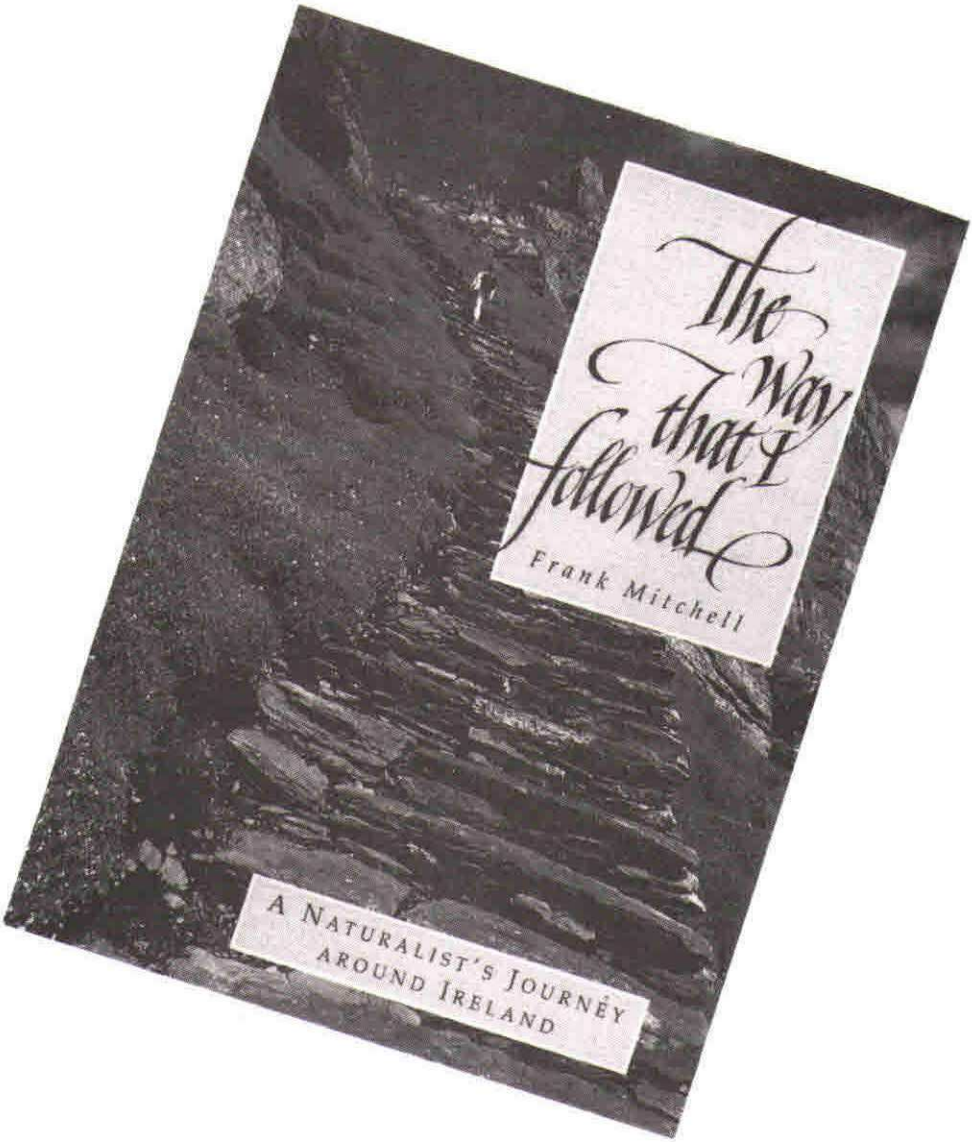
Before the war intervened, his research activities were mainly involved with the stratigraphy and tectonics of the Palaeozoic rocks of the Cross Fell Inlier, though his first excursion into serious science had been an investigation into the Silurian fossils of the Corley Conglomerate of Upper Carboniferous age, about which he gave a paper to the Geological Society whilst still an undergraduate. At this time, he became interested in the Quaternary geology around his home territory near Coventry, an interest that was to endure to the end. It was characteristic of Fred's personality that he managed to charm so many of his friends and colleagues into

assisting him in hand drilling innumerable auger holes from which he deduced the complex Quaternary stratigraphy in the area between Coventry, Rugby and Leamington. Often, one's ideas cannot be fully tested but on this occasion, the deposits were extensively exploited for sand and gravel, thereby exposing Fred's views to intimate scrutiny. However, his interpretations almost always proved to be correct.

Fred Shotton's views of the age of these deposits have recently been challenged. He saw them as post-Anglian glacial deposits (therefore post-Hoxnian) whilst others, notably Jim Rose, saw them as lateral equivalents of the Anglian deposits. In his last few years, Fred put up a spirited defence of his position which would have done credit to someone half his age and it would seem that the arguments are by no means over yet. Despite the vigour with which he prosecuted his case, he bore no animosity to his opponents and surely, Fred will be remembered for many years to come for this masterly piece of research.

In this short note, I have had to omit so many of his scientific achievements. His work during the war — siting wells in the north African Desert, for instance, or locating hazards that might arise on the Normandy beaches through unstable Quaternary sediments — was the inspiration for so many "Uncle Fred" stories that many of us have enjoyed for so long. To those of you who only knew Fred Shotton in his declining years, may I say that in his heyday he was indeed a great man with an almost overwhelming infectious enthusiasm. We shall miss him, therefore, as a first rate scientist and a wise friend.

Professor G R Coope



To be reviewed in the next issue!

Notes

QUATERNARY RESEARCH ASSOCIATION

The Quaternary Research Association is an organisation comprising archaeologists, botanists, civil engineers, geographers, geologists, soil scientists, zoologists and others interested in research into the problems of the Quaternary. Most members reside in Great Britain, but membership also extends to most European countries, North America, Africa and Australasia. Current membership stands at c.1000. Membership is open to all interested in the objectives of the Association. The annual subscription for ordinary members is £10.00 and is due on January 1st for each calendar year. Reduced rates apply for students, unwaged ans associated members.

The main meetings of the Association are the Annual Feidl Meeting, usually lasting 3 or 4 days, held in April, and a 1 or 2 day Discussion Meeting held at the beginning of January. Additionally, Short Field Meetings may be held in May or September and occasionally these visit overseas locations. Study Courses on the techniques used in Quaternary work are also occasionally held. The publications of the Association are the *Quaternary Newsletter* issued with the Association's *Circular* in February, June and November, the *Journal Science* published in association with Longmans, and with three issues a year, the Field Guides Series and the Technical Guide Series.

The Association is run by an executive committee elected at an annual general meeting held during the course of the April field meeting. The current officers of the Association are:

President: Professor J Rose, Department of Geography, Royal Holloway and Bedford New College, University of London, Egham Hill, Egham, Surrey TW20 0EX

Vice President Professor W A Watts, Provost's House, Trinty College, Dublin 2, Ireland

Secretary Dr M J C Walker, St David's University College, Lampeter, Dyfed, Wales SA48 7ED

Assistant Secretary (Publications): Dr D R Bridgland, 41 Geneva Road, Darlington, Co Durham DL1 4NE

Treasurer: C A Whiteman, Botany School, University of Cambridge, Downing Street, Cambridge CB2 3EA

Editor (*Quaternary Newsletter*): Dr B J Taylor, British Geological Survey, Keyworth, Nottingham NG12 5GG

Editor (*Journal of Quaternary Science*): Dr P L Gibbard, Botany School, University of Cambridge, Downing Street, Cambridge CB2 2EA

All questions regarding membership are dealth with by the Secretary, the Associations publications are sold by the Assistant Secretary (Publications) and all subscription matters are dealt with by the Treasurer.

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