

Quaternary Australasia

The Newsletter of the Australasian Quaternary Association

Volume 13, No. 2

June 1995

ISSN 0811-0433

QUATERNARY AUSTRALASIA, VOL. 13/2, DECEMBER 1995

Material for the next issue should reach the editor by **30th April 1995**:

Dr. Bill Boyd, Editor Quaternary Australasia
Centre for Coastal Management
Southern Cross University
PO Box 157, Lismore NSW 2480, Australia

Tel.: (066) 203 007
Fax: (066) 212 669
e-mail: bboyd@scu.edu.au

The **AUSTRALASIAN QUATERNARY ASSOCIATION (AQUA)** is an informal grouping of people interested in the manifold phenomena of the Quaternary. It seeks to encourage research by younger workers in particular, to promote scientific communication between Australia and New Zealand, and to inform members of current research and publications. It holds biennial meetings and publishes the journal *Quaternary Australasia* twice a year. *Quaternary Australasia* is edited by Bill Boyd, with assistance from Colin Murray-Wallace. The annual subscription is \$A20 or \$10 for students, unemployed or retired persons. President 1993 - 1995 is Dr Ian Thomas, Department of Geography, University of Melbourne. An application form for membership is appended to this issue (last page), and should be returned to Dr Geoff Hope, Membership Secretary, Division of Archaeology and Natural History, Research School of Pacific and Asian Studies, Australian National University, Canberra, 0200. Members joining after September gain membership for the following year. Existing members will be sent a reminder in December.

COMMITTEE MEMBERS

Dr Ian Thomas -- President
Dept of Geography and Environmental Studies
The University of Melbourne
Parkville, Victoria 3052
ph: (03) 9344 6330
FAX: (03) 9344 4972
e-mail: i.thomas@geography.unimelb.edu.au

Dr Bill Boyd -- Editor
Centre for Coastal Management
Southern Cross University
Lismore, N.S.W. 2480
ph: (066) 203 007
FAX: (066) 212 669
e-mail: bboyd@scu.edu.au

Dr Colin Murray-Wallace -- Secretary
School of Geosciences (Geology)
University of Wollongong
Northfields Avenue
Wollongong, N.S.W. 2522
ph: (042) 214 419
FAX: (042) 214 250
email: c.murray-wallace@uow.edu.au

Dr Geoff Hope -- Membership Secretary
Div. of Archaeology and Natural History
Research School Pacific & Asian Studies
Australian National University
Canberra, A.C.T. 0220
ph: (062) 49 3283
FAX: (062) 49 4917
email: geoff.hope@coombs.anu.edu.au

Ms. Christine Kenyon -- Treasurer
Dept of Geography & Environmental Studies
The University of Melbourne
Parkville, Victoria, 3052
ph: (03) 9344 7815
FAX: (03) 9344 4972
christine_kenyon.geog_students@
muwaye.unimelb.edu.au

Committee members:
Kate Harle, James Schulmeister,
Stephen Gale and Peter Kershaw

Post-graduate representatives:
Kate Harle, Monash; Brendan Brookes, email:
Wollongong; Elizabeth Pickett, UWA;
Kathryn Taffs, Adelaide; Meredith Orr,
Melbourne

QUATERNARY AUSTRALASIA, VOL. 13/2, DECEMBER 1995

CONTENTS

Editorial

AQUA: President's Report

CLIMANZ IV: Climate Change in the Late Quaternary of the Australasian Region

Departmental News:

Quaternary at Macquarie University

Quaternary at New Zealand Universities and Other Places

Quaternary at The University of New England

INQUA: XIV Congress Berlin

Conference and Meeting News

Recent Publications

Quaternary E-Mail Lists, Internet Pages & Electronic Journals

Quaternary List: Canadian Research in Quaternary Science

Quaternary Research Association: WWW Home Page and E-mail Directory

Electronic Journal: Glacial Geology & Geomorphology

Arcling: Language, Anthropology and Archaeology

Phy-Talk: Phytolith Research Discussion List

Tropical Geomorphology Newsletter

Journal of Paleolimnology

World Palynology E-mail Directory on WWW

Radiocarbon List

S.E. Asian - Pacific Australasia Archaeology List

A.N.Other Lists

Quaternary Australasia Papers

The palaeoecological record from Site 820: A further response and research developments (A. Peter Kershaw)

Latex peels for interpreting archaeological sites to the public (Sarah Colley)

AQUA Membership Form

EDITORIAL

Here we go again! QA 13/2 brings you (some of) the latest in Australasia Quaternary news, plus a few developments overseas. In the last issue we heard some comment about setting up an AQUA-list on the electronic airways. Although little progress has been made in that area, I report elsewhere in these pages of several e-mail lists, WWW pages and electronic journals and newsletters which should be of interest to Australasian Quaternarists. No doubt my list is a minimalist list, so to speak, and there are plenty of other relevant lists, pages and journals to know about. Please forward details of you favourite cyberspace corners -- you'll find me on bboyd@scu.edu.au -- and I'll publicise them in the next issue. If you are not electronically connected to the rest of the world, do shout out. It may be possible to publish digests of e-mail lists, which I am sure does not step on any copywriter's toes. Also, if anyone wants a copy of this issue (and possibly I can scrape together some of the text of previous issues) in electronic form, then get in touch and I will start an initial AQUA e-mailing list. It won't be a proper list (yet?) but may fill the gap until an official AQUAlist gets up and running.

In my last editorial, I bravely volunteered to review the state of Quaternary teaching in Australasia. A brave volunteer indeed. All I needed was some input from all the Quaternary teachers around the place, and we could present the comprehensive overview to aid our prospective students with those all-important decisions. Was the silence deafening or not??? Many thanks to those who did reply -- you will find your words of wisdom in these pages.

Important Notices Time ... CLIMANZ IV looks like it has finally arrived! After a somewhat lengthy gestation period, it is now set to happen towards the end of February next year. If you haven't sent in data sheets, then get in touch with Geoff Hunt a.s.a.p. (contact details for Geoff are amply scattered through the CLIMANZ IV notice elsewhere in this volume). The more information the better, and certainly the easier it will be to define the next generation of research problems to be tackled by the Australasian Quaternary community.

That's all folks!

Bill Boyd, Editor.

AQUA

PRESIDENT'S REPORT

The response to the committee's request for input in regards to the future role of AQUA has been less than overwhelming. In fact, less than one submission was received! I guess we will have to wait until a general meeting is called before representative opinion can be obtained. I suggest that we set the date of our next AGM to coincide with the CLIMANZ conference from the 26th -28th of February. Otherwise, the Easter break seems the best bet. I will mail out a firm committee decision on this sometime soon. Elsewhere in this issue, Bill has reproduced information crucial to the success of CLIMANZ. In order to make this meeting a success, Liz Truswell and Geoff Hunt need data. If you can contribute please do so. If not, at least try to attend the meeting in late February.

A concern which ultimately affects all of those interested in Australian Quaternary Studies is the possibility of palaeoenvironmental sites of scientific and cultural interest coming under threat from development interests. Cases abound. Mt Etna, Queensland, the Aboriginal sites in southwest Tasmania and many others spring to mind. Patrick De Deckker, Bernie Joyce, Roger Jones and Peter Gell are battling hard to stop a mining venture from quarrying scoria from the rim of East and West Basin crater lakes in southwestern Victoria. The mining is likely to have great effects on the palaeoenvironmental record as well as with currently observable processes. Objections have been lodged with the Administrative Appeals Tribunal of Victoria and will be heard on the 14th of December. The letter presented below is a submission, from the President of AQUA on behalf of our membership. If anyone feels as though they wish to make some sort of statement or objection they should get in touch as soon as possible with either Patrick, Bernie or Peter.

Administrative Appeals Tribunal of
Victoria,
Planning Division,
7th Floor, 55 King Street,
Melbourne Vic. 3000
Your Ref: 1995/029224

The Australasian Quaternary Association has recently become aware of a proposal to quarry volcanic rock from the low volcanic ridge between East and West Basin crater lakes on Property: PT CA 22 MAMRE RD, NALANGIL VIC 3249, west of Colac. Our membership is alarmed that a significant repository of environmental and cultural history is likely to be severely degraded by the proposed quarrying activities. The scientific values of the crater lakes are well known to scientists both here in Australia and overseas. The lakes are significant in that they are the only example of meromictic lakes on the Australian mainland. The unique chemical and biological processes operating in the lakes have been the subject of international scrutiny in scientific journals.

These processes must be allowed to continue in the natural state in order that the Australian community can benefit from studies which are addressing some of the most pressing environmental questions in Australia. Problems such as the extent and possible future development of salinity in soils, the recent loss of biodiversity in western Victorian grassy ecosystems, the long term effects of different fire regimes on vegetation and the understanding of climatic change and variability are either being currently addressed or under proposal for study with reference to the undisturbed sediments of both crater lakes. In order for these studies to be completed and for others to commence, it is imperative that no alteration to the crater lakes waters, sediments or catchment slopes be permitted.

Any interference with the natural hydrological or biological or geomorphological processes which exist in the scoria rocks which separate east from the west crater would likely change the nature of the processes in both craters. The same is thought to be true for the entirety of the volcanic slopes which form the catchments of both crater lakes.

It is the opinion of the committee of the Australasian Quaternary Association that

any alteration of natural processes would be a tragedy for Australian science and for the Australian community in general. It is relevant to understand that similar places in North America, New Zealand, Asia and Europe have been preserved for scientific, aesthetic and heritage purposes. Those places form important nodes on the economically important agendas of eco and scientific tour groups. Koori heritage form an important part of the Quaternary history of Australia and the volcanic hills of western Victoria are integrally related to Koori dreaming stories. The volcanoes and the crater lakes are therefore likely to form part of the Aboriginal history of the area and be of emotional significance to the Koori communities of western Victoria.

The Australasian Quaternary Association believes that the crater lakes and their catchments should be accorded a degree of respect that might be expected for any place with 10,000 years of cultural and environmental history. It would seem a shortsighted action to quarry an area with such scientific significance and touristic potential when adequate sources of the same rock material appear to be available nearby.

Yours sincerely

Dr Ian Thomas
President,
Australasian Quaternary Association

CLIMANZ IV

**CLIMATE CHANGE IN THE
LATE QUATERNARY OF THE
AUSTRALASIAN REGION**

HEAR YE! HEAR YE! A reminder that the forthcoming CLIMANZ workshop is fast approaching. There is still time to indicate your attendance, submit an abstract and lodge your data.

The CLIMANZ meeting aims to draw together information from a series of time intervals in the Late Quaternary. An integration of the individual site interpretations will be attempted in order to produce time-slice maps. The more sites and interpretations available the better such maps will be.

It is hoped that both an abstract and supporting data will be supplied by contributors. The workshop provides an opportunity to make available to the scientific community those datasets previously only partly published, those yet to be published or those never likely to see the light of day!

WHERE AND WHEN

Geology Department, Australian National University

26-28th February, 1996

FORMAT

The 3-day program will begin with a half day overview, by invited speakers, of key developments, issues and problems in Quaternary climate research, followed by two days of presentations and discussions organised on a time-slice basis, and a final half day of summaries. Convenors have been identified for each time-slice. They will provide a summary of the interpretations for each time-slice. Due to the limited time available for each time-slice there may be a restriction on the number of speakers or time available. Contributors of long continuous records should not expect to speak at each time-slice but should draw attention to one or two key periods of the record.

ABSTRACTS

Abstracts should be 250-500 word summaries of climatic interpretations for important sites or regions within the time interval concerned. If sites cover more than one time interval, then please break the abstract into the appropriate intervals. Sites should be clearly identified so the interpretations can be matched with the mapped points.

Abstract should be submitted by 15th December (if there is still trouble with this deadline please communicate directly with the convenor).

WORKSHOP ATTENDANCE

Those who have not yet replied please send the following information to Geoff Hunt at the address below by no later than November 30th (in a similar fashion the convenors would appreciate an intention to provide an abstract by the same deadline). [Editor's note: I am sure that Geoff will be happy to receive slightly late expressions if interest, given the publication timeline of this issue of QA ...]

- Name, Address and E-Mail
- Whether you intend contributing data to the workshop
- The time-slice of your interest
- Whether you have submitted an abstract to the convenor, and which convenor (see below)

Send all this information to Geoff Hunt at:

**Australian Geological Survey
Organisation
PO Box 378
Canberra ACT 2601**

**Phone : 06 2499770
Fax : 06 2499970
E-mail : ghunt@agso.gov.au**

CONVENORS

Potential contributors are asked to contact the most appropriate convenor, who will coordinate data for the identified time-slice. If your data covers more than one time-slice, then contact the convenor whose area of interest matches most closely.

0-6ka John Dodson
Geography Dept.
University of Western
Australia
Ph 09 3802695
Fax 09 3801054
E-mail: johnd@gis.uwa.edu.au

10-15ka Geoff Hope
Department of Archaeology &
Natural History
Research School of Asian and
Pacific Studies
Australian National University
Ph 06 2493283
Fax 06 2494917
E-mail: geoff.hope@coombs.
anu.edu.au

18-20ka Eric Colhoun
Department of Geography
University of Newcastle
Ph 049 215082
Fax 049 215887
E-mail: ggeac@cc.newcastle.
edu.au

Isotopic Stage 3 (lake levels)
Jim Bowler
Department of Earth Science
University of Melbourne
Ph 03 3446740
Fax 93447761

Isotopic Stages 3 & 4
Gerald Nanson
Department of Geography
University of Wollongong
Ph 042 213631
Fax 042 213764
E-mail: g.nanson@uow.edu.au

Isotopic Stage 5
Brad Pillans
Department of Archaeology &
Natural History
Research School of Asian and
Pacific Studies
Australian National University
Ph 062493153
Fax 062494917
E-mail: pillans@coombs.anu.
edu.au

Isotopic Stages 6 & 7

Patrick de Deckker
Department of Geology
Australian National University
Ph 062492070
Fax 062495544
E-mail:
patrick.dedeckker@anu.edu.au

DATASETS

What type of information should be sent in association with the abstract for a site? In essence the aim is to gather ALL primary information for the site which has relevance to the interpretations given. A form was sent to the convenors to gather in a standard fashion the basic site information. The form contains fields for site name, type, location (country, state, altitude, lat, long) and what data is available. As in the database this data can be subdivided into separate disciplines. Thus there are geochronology, geochemistry, palaeontology, palaeobotany, stratigraphy and geomorphology tables.

Once a contributor has indicated what datasets exist the relevant table forms will be passed on. The tables and explanatory notes have been sent to the convenors and can be collected from them or from Geoff Hunt. Below is a brief description of each table and a list of field names. Many of the names are self-explanatory while others will require access to the notes. The tables are designed to be used as a spread sheet with field names acting as column headings and for convenience it is preferred that they be supplied digitally to convenors on return.

Please note, although the tables are based on the database fields and we prefer computer versions we are willing to accept other formats (e.g. where contributors already store data on spreadsheets but with different fields or prefer to supply in paper format) to reduce any inconvenience to the contributor. If there are any questions please contact Geoff Hunt.

Geochronology

- Dating for the site using some form of analytical method (such as radiocarbon, ESR, TL, AAR).
- Site name, Depth, Thickness, Method, Laboratory ID Number, Age, Error+, Error-, Material, Reliability, Comments

Stratigraphy

- Holds a listing of lithological features of the deposit. The first table describes the lithological units by depth while the second is for more detail within units (such as sample measurements).
- Sitename, Unit Name, Correlations, Depth, Thickness, Lithology, Structures, Biological Remains, Alterations Present, Comments
- Unit Name, Depth, Thickness, Characteristic, Lower Value, Modifier, Upper Value, Modifier, Units, Trend, Comments

Geochemistry

- Data from chemical analysis of samples (including analyses used to determine geochronological ages). Divided into two tables the first identifying the material being tested and the second for the measurement and depth.
- Sitename, Material, Element Form Analysed, Units, Fossil Name, Comments
- Element Form Analysed, Depth, Thickness, Lower Value, Error, Upper Value, Error

Palaeontology

- A record of the fossil fauna preserved in the deposit. This list includes vertebrates, invertebrates and microfossils (including diatoms, radiolarians, dinoflagellates). The three tables are divided into the nature of the whole deposit, a listing of the species

found and measurements on individual species form.

- Sitename, Upper Age, Modifier, Lower Age, Modifier, Depth, Thickness, Preserving Medium, Name/Correlations, Source, Comments
- Sitename, Family, Genus, Species, Other Name, Status, Identification, Taphonomy, Comments
- Species, Depth, Thickness, Material, No. of Specimens, Minimum No. of Individuals, Abundance, Comments

Palaeobotany

- Data from the preserved macro and microfloral remains. If a pollen record exists and it has been submitted or will be submitted to Geoff Hope (or a minion) for the IndoPacific Pollen Database then a note to that effect is sufficient.
- Sitename, Upper Age, Modifier, Lower Age, Modifier, Depth, Thickness, Preserving Medium, Name/Correlations, Fossil Preservation, Methodology, Comments
- Sitename, Family, Genus, Species, Other Name, Status, Habitat, Taphonomy, Comments
- Species, Depth, Thickness, Material, Lower Value, Modifier, Upper Value, Modifier, Variability/Trend/Abundance, Comments

Geomorphology

- Data of the landforms found at the site. The first table contains a description while the second is for more specific measurements of the landform.
- Sitename, Geomorphological Type, Correlations, Upper Age, Lower Age, Description, Present State, Comments
- Geomorphological Type, Character Measured, Lower Value, Modifier, Upper Value, Modifier, Units, Comments

CLIMATE CHANGE IN THE LATE QUATERNARY OF THE AUSTRALASIAN REGION

CLIMANZ IV

DEPARTMENTAL NEWS

As anticipated in last issue's editorial, the response to requests for information about Quaternary teaching in our universities has been underwhelming. Perhaps few of us think we need such an overview. Never mind, a few responses came in, and here they are. Many thanks for the contributions.

QUATERNARY AT MACQUARIE UNIVERSITY

Paul Hesse reports:

From 2nd semester 1996 I will be teaching a 3rd year unit called "Quaternary Environments" in the School of Earth Sciences. There is currently a course taught by Jim Kohen in the School of Biological Sciences (also at third year) called "Aboriginal impacts on Australian Ecosystems", with a companion fieldwork unit "Aboriginal Resources Fieldtrip". Our students do/will take these courses as part of biology, physical geography, geomorphology or REM (resource and environmental management) degrees. There is also a unit on "Aboriginal Prehistory" at second year which can also be taken by science students. Both Jim and I will be/are supervising Honours and Postgrad students in areas related to the Quaternary, and in fact many of our past and present postgrads supervised by Gary Brierley, Russell Blong, Geoff Humphries and Peter Mitchell have a Quaternary "bent". Diane Hart in Earth Sciences is our resident phytolith expert and John Pickard in the Graduate School of the Environment and Don Adamson have long-standing interests in Quaternary research. In addition, we are lucky to have Lyndall Dawson on our general staff who has expertise in mammalian palaeontology.

MACQUARIE UNIVERSITY

QUATERNARY AT NEW ZEALAND UNIVERSITIES AND OTHER PLACES

James Shulmeister sends the following summary of the major Quaternary "things" going on in the New Zealand Universities and other institutes. If he has missed someone out, do not be offended. Just send an updated report to the Editor ...

Theme 1 - High resolution for last 2000 years

James Goff (Geography, Victoria University of Wellington): Wellington Harbour Sedimentation project. High resolution records for last 150 years, records up to 9,000 BP. European settlement and land clearance.

Paul Williams (Geography, Auckland University): Banding in speleothems and their paleoenvironmental significance (an investigation of plain light and luminescent banding using laser scanning).

Theme II - PEPH

Sarah Gaudening, Jim Cole and Andy Sturman (Geology and Geography, Canterbury University): Volcanic eruptions and southern hemisphere climates. An evaluation of climate and volcanic records to reconstruct the effects of eruptions on the climate.

James Shulmeister, John Carter, Sarah Holt (Geology, Victoria University of Wellington), Jane Soons (Geography, Canterbury University), Neville Moar (Landcare, Lincoln), Glenn Berger (USA) and others TBA: Banks Peninsula Drilling Project. A 75m core of aeolian sourced sediment covering at least one glacial/interglacial cycle is being investigated using sedimentology, diatoms, pollen, forams, phytoliths, C-14 and TL.

Theme III

Paul Williams (Geography, Auckland University): Glacial advances and interstadial/interglacials from the record in New Zealand (Aurora Cave) Fiordland.

Ian Owens (Geography, Canterbury University), Vanessa Brazier and Martin Kirkbride (UK): Modern process studies of rock glaciers and former extent of relict

rock glaciers in the Ben Ohau and Tom Thumb range.

Scott Nichol (Geography, Auckland University): Late Quaternary evolution of Marsden Point barrier, Whangarei Harbour. A study of a last Interglacial dune and barrier beach deposit using TL dating, ground penetrating radar, levelling and sedimentology.

Ursula Cochrane, Mike Hannah and James Goff (Geology, Victoria University of Wellington): Holocene evolution of Lake Kohangapiripiri, Wellington. A detailed reconstruction of the mid-Holocene evolution of a barrier blocked lake using diatoms.

James Shulmeister, Bill McLea and Christiana Singer (Geology, Victoria University of Wellington): Detailed investigation of Younger Dryas age environmental change, NW Nelson and Westland.

Peter Almond (Soil Science, Lincoln): Soil and site factors in indigenous forest management; includes loess and soil stratigraphy studies aimed at providing a relative age chronology for moraines and terraces, plus some pollen work (N.Moar) and TL dating (G.Berger).

Jude Addenbrooke (Soil Science, Lincoln): Soil resources of North Okarito forest, south Westland; includes loess and soil stratigraphy studies aimed at providing a relative age chronology for moraines and terraces, plus some pollen work (N.Moar) and TL dating (G.Berger)

NEW ZEALAND

QUATERNARY AT THE UNIVERSITY OF NEW ENGLAND

Bob Haworth reports:

The following is a summary of Geography courses that touch on or are deeply concerned with Quaternary studies. Geoplan 103 (Australian Landforms and Vegetation) is a general physical geography course, but its "hidden" agenda is to prepare for later Quaternary studies. Last year around 3000 students, external and internal, completed it, but only a few dozen survived to do "deep" Quaternary studies in 3rd year. Other Geography courses with a slight Quaternary touch to them include Geoplan 211 (The Landscape-Atmosphere System), with around 50 students, Geoplan 331 (Geoecology), with around 15-30 students, and Biogeography 391 (Biogeography) with around 15-30 students. Geoplan 341 (Geomorphology) places a special reference to the events of the last 2 million years, and is attended by around 15-30 students.

That's the good news. The bad news [at least as far as UNE is concerned; Editor's note] is that Stephen Gale is leaving in January for Sydney University, Jeremy Smith (Biogeography and Geoecology) is in Antarctica for 18 months, and I am the only fulltime permanent staff member left teaching *any* kind of physical geography! How much Quaternary I can fit in I don't know, and I don't know who will replace Stephen, *if* he is replaced. Bruce Thom [UNE V.C.] has offered to help out, and Bert Jenkins (from Ecosystem Management) has replaced Jeremy for 18 months.

UNIVERSITY OF NEW ENGLAND

INQUA

**XIV CONGRESS
BERLIN**

The following is a report on the Berlin INQUA meeting from Bob Fulton (e-mail fulton@gsc.emr.ca), distributed recently on the CANQUA Quaternary e-mail list (see elsewhere in this volume for details). Since Bob's report has been circulated (widely) there, it should be OK to reproduce it here. It will give you some idea of the richness of the e-mail list information. However, please let the Editor know if this sort of publishing is not on! In the meantime, here is Bob Fulton's report:

**XIV INQUA Congress
Berlin, August 3-10 1995**

Several requests have been made for reports on the recent INQUA Congress. Here is a copy of a report that I wrote for my employer and which was also published in the Fall 1995 issue of the CANQUA Newsletter

INQUA was not the smash organizational success that was expected of a German meeting. There were complaints of delays in the passing on of information, lost reservations, poor meeting rooms, poorly structured sessions, and high costs. Costs probably had the most detrimental effect on the meeting attendance. Originally, as many as 1500 participants had been expected but in the end the meeting was attended by just over 1000. A total of 21 field trips were originally offered but there were enough registrants for only 7. Forty-four one-day excursions were offered but only 18 were run, and of the 13 accompanying member activities, only 2 were run. (As an example of how costs escalated: I originally planned on taking a DM 1500 trip, which with the \$.80 DM value of two years ago would have cost \$1200. After a tourist agent was brought in to organize the field excursions, this trip went to DM 2600, and at the same time the German mark was selling for \$1.) Apparently, the Federal and local governments would not provide the support requested and most financial support came from the universities. The universities put more than DM 300,000 into the meeting. To the credit of the

organizers, more than half of this money went to assuring participation of third world countries. They paid participants.

The meeting was held at the Freie Universitat Berlin with about 900 papers on the program being given in 10 simultaneous sessions. Sessions were held in two buildings, which made it a little difficult to paper hop but the main difficulty was meeting room seating. The arrangement was close-packed theatre-style so it was necessary to stand to let anyone in or out and there were no centre or rear aisles so it was necessary to walk in front of the speaker to cross the room. Also, as little space was available in university residences, congress participants were scattered around the city in moderately expensive to very expensive accommodation.

Program

The program had the usual number of no-shows and papers inserted at the last moment. And as usual, there was a mix of very good and almost completely unintelligible presentations. Some interesting items that I picked up follow.

The geological surveys in the eastern part of Germany have been working on a major stratigraphic mapping program. What they are preparing are lithofacies maps of each stratigraphic layer at a scale of 1:50 000. They are beginning at the surface and working downwards. Much work has been done without the aid of computers but they are now beginning to scan finished maps so they will be easier to update. They are dealing with about 250 000 boreholes and 60 major open pit mines, and have set up more than 300 Quaternary units.

More work has been done on what the Swedish have called "Rogen" moraine. One speaker from Sweden said that the North American term "ridged moraine" is more appropriate because it is more general and covers the wide variety of features included in this group of features. It was also said that the specific sedimentology of ridged moraine features was of no significance because they were formed by a moulding or pushing of existing deposits.

There were a fair number of papers on groundwater systems and drainage of meltwater from the base of retreating ice sheets. This seems to be a popular subject

with the modellers at the moment. The general picture was that substrate controlled ice sheet drainage. If the substrate was hard and largely impermeable, meltwater collecting at the base of the ice drained through channels in the ice and where debris was present eskers were formed. Where the substrate was permeable, the meltwater was discharged largely as groundwater. Where the substrate was largely poorly permeable soft materials, tunnel valleys are the most likely form of meltwater drainage. There was no mention of sub ice storage of large volumes of water and subsequent mega floods.

A "Friends of the Varves" group has been organized. Bertil Ringberg is in charge. A database for Swedish varve information has been set up in Sweden, a newsletter is planned. If anyone is interested, I have the address of the newsletter editor. Also, they plan on using John Smol's paleolimnology listserver as an electronic communication site. Computer techniques have been used to check the New England varve correlations made by Antevs. (Apparently these were largely discredited by North American workers). Antev's work came out very well. A varve workshop/field trip is planned for the area in September, 1996.

Controversy continues as to the extent of former glaciers in Russia. It was claimed that a large Siberian ice sheet existed which, in addition to covering the mountainous areas of northeast Asia, extended onto the adjacent shelf, over much of Beringia, and even effected Herschel Island. The main evidence used for this was landforms, with the many oriented ponds in the area being interpreted as glacial scour features.

Interesting work is being done in United States on the evolution of neotectonic features around a "Hot Spot". This follows the Yellowstone "Hot Spot" from its earliest manifestations with extrusion of Columbia River Basalts about 15 Ma. Using a system of classifying faults according to age, it has been shown how a belt of faulting, uplifting, and tilting that has migrated to the northeast at a rate of about 2.9 mm per year.

INQUA continues to struggle with the subdivision and indeed the extent of the Quaternary. It has recently been decided to officially place the contact between Upper and Middle Pleistocene at the base

of the Eem in the type section in Holland. Problems have been pointed out with the current type section for the base of the Pleistocene at Vrica, Italy. For one thing it appears to represent only the upper part of the Villa Franchian (the first recognized Late Cenozoic European cold period). Also, it was said to mark the first occurrence of several cool climate foraminifer. It however, has been shown that these forams appear in the world oceans 20 to 80 ka earlier. Another problem is that the Olduvai is not as easily located or defined as was originally thought (it was shorter and apparently a multiple event). A number of groups and individuals would like to see the base of the Pleistocene moved to the Gauss/Matuyama reversal (now said to have occurred about 2.6 Ma at the beginning of marine oxygen isotope stage 104) as they feel this approximated the time of first major late Cenozoic cooling. The Italians are trying very hard to keep the type section for the base of the Quaternary in Italy and also established as the type for the contact between the Middle and Lower Pleistocene (at the Brunhes/Matuyama reversal). Apparently, there are excellent marine sections in both Japan and New Zealand which could be established as stratotypes for Lower and Middle Pleistocene boundaries.

Geological evidence of past tsunamis are now an important considerations in assessing hazards of coastal areas. This is in part because of the realization that tsunamis can occur in tectonically stable areas. This has been driven home by the discovery of evidence for a major tsunami around the North Sea about 7 ka. The thought is that this might have been caused by a submarine slide. There is concern over the ramifications such an event would have on the North Sea oil operations and on the large urban centres sited on this water body. Along the same line, progress has been made in interpreting earthquake damage in terms of earthquake strength. This is making it possible to extend the record of paleoseismicity into the past.

One-Day Field Excursion

Sunday during the meeting was devoted to day field trips. I took one that looked at stratigraphy in three open pit coal mines south of Berlin. Much of the area south of Berlin is flat and underlain by outwash or eolian sand so the coal mines are virtually the only exposures. In the course of the

trip we crossed the Weichselian (Wisconsinan) and Saalian (Illinoian) glacial limits. An interesting observation is that where till is exposed at the surface there are no paleosols as apparently periglacial erosion was vigorous enough during each glaciation to remove the paleosol formed during the previous interglaciation.

On the trip we saw deposits which pretty much spanned the Middle and Late Pleistocene. An interesting point of note is that there are no magnetically reversed Quaternary deposits in northern Germany. The oldest Quaternary sediment seen was a normally magnetized gravel which contained no Nordic material. It underlay two tills from the Elsterian Glaciation (about 500 ka) which were separated by sand and gravel. The Elsterian Glaciation deposits were overlain by marly and diatomaceous lake deposits assigned to the Holsteinian Interglaciation. In this area the Holsteinian Interglaciation was relatively cool and lasted a little less than 15 ka. This was overlain by up to three tills separated by two stratified units assigned to the Saalian Glaciation. We did not see warm period deposits between these units but they do exist so apparently the Saalian Glaciation (like the Illinoian of the Midwest US) consisted of several major advances which were separated by nonglacial periods that probably were equivalent to interglacials. The Saalian advances might correlate with marine oxygen isotope stages 6, 8, and 10. The succession of Upper Pleistocene deposits which we saw was exceptionally complete. It consisted of organic rich silts and sands that were deposited in an undrained depression. The pollen data indicated a change of climate from cool conditions to an interglacial maximum, and then fluctuation through two cool and two warm cycles. The cooler deposits were dominantly silt and sand whereas the warmer ones contained fair quantities of organic materials. These deposits were said to represent marine oxygen isotope substages 5a, 5b, 5c, 5d, and 5e. On top was wind deposited and cryoturbated sand.

The German geologists have done an excellent job of recording and interpreting the geology exposed in the coal mines. Unfortunately, soft coal mining has stopped in northern Germany, pits are being rehabilitated and so these excellent sources of Quaternary stratigraphic information are being lost.

INQUA Commissions and Business

The congress included many commission meetings and business meetings where activities for the next intercongress period were planned. In general, the executive wants to move away from commissions which seem to take on lives of their own and instead to promote projects which would cover limited fields and be completed in a set time. An amendment has been made to the constitution to limit the life of a commission to two intercongress periods. This new philosophy was not enthusiastically embraced by many national delegates who see their prestige in the organization as dependent on the number of commissions they can operate from their countries. Some commissions are however, attempting to change and to operate more on an individual project basis.

The old commission on Nature and Genesis of Glacial Materials has changed its name to "Quaternary Glaciations". The glacial tectonics group (J. Hart) is going to place emphasis on processes occurring at the base of ice sheets. The geospatial group (J. Aber) will emphasize work on data which can be used in modelling. Subglacial processes (J. Rose) will work on relationship of landforms, materials and structure to subglacial hydrogeology. The extent and chronology of glaciations (J. Mangerud) will place emphasis on what happened during the last glacial cycle with attempts to compare it with earlier cycles. Other groups that will be active are: sedimentology of deposits (D. van der Lieter), Monsoons in Asia, Peribaltic region, and the southeastern part of the Scandinavian ice sheet. The focus will be on processes associated with glaciation in an attempt to better understand development, movement, and chronology of glaciations. They are planning on enhancing communication through use of the World Wide Web.

The Quaternary shorelines commission is going to maintain its many regional subcommissions. Their main objective will be obtaining an understanding of coastal dynamics during the Quaternary. They will be looking at interglacial sea levels, sea level changes on continental shelves, coral reefs, sediment sources and sinks, sea level changes associated with seismic events, and the impact of El Nino events on coasts and sea level.

The loess commission will continue to work on regional correlation of loess and will look at correlation between northern and southern hemispheres. They want to hold a meeting jointly with the paleopedology commission and have meetings planned for Siberia and Brazil.

Tephra chronology continues as one of the most dynamic commissions. They will change their name to "Volcanology" in order to indicate the broad scope of their work. They want to extend their database on widespread tephra events, improve techniques for characterizing microtephras and for high resolution dating, bring out hazards and impacts of eruptions, and to emphasize training in developing countries.

The paleopedology commission wants to work at establishing mathematical relationships between soil genesis and climate. Working groups are being established or maintained on: paleosol classification, diagenesis, dating, and definition and terminology. Specific projects will deal with: paleosols in stratigraphy, classification of paleosols, climatic interpretations, and a better understanding of "thresholds" in soil development.

The Holocene commission will establish or continue subcommissions dealing with data handling methods, latitudinal treeline movements, and the impact of man during the Holocene.

The commission on global continental hydrology will carry projects related to the methodology of obtaining and interpreting information on paleofloods, the paleohydrology of large river basins of the world and their response to climate change, and a European transect of similar-sized basins which will look at reconstructing paleogroundwater conditions of the last 20 ka.

The stratigraphy commission is to be reorganized but its prime task will continue to be the definition of the main boundaries within the Quaternary. In addition they want to place emphasis on the stratigraphy, paleontology etc. of deposits which contain the main paleomagnetic reversals.

The work of the paleoclimate commission is also subject to review. They would like everyone working in the Quaternary to

make the commission aware of paleoclimatic aspects of their work. Specific projects they have in mind are: paleoclimatic cycles between the Olduvai and the Brunhes/Matuyama reversal, a transect of the Atlantic from North America to Europe, and the role of climate in forcing geological processes.

The paleogeographic atlas commission is another one that is under review. Their Northern Hemisphere atlas has been completed and published but plans for Southern Hemisphere and world atlases have run into problems because of lack of information and of volunteers who can provide the necessary Southern Hemisphere expertise.

A number of other commissions were mentioned but no reports or plans were presented. A new commission on the carbon cycle is being established. The Early Man Commission has been disbanded but the executive is hoping to receive a new proposal. The commissions on South America, Global Change, and Applied Quaternary were all discontinued because they had been unable to generate any activity or because it was felt that the commission had achieved its objectives.

New Executive and Next Meeting

The new executive consists of: President, S.C. Porter (U.S.A.); Secretary, S. Haldorsen (Norway), Treasurer, E. de Mulder (The Netherlands), Vice Presidents, M. Iriondo (Argentina), Y. Ota (Japan), T.C. Partridge (South Africa), and N.J. Shackleton (U.K.).

The XV Congress will be in Durban, South Africa in early August 1999. The theme of the congress will be Africa, cradle of humankind during the Quaternary.

Conclusions

There may have been some problems in getting the IVX Congress off the ground but in the end the meeting served its primary purpose, which is to make it possible for Quaternary scientists from around the world to meet and discuss their work.

Attendance statistics

Koji Okumura (e-mail: kojiok@gsjrstn.gsj.go.jp), followed up Bob's report with a report on attendance statistics prepared for the Japanese-QUA report on Berlin congress. The numbers are based on the participant list distributed on the last day of the congress. Koji suggests that the lists are probably incomplete. Nevertheless, they give an useful overview.

By region:

Europe	645	Asia	109
N. America	106	CIS	56
Oceania	19	S. America	16
Africa	13	Middle East	9
C. America	2	unknown	1

By nation:

Argentina	7	Australia	14
Austria	6	Bangladesh	1
Belarus	2	Belgium	23
Brazil	6	Bulgaria	2
Canada	28	Czech	7
Chile	1	China	41
Denmark	8	Estonia	2
Finland	20	France	46
Georgia	2	Germany	273
Greece	5	Hong Kong	3
Hungary	6	India	5
Ireland	3	Israel	9
Italy	43	Japan	44
Latvia	2	Lithuania	6
Mexico	1	New Zealand	5
Norway	10	Panama	1
Poland	20	Portugal	1
Russia	39	Slovakia	4
Slovenia	2	South Africa	11
South Korea	4	Spain	12
Sri Lanka	1	Sudan	1
Sweden	21	Switzerland	20
Taiwan	10	The Netherlands	39
U.S.A.	78	Uganda	1
Ukraine	1	United Kingdom	76
unknown	1	Venezuela	2

*XIV INQUA CONGRESS
BERLIN*

**CONFERENCE AND MEETING
NEWS**

4-6 January 1996. **Quaternary Research Association & Association of Environmental Archaeologists: Perspectives on the Holocene Environments of Prehistoric Britain, England.** Contact: Prof. K.J. Edwards, Department of Prehistory & Archaeology, University of Sheffield, Sheffield S10 2TN, England. Phone: 44 114 282 5026/5030; Fax: 44 114 272 2563; e-mail: k.j.edwards@sheffield.ac.uk

19-23 February 1996. **13th Australian Geological Convention & AGSO Jubilee Symposium,** Canberra, Australia. Contact: 13th AGC, ACTS, G.P.O. Box 2200, Canberra, ACT 2601, Australia. Phone: 62 6 257-3299; Fax: 61 6 257 3256.

26-28 February 1996. **CLIMANZ IV - Climate change in the Late Quaternary of the Australasian Region,** Canberra, Australia. Contact: Geoff Hunt, Australian Geological Survey Organisation, P.O. Box 378, Canberra, ACT 2601, Australia. Phone: 61 6 249 9770; Fax: 61 6 249 9970; e-mail: ghunt@agso.gov.au.

17-21 April 1996. **Coast to Coast '96: Australia's Coastal Management Conference,** Adelaide, Australia. Contact: Coast to Coast '96 Secretariat, Sapro Marketing, P.O. Box 8253, Hindley Street, Adelaide SA 5000, Australia. Phone: 61 8 212 7555; FAX: 61 8 212 7148.

22-26 April 1996. **8th International Conference on Luminescence and Electron Spin Resonance Dating (LED 1996),** Canberra, Australia. Contact: Mrs Judy Papps, Quaternary Dating Research Centre, ANH, RSPAS, Australian National University, Canberra, ACT 0200, Australia. Phone: 61 6 249 4764; Fax: +61 6 249 0315; e-mail: Judy.Papps@anu.edu.au.

6-8 May 1996. **International Symposium on Transect Studies on Global Change and Biodiversity (TSGB),** Beijing, China. Contact: Secretariat of TSGB Symposium, Centre for Plant Ecology, Institute of Botany, The

Chinese Academy of Sciences, 141 Xizhimenwai Avenue, Beijing 100044, China. Phone: 86 10 835 3831 ext. 274 Or 293; Fax: 86 10 831 9534; e-mail: zhangxs@bepc2.ihep.ac.cn

27-29 May 1996. **Geological Association of Canada Annual Meeting,** Winnipeg, Canada. Contact: Ken Harris, Minnesota Geological Survey, 2642 University Ave., St. Paul, Minnesota, 55114-1057; Fax: 204 261 7581; e-mail: harri015@maroon.tc.umn.edu or jt_teller@umanitoba.ca

22-29 June 1996. **Ninth International Palynological Congress,** Houston, Texas, U.S.A. Contact: D.J. Nichols, U.S. Geological Survey, MS 919, Box 25046, Denver, Colorado 80225-0046, USA. Phone: 303-236-5677; FAX: 303-236-5690; e-mail: dnichols@greenwood.cr.usgs.gov

1-4 August 1996. **Climatic Change - The Karst Record,** Bergen, Norway. Contact: Dr. S. E. Lauritzen, Department of Geology, Bergen University, Allegaten 41, N-5007 Bergen, Norway; Phone: (47) 55-32 08 95; Fax: (47) 55 32 44 16; e-mail: Stein.Lauritzen@geol.uib.no

4-14 August 1996. **30th International Geological Congress,** Beijing, China.

5-10 August 1996. **28th International Geographic Congress: Land, Sea and Human Effort,** The Hague, The Netherlands. Contact: Congress Secretariat 28th IGC, Faculteit Ruimtelijke Wetenschappen Universiteit Utrecht, Postbus 80.115, 3508 TC Utrecht, The Netherlands. Phone: 31 30 532 044; Fax: 31 30 540 604; e-mail: r.vanderlinden@frw.ruu.nl.

22-28 September 1996. **Wetlands for the future: INTERCOL's V International Wetlands Conference,** Perth, Australia. Contact: Secretariat, UWA Extension Conference & Seminar Management, The University of Western Australia, Nedlands, Perth 6907, Australia. Phone: 61 9 380 3181/2433; Fax: 61 9 380 1066; e-mail: uwaext@uniwa.uwa.edu.au.

July 1997. **VIII Pacific Science Inter-Congress: Islands in the Pacific Century,** Suva, Fiji Islands. Contact: Secretariat, VIII Pacific Science Inter-Congress, c/- School of Pure and Applied

Sciences, The University of the South Pacific, PO Box 1168, Suva, Fiji Islands. Phone: 679 313 900 ext 2691 or 2430; Fax: 679 302 548; e-mail: pas@usp.ac.fj.

28 August - 3 September 1997. **IV International Conference on Geomorphology**, Bologna, Italy. Contact: IV International Conference on Geomorphology, Planning Congressi s.r.l., Via Crociali 2, I-40138 Bologna (Italia).

June 1999. **19th Pacific Science Congress**, Sydney.

RECENT PUBLICATIONS

Alloway, B.V., Lowe, D.J., Chan, R.P.K., Eden, D.N. & Froggatt, P.C. 1994. Stratigraphy and chronology of the Stent tephra, a c. 4000 year-old distal silicic tephra from Taupo Volcanic Centre, New Zealand. *New Zealand Journal of Geology and Geophysics*, 37, 37-47.

Anon. 1994. *CSIRO Division of Atmospheric Research Research Report 1992-1994*. CSIRO Division of Atmospheric Research, Mordialloc, Victoria.

Argue, D. 1995. Aboriginal occupation of the Southern Highlands: Was it really seasonal? *Australian Archaeology*, 41, 30-36.

Argue, D. 1995. Discovery of a possible digging stick in the southeastern region of Australia. *Australian Archaeology*, 41, 38-40.

Baban, S.M.J. 1995. The use of Landsat imagery to map fluvial sediment discharge into coastal waters. *Marine Geology*, 123-263-270.

Bartarya, S.K. & Sah, M.P. 1995. Landslide induced river bed uplift in the Tal valley of Garhwal Himalaya, India. *Geomorphology*, 12, 109-121.

Bauer, B.O. & Allen, J.R. 1995. Beach steps: An evolutionary perspective. *Marine Geology*, 123, 143-166.

Benoit, P.H. 1995. Meteorites as surface exposure time markers on the Blue Ice Fields of Antarctica: Episodic ice flow in Victoria Land over the last 300,000 years. *Quaternary Science Review*, 14, 531-540.

Bird, M. 1995. Coastal morphodynamics and the archaeological record: Further evidence from Upstart Bay, north Queensland. *Australian Archaeology*, 41, 57-58.

Bowman, D. 1995. Two examples of the role of ecological biogeography in Australian prehistory: The fire ecology of *Callitris intratropica*, and the spatial pattern of stone tools in the Northern Territory. *Australian Archaeology*, 41, 8-11.

Bradley, R.S. & Jones, P.D. 1995. *Climate since A.D. 1500*. Routledge, New York & London.

Bradshaw, E. 1995. Dates from archaeological excavations on the Pilbara coastline and islands of the Dampier Archipelago, Western Australia. *Australian Archaeology*, 41, 37-38.

Clarkson, B.R., McGlone, M.S., Lowe, D.J. & Clarkson, B.D. 1995. Macrofossil and pollen representing forests of the pre Taupo volcanic eruption (c. 1850 yr BP) era at Pureora and Bennydale, central North Island, New Zealand. *Journal of the Royal Society of New Zealand*, 25, 263-281.

Crowley, G.M. 1994. Quaternary soil salinity events and Australian vegetation history. *Quaternary Science Reviews*, 13, 15-22.

Crowley, G.M. 1994. Groundwater rise, soil salinization and the decline of *Casuarina* in southeastern Australia during the late Cenozoic. *Australian Journal of Ecology*, 19, 417-424.

Crowley, G.M. & Kershaw, A.P. 1994. Late Quaternary environmental change and human impact around Lake Bolac,

- western Victoria, Australia. *Journal of Quaternary Science*, 9, 367-377.
- Crowley, G.M. & Gagan, M.K. in press. Holocene evolution of coastal wetlands in wet-tropical Australia. *Holocene*, 5.
- Derbyshire, E. 1995. *Windblown sediments in the Quaternary record*. Quaternary Proceedings, No. 4, Wiley.
- Dixon, G. & Aitken, D. (eds) 1995) *Institute of Australian Geographers: Conference Proceedings, 1993*. Monash Publications in Geography No. 45.
- Gale, S.J., Haworth, R.J. & Pisanu, P.C. 1995. The 210Pb chronology of Late Holocene deposition in an eastern Australian lake basin. *Quaternary Science Reviews*, 14, 395-408.
- Glassford, D.K. & Semeniuk, V. 1995. Desert-aeolian origin of late Cenozoic regolith in arid and semi-arid Southwestern Australia. *Palaeogeography, Palaeoclimatology, Palaeoecology*, 114, 131-166.
- Green, J.D. & Lowe, D.J. 1994. Origins and development. Pp. 13-23 in J.S. Clayton & M.D. de Winton (eds) *Lake Rotoroa: Change in an Urban Lake*. National Institute of Water & Atmospheric Research (NIWA) Ecosystems Publication 9.
- Hennessy, K.J., Whetton, P.H. & Pittock, A.B. (eds) 1995. *CSIRO Climate Change Research Program: Collaboration in scenario development and impact projects 1990-1995*. CSIRO Division of Atmospheric Research, Mordialloc, Victoria.
- Hope, G. & Tulip, J. 1994. A long vegetation history from lowland Irian Jaya, Indonesia. *Palaeogeography, Palaeoclimatology, Palaeoecology*, 109, 385-398.
- Kershaw, A.P. 1994. Pleistocene vegetation of the humid tropics of northeastern Queensland, Australia. *Palaeogeography, Palaeoclimatology, Palaeoecology*, 109, 399-412.
- Kittel, T. (ed.) 1995 Special issue: Results from the model evaluation consortium for climate assessment (MECCA). *Global & Planetary Change*, 10, 3-238.
- Lin, C., Melville, M.D., White, I. & Wilson, B.P. 1995. Human and natural controls on the accumulation, acidification and drainage of pyritic sediments: Pearl River Delta, China and coastal New South Wales. *Australian Geographic Studies*, 33, 77-88.
- Lowe, D.J. & Hogg, A.G. 1995. Age of the Rotoehu Ash. *New Zealand Journal of Geology and Geophysics*, 38, 399-402.
- Maddy, D. & Brew, J.S. (eds) 1995. *Statistical modelling of Quaternary Science data*. Quaternary Research Association Technical Guide No. 5.
- Mitchell, C.D. (ed.) 1995. *Climate change Projects 1994-95*. CSIRO Division of Atmospheric Research, Mordialloc, Victoria.
- Nanson, G.C., Barbetti, M. & Taylor, G. 1995. River stabilisation due to changing climatic and vegetation during the late Quaternary in western Tasmania, Australia. *Geomorphology*, 13, 145-158.
- Newnham, R.M., de Lange, P.J. & Lowe, D.J. 1995. Holocene vegetation, climate, and history of a raised bog complex, northern New Zealand, from palynology, plant macrofossils, and tephrochronology. *The Holocene*, 5, 267-282.
- Newnham, R.M., Lowe, D.J. & Wigley, G.N.A. 1995. Late Holocene palynology and palaeovegetation of tephra-bearing mires at Papamoa and Waihi Beach, western Bay of Plenty, North Island, New Zealand. *Journal of the Royal Society of New Zealand*, 25, 283-300.
- Nodder, S.D. 1995. Late Quaternary transgressive/regressive sequences from Taranaki continental shelf, western New Zealand. *Marine Geology*, 123, 187-214.
- O'Connor, S. 1995. Carpenter's Gap rockshelter 1: 40,000 years of Aboriginal occupation in the Napier Ranges, Kimberley, W.A. *Australian Archaeology*, 41, 58-59.
- Okhouchi, N., Kawahata, H., Okada, M., Murayama, M., Matsumoto, E., Nakamura, T. & Taira, A. 1995. Benthic foraminifera cadmium record from the western equatorial Pacific. *Marine Geology*, 127, 167-180.

- Pain, C.F. & Ollier, C.D. 1995. Inversion of relief -- A component of landscape evolution. *Geomorphology*, 12, 151-165.
- Pate, F.D. 1995. Palaeodietary inferences from bone collagen stable isotopes at Roonka Flat, South Australia. *Australian Archaeology*, 41, 57.
- Perillo, G.M.E. (ed.) 1995. *Geomorphology and sedimentology of Estuaries*. Developments in Sedimentology Vol. 53, Elsevier.
- Pillans, B. & Walker, P. 1995. Landscape and soil development on Monaro Basalt west of Nimmitabel, New South Wales. *Australian Geographical Studies*, 33, 193-211.
- Pinxian, W., Luejiang, W., Yunhua, B. & Zhimi, J. 1995. Late Quaternary paleoceanography of the South China Sea: Surface circulation and carbonate cycles. *Marine Geology*, 127, 145-165.
- Prescott, J.R. & Hutton, J.T. 1995. Environmental dose rates and radioactive disequilibrium from some Australian luminescence dating sites. *Quaternary Science Reviews*, 14, 439-447.
- Sammut, J., Melville, M.D., Callinan, R.B. & Fraser, G.C. 1995. Estuarine acidification: Impacts on aquatic biota of draining acid sulphate soils. *Australian Geographical Studies*, 33, 89-100.
- Scriven, L.J., McLoughlin, S. & Hill, R.S. 1995. *Nothofagus plicata* (Nothofagaceae), a new deciduous Eocene macrofossil species, from southern continental Australia. *Review of Palaeobotany & Palynology*, 86, 199-209.
- Shulmeister, J. & Lees, B.G. 1995. Pollen evidence from tropical Australia for the onset of an ENSO-dominated climate at c. 4000 BP. *The Holocene*, 5, 10-18.
- Siesser, W.G. 1995. Paleoproductivity of the Indian Ocean during the Tertiary Period. *Global & Planetary Change*, 11, 71-88.
- Smith, M.A. 1995. Radiocarbon dates for bifacial points at Scotch Creek 1, Northern Territory. *Australian Archaeology*, 41, 40-41.
- Smith, N. 1995. Recent hydrological changes in the Avoca River catchment, Victoria. *Australian Geographical Studies*, 33, 6-18.
- Tamrat, E., Thouveny, N., Taôeb, M & Opdyke, N.D. 1995. Revised magnetostratigraphy of the Plio-Pleistocene sedimentary sequence of the Olduvai formation (Tanzania). *Palaeogeography, Palaeoclimatology, Palaeoecology*, 114, 273-283.
- Tanaka, K., Machette, M.N., Crone, A.J. & Bowman, J.R. 1995. ESR dating of aeolian sand near Tennant Creek, Northern Territory, Australia. *Quaternary Science Reviews*, 14, 385-393.
- Ulm, S., Barker, B., Border, A., Hall, J., Lilley, I., McNiven, I., Neal, R. & Rowland, M. 1995. Pre-European coastal settlement and use of the sea: A view from Queensland. *Australian Archaeology*, 41, 24-26.
- van der Kaars, W.A. & Dam, M.A.C. 1995. A 135,000-year record of vegetational and climate change from the Bandung area, west-Java, Indonesia. *Palaeogeography, Palaeoclimatology, Palaeoecology*, 117, 55-72.
- White, J.P. & Flannery, T. 1995. Late Pleistocene fauna at Spring Creek, Victoria: A re-evaluation. *Australian Archaeology*, 41, 13-17.

**QUATERNARY
E-MAIL LISTS,
INTERNET PAGES &
ELECTRONIC JOURNALS**

With the growing interest in so-called "cyberspace", it is unsurprising to find an increasing number of that specialist e-mail lists, Internet pages and electronic journals and newsletters. Amongst the noise, there is always something useful.

In the last issue, our President, Ian Thomas, made some preliminary comments about the need or desirability of establishing some form of electronic communication amongst AQUA members. Little has happened on that front, yet. However, I have received some comment supporting the idea. Paul Hesse, for example, writes as follows.

- I was pleased to see the report from Jim Bowler on the INQUA executive meeting in Kathmandu. I would also have liked to see some report of the PAGES meeting it coincided with and in fact all the other meetings that several people attend as representatives of AQUA or the Australian Quaternary community. A couple of issues ago there was a plea (belated by the time it was mailed out [apologies from the editor]) for submissions for a collective ARC application. For those of us not on the meeting/committee circuit there is no method of getting information about what is going on at the "executive" level other than word of mouth. I would like to see QA become a venue for reporting what goes on in bodies such as AQUA, INQUA, PAGES, IGBP, IGCP, National Committee for Quaternary Research, etc. An electronic web site or e-mail list may be a way to make the information more current. You can put this gripe in the next QA as a letter to the Editor if you like. And yes, it's probably partly a reaction to being isolated in Sydney!

If that is not support for electronic development, what is? We should undoubtedly get going on this, and many AQUA members will presumably make good use of such a service. There are some members, of course, who for various reasons do not have access to the net. It should be possible to publish digests of

any AQUAlist in *Quaternary Australasia*, which while not having the immediate urgency of an electronic mailing list, will certainly keep everyone more-or-less up to date. After all, what are a few months in Quaternary time???

In the meantime, the following might serve as a partial surrogate for electronic time travel in Australasia. The following represents an entirely unrepresentative sample of e-mail lists, world wide web pages and electronic newsletters and journals which should be of interest to Quaternarists. There are undoubtedly many other relevant lists, pages and electronic publications. These can and will be listed here in the next issue, ONLY if the editor knows about them. And how does the editor get to know about them ...? Only if someone tells him ... If you have a favourite list, page or publication, send details to Bill Boyd at:

bboyd@scu.edu.au

In the meantime, here are some to start with.

**QUATERNARY LIST:
CANADIAN RESEARCH IN
QUATERNARY SCIENCE**

A new listserver has been created for all interested in research in the Quaternary sciences, particularly, but not exclusively, in Canada. This listserver was established through the initiative of the Canadian Quaternary Association, especially Dana Naldret and Dave Liverman, with the assistance from the Memorial University of Newfoundland, and the Newfoundland Department of Mines and Energy. We hope that this will be of interest to anyone with an interest in the Quaternary geological period, including geologists, geomorphologists, soil scientists, palaeo-environmentalists, archaeologists, paleont-ologists, geochronologists, palyno-logists, geotechnical engineers, and many others.

A listserver consists of an automated mailing list. Any message sent to the list is automatically passed on to all subscribers on the list. Typical messages include announcements about conferences, field trips, job vacancies, new papers, new books, requests for assistance in locating references, people and resources,

discussion of research ideas, general theory, etc., exchange of news, and anything that the list members think appropriate. This is a useful medium for groups whose members are geographically widespread. For it to be effective we need to build up our numbers to 100 or so, so please forward this message to anybody who you think may be interested.

In particular, many items interesting to CANQUA members will appear on the list, including the newsletter, meeting announcements, and other CANQUA business. This does not mean, however, that it is only for CANQUA members! We welcome anyone who wants to subscribe.

To subscribe send the following message to:

listserv@morgan.ucs.mun.ca

SUBSCRIBE QUATERNARY Your name

You should receive acknowledgement of your subscription.

The listowner is Dave Liverman, who can be reached at:

dgl@zeppo.geosurv.gov.nf.ca

Contact him if you have any problems.

Messages to the list should be sent to:

QUATERNARY@morgan.ucs.mun.ca

This address can be used only to send messages to everyone on the list. The list has a mail digest facility which stores messages in a digest, and mails them to the subscriber when the digest exceeds a certain number of lines, or after a given time period. Useful if you don't want your mailbox filled with messages!

There is also an archive facility, in which past issues of the Quaternary digest have been archived through the good graces of the Newfoundland Geological Survey. To obtain these use FTP to connect to:

zeppo.geosurv.gov.nf.ca.

A typical session should look like this:-
>ftp zeppo.geosurv.gov.nf.ca login: guest
or anonymous password: e-mail address
cd pub cd quat dir -- gives list of files --

get May94 -- gets file holding messages from May, 1994.

QUATERNARY RESEARCH ASSOCIATION: WWW HOME PAGE AND E-MAIL DIRECTORY

Details of Quaternary Research Association (the British Quaternary Association, abbreviated to QRA) meetings, membership forms and QRA publications are now available on the web. Links to departments with Quaternary interests, other societies with similar aims, conference information and so on will be added on request. Once into the page readers can find information about the QRA and links to other relevant Quaternary sites.

The QRA WWW URL is:

<http://www2.tcd.ie/~pcoxon/qra.html>

A directory of QRA member's e-mail addresses has been compiled for distribution to all those wishing to participate. The compiled directory is sent to all respondents and parts of the current Circular and other information will be sent by e-mail to those on the QRA e-mail directory. This service will not replace the existing system of mailing to QRA members, but it will allow rapid information updates to be made as well as additional conference to be circulated quickly.

Pete Coxon, the QRA Secretary, is compiling an e-mail directory of members from information e-mailed to him at:

pcoxon@tcd.ie

If you want to be entered on this list, use the following format for your entry:

<your name> <brief address> space
<e-mail address> all on one line.

The Secretary will reply to all respondents to check that the e-mail address works, and mail back a membership list. If the address provided is inoperative, it will not be included in the directory.

**ELECTRONIC JOURNAL:
GLACIAL GEOLOGY &
GEOMORPHOLOGY**

The new electronic journal, *Glacial Geology & Geomorphology* is now fully operational on the following WWW site:

<http://ggg.qub.ac.uk/ggg>

This site is interactive and will show you most of the things you need to know about the new journal. You can see a mock of the journal and get information about subscription and instructions for authors etc. The first issue will be published in spring 1996. This is a fully refereed journal and contributions are now being sought on any branch of glacial geomorphology, glacial geology and glacial sedimentology. This electronic journal offers the possibility of colour diagrams, images as well as video clips. There are moderated comments on published papers as well as book reviews, technical notes and an alerting service for new papers coming on line.

GGG is published on behalf of the British Geomorphological Research Group by John Wiley and Sons Ltd. For more information, e-mail:

W. Brian Whalley
b.whalley@qub.ac.uk
or
e.journal@qub.ac.uk

School of Geosciences
The Queen's University
Belfast BT7 1NN, UK

**ARCLING:
LANGUAGE, ANTHROPOLOGY
AND ARCHAEOLOGY**

The ARCLING e-mail listserver exists to promote discussion on the interface between archaeology/prehistory and language, conceived in the broadest terms. An additional focus of the list is inter-relations of archaeology and language with ancient DNA studies and comparative anthropology. Subscribers are urged to post questions, ideas, notices of new findings, conference and workshop announcements, book titles or reviews that relate to these disciplines or related matters.

The list is unmoderated (i.e. all messages sent to the list will go to all people currently subscribed to ARCLING), so subscribers should themselves exercise moderation. Postings should be limited to 150 lines except in exceptional cases and should have a succinct one-line summary at the head. Replies to questions should initially be sent to the individual concerned who will ideally post a summary after some time.

This list was mooted at the Language, Anthropology and Archaeology symposium of World Archaeological Congress - 3 in New Delhi in December 1994.

Malcolm Ross is the primary list owner, doing maintenance and coordinating policy. Roger Blench and Matthew Spriggs are the secondary list owners, and are also involved in any policy decisions. Their respective e-mail addresses are:

malcolm.ross@anu.edu.au
rmb5@hermes.cam.ac.uk
spriggs@coombs.anu.edu.au

To send a message to all the people subscribed to the list, just send mail to:

ARCLING@listproc.anu.edu.au.

To send a command to the list, send it to:

listproc@anu.edu.au.

**PHY-TALK:
PHYTOLITH RESEARCH
DISCUSSION LIST**

This list, which was started in March 1995, is designed to facilitate information exchange among researchers involved in the study of phytoliths, microscopic mineral deposits in plants. It is open to anyone who would like to know more about phytoliths, regardless of their field. We welcome archaeologists, plant biologists, geologists, palynologist, ecologists, and any other -gists you can think of. The atmosphere of the list is deliberately informal, though any behaviour deemed unbecoming (personal attacks, name calling, etc.) will not be tolerated. [If you do not mean your comments to be taken seriously, then attach a :-) (sideways smiley face) to them to let the readers know that they are meant in fun; it will avoid hard feelings and

misunderstandings]. Also, if you wish to use any information published in this list, please check with the author directly and cite appropriately. A log is kept automatically of all postings to this list, so you can peruse at your leisure what has been said on the list.

There are three e-mail addresses associated with this list:

phy-talk@vm1.spcs.umn.edu

This is the address of the mailing list. Any message sent to this address will be read by everyone on the list. Do NOT send requests to be added or taken off the list to this address. Those requests are handled by the next address. Also, you should not be concerned if the above address comes out looking a bit strange on the mail. Usually the messages are routed through a couple of servers, which appended their own addresses to it. Just remember if you send your mail to this address, it will be posted to the entire list.

listserv@vm1.spcs.umn.edu

This is the address of the automated list-server, which manages our mailing list.

listacct@vm1.spcs.umn.edu

This is the address for the manager of the list-server. Unlike the previous address, it is supposed to have real people attached to it. These people will not handle anything administrative to do with the list. Instead, if you are having difficulties with your server talking to the list-server, then you should contact these people. However, you can also contact Susan Pennington at the following address, and she will try to help:

penn0010@gold.tc.umn.edu

To subscribe to this list, send a message to the automated list-server:

listserv@vm1.spcs.umn.edu

Leave the SUBJECT: field blank, and on the top line and the leftmost position type:

subscribe phy-talk <your real name>

for example,

subscribe phy-talk Susan Pennington

Then you send the message. The list-server will take your e-mail address from the header and add you to the list. You should then receive an acknowledgement from the list-server saying that you have been added. Further details can be received from:

Susan J. Pennington
Program for Interdisciplinary
Archaeological Studies
215 Ford Hall
University of Minnesota
Minneapolis, MN 55403
penn0010@gold.tc.umn.edu

TROPICAL GEOMORPHOLOGY NEWSLETTER

The Tropical Geomorphology Newsletter is a biannual bulletin for scholars concerned with geomorphic processes and landscapes in the tropics. Published every April and October it is currently in its 10th year of publication. It is edited by Avijit Gupta and P.P. Wong from the Department of Geography, National University of Singapore. It is supplied free but the readers are expected to contribute news of their research and publication whenever appropriate to the newsletter. Such information may be sent to:

Avijit Gupta
Department of Geography
National University of Singapore
Singapore 119260
Fax: 65 777 3091
e-mail: geoagup@nus.sg

Contributions should be sent to David Godley, TGN E-list Administrator, at:

tgn@zikzak.net

These will be forwarded to Avijit Gupta on your behalf.

In an effort to reduce mailing costs and to widen readership the decision has been made to make TGN available via e-mail. If you are a current subscriber to TGN and would be interested to receive the electronic edition instead of the "physical": edition could you please send an message to that effect to David Godley at the above e-mail address. In the message could you please also provide your name and address as they occur on your mailing label as this will

aide your removal from the "physical" mailing list.

If you are not on the current mailing list but would like to receive the new electronic edition, please send a note to that effect to the same address. Again, we ask that you state the fact that you are not currently on the mailing list to save us a bit of effort.

Back issues of TGN will soon also be made available at the following URL ¹

<http://www.zikzak.net/tgn>

JOURNAL OF PALEOLIMNOLOGY

The Journal of Paleolimnology World Wide Web (WWW) home page started a year ago. This WWW site provides readers with information about past and current issues of the journal (including indices, titles, keywords, summaries), future papers to appear in the journal, announcements, editorial and manuscript preparation/submission details, an e-mail directory of paleolimnologists, and, of course, links to other useful WWW sites.

The Journal of Paleolimnology WWW home page can be accessed (using any WWW compatible software such as NCSA's Mosaic, SPRY's Air, or NetScape) at the following address:

<http://www.umanitoba.ca/geosci/PALEOLIM/jopl.html>

If you have any comments or questions, please send them to John and/or Bill at the following addresses

John P. Smol
Paleoecological Environmental
Assessment and Research Lab
(PEARL)
Dept. Biology
Queen's University
Kingston, Ontario

¹ STOP PRESS: E-mail received from David Godley at the very last minute ... This note is to announce that back issue No. 18-19 of TGN is now available at the TGN Home Page. The URL of this issue is <http://www.zikzak.net/tgn/issues/i18-19.html>

K7L 3N6 Canada

Tel: (613) 545-6147
Fax: (613) 545-6617
e-mail: smolj@qucdn.queensu.ca

William M. Last
Dept. Geological Sciences
University of Manitoba
Winnipeg, Manitoba
R3T 2N2 Canada

Tel: (204) 474-8361
Fax: (204) 261-7581.
e-mail: mlast@ccm.umanitoba.ca

WORLD PALYNOLOGY E-MAIL DIRECTORY ON WWW

A global e-mail directory of palynologists (paleo- and actuo-) is being compiled on the web site of the American Association of Stratigraphic Palynologists (AASP), at:

<http://opal.geology.utoronto.ca:80/AASP/aaspemail.html>

Palynologists need not be members of AASP to appear in this directory. The directory also contains links to personal home pages. If you are not on this directory, but wish to be, please e-mail me a short message with:

- (1) your full name (upper cased, e.g., SMITH, JOHN B.)
- (2) your e-mail address
- (3) if available, your personal home page address.

The purpose of this initiative is to simplify and broaden communication within the palynological community. There is no charge for listing. This directory will be maintained and updated regularly, and entries added, deleted, or changed promptly on request. Of course, you need not be connected to the WWW to have your e-mail address listed in the directory.

RADIOCARBON LIST

Editor's note: I gather there is a Radiocarbon Dating List (possibly served out of Arizona?). Does anyone know anything about this?

**S.E. ASIAN - PACIFIC
AUSTRALASIA
ARCHAEOLOGY LIST**

Another editor's note: I was formerly on of this list, but it seems that I have been dropped from it; it may not exist, or it may have one of those default functions which deletes subscribers for some reason. Does anyone have any information about this list? I may have got the geographical limits wrong also!

A.N.OTHER LISTS

Yet another Editor's note: there must be plenty of other lists and WWW pages which are of interest to Quaternarists. Send your details now.

To be continued ...

**QUATERNARY AUSTRALASIA
PAPERS**

**Paper: Quaternary Australasia
13/2 (1995)**

**THE PALAEOECOLOGICAL
RECORD FROM SITE 820:
A FURTHER RESPONSE AND
RESEARCH DEVELOPMENTS**

A. Peter Kershaw

Centre for Palynology and Palaeoecology
Department of Geography and
Environmental Science
Monash University
Clayton, Victoria 3168, Australia

The comments by Atholl Anderson (1994), Geoff Hope (1994) and Esmee Webb (1995), concerning the proposal that environmental change in northeastern Australia was caused by Aboriginal people about 140,000 years BP (Kershaw *et al.* 1993), prompt this response. My reply will be brief as many points were covered in my original response (Kershaw 1994) to the paper of Peter White (1994).

I am not very surprised about levels of concern expressed within the archaeological community and can appreciate their discomfort over the advocacy of a human presence in the absence of tangible artefactual material. From a paleoclimatologist's perspective though, the postulation of a climatic cause for sustained environmental change at this time would be more difficult to digest considering the evidence for the global nature of climate change which precludes a substantial diversion from the established pattern of glacial cyclicality. I am more surprised about the response from "born again" Hope and intrigued that, after several decades as neighbours, the opening of a door between the Departments of Prehistory and Biogeography and Geomorphology should have had such a marked influence on communication.

I expect that debate over this issue is still in its infancy. As Esmee Webb points out, the controversy over the cause of the Western European elm decline, where evidence has been accumulating for over 50 years, continues. It seems apparent that, like many such debates, including that concerning the demise of the megafauna, there is a correspondence between some human cultural and settlement change and climate, regardless of the actual causal mechanism. The burning question in Australia is no exception in that a link between climate and people has been postulated for environmental changes in both the ODP 820 and Lake George records.

Atholl Anderson addresses the question of the value of palaeoecological evidence generally as a proxy record for cultural history. Here, he makes reference to the review paper of Walker & Singh (1993) which indicates that, for most of the world, archaeological evidence for colonisation is generally older than palaeoecological evidence. This paper is a little strange in being rather conservative in its interpretation of environmental evidence except for that from Lake George. At the time this paper was written, there was very little information on the history of fire. A recent review focusing on inferred human burning in the tropics by a number of people actively involved in the production of past charcoal records (Kershaw *et al.* in press) suggests a much older record of human colonisation and impact. It indicates sufficient differences in burning histories in recently colonised areas like South and Central America from those in areas where there has been a much longer human presence to suggest that charcoal can be a useful indicator of human presence. Esmee Webb provides unintentional support for this assessment with her reference to the 'human' burning records of Calvin Heusser (presumably the sites referred to in Salemme *et al.* 1995) from extra-tropical Tierra del Fuego. The fact that burning was initiated, around 10,000 year BP, perhaps slightly later than the earliest archaeological evidence from the area and somewhat later than in southern Chile (Monte Verde) is not really surprising. These may be the first published burning records from the region while archaeologists have been active over a long period. It is interesting that Fagan (1989) concludes that "The Monte Verde site shows just how scanty the archaeological record of the first

Americans is, and just how little we are likely to find out about them until more waterlogged sites come to light". The waterlogged sites are there and are certain to reveal more charcoal than artefacts. I feel that as palynologists become more aware of the value of counting charcoal, there is a good chance that past burning records will provide the most accurate picture of human settlement patterns and cultural development on a broad regional scale.

In keeping with this belief, the Centre is focusing research on the construction and refinement of long burning records from the Australian/Southeast Asian region. Following the proposal of Bird (in press), a research student, Xuan Wang, is constructing both charcoal and black carbon records from marine cores covering at least the last glacial cycle on the Lombok Ridge and in the Banda Sea in association with the palynological studies of Sander van der Kaars. With ODP site 820, a Ph.D student, Patrick Moss, is reconstructing the last 200,000 years in much greater detail, and examining the modes of pollen transport to the site, while Barbara Wagstaff will apply the reflectance method of charcoal counting to the core samples to satisfy the general concerns of pre-Quaternary palynologists to the way that Quaternarists often identify charcoal.

It is hoped that these proposals, at least for site 820, will also satisfy the more technical criticisms of Anderson and Hope, if indeed they are legitimate. Geoff Hope expresses concern that the source of sediment may have been changing through time and may have influenced charcoal values and mangrove pollen percentages. This is possible, but these changes should not be divorced from the major concomitant change in araucarian forest representation. There is no doubt that a regional decline in this component occurred. *Araucaria* pollen was common, indicating the abundance of this plant. The pollen is now extremely rare consistent with the almost total absence of the parent plant. The decline could have taken place at any time during the last 140,000 years if one cares to speculate on changing sediment sources as the cause - sediment sources that apparently did not change in the previous one million years. If one simply considers the available evidence, then *Araucaria* declined around 140,000 years ago. Atholl Anderson, after consulting Birks & Birks (1980: 165),

queries the statistical basis for advocating the vegetation change, and suggests that both the pollen sum and number of samples are insufficient to draw any conclusions. If this was the case then I feel that there would be no such thing as geological pollen stratigraphy and that some palynologists including myself, Geoff Hope and Gurdip Singh (with a pollen sum of less than 20 grains in some samples from Lake George) would have been out of business long ago. A glimpse at the diagram on the following page of Birks and Birks (p. 166) indicates clearly that taxa achieving percentages of greater than about 10%, as is the case for *Araucaria* prior to 140,000 years ago, attain approximately their true values by the time 100 grains have been counted and, from my experience, generally long before this. The diagram also shows that uncommon taxa, as with *Araucaria* after 140,000 years ago, if recorded in a count of 100 grains, never vary by more than 1 or 2% as the count proceeds. The difference between *Araucaria* representation in the two periods, despite low counts and a small number of samples, is certainly meaningful. This conclusion is now supported by the addition of another 25 samples from the post 140,000 year period analysed by Patrick Moss as all show low *Araucaria* percentages. We await with interest the extension of his record beyond 140,000 years BP.

Concerning the problem of advocating human presence so close in time to the first evidence for *Homo sapiens*, I just want to ask if anyone is prepared yet to resurrect the idea that modern people evolved within or close to the Australian continent?

References

- Anderson, A. 1994. Comment on J. Peter White's paper 'Site 820 and the evidence for early occupation in Australia'. *Quaternary Australasia* 12/2, 30-31.
- Bird, M.I. 1995. Fire, prehistoric humanity and the environment. *Interdisciplinary Science Reviews*. In press.
- Birks, H.J.B. & Birks, H.H. 1980. *Quaternary Palaeoecology*. Edward Arnold, London.
- Fagan, B.M. 1989. *People of the Earth*. 6th Edn. Scott, Foresman, Illinois.

Hope, G. 1994. Comment on ODP site 820 and the inference of early human occupation in Australia. *Quaternary Australasia* 12/2, 32-33.

Kershaw, A.P. 1994. Site 820 and the evidence for early occupation in Australia - a response. *Quaternary Australasia* 12/2, 24-29.

Kershaw, A.P., Bush, M.B., Hope, G.S., Weiss, K-F., Goldammer, J.G. & Sanford, R. in press. The contribution of humans to past biomass burning in the tropics. In J. Clark (Ed.) *Sediment Records of Biomass Burning and Global Change*. Springer Verlag.

Kershaw, A.P., McKenzie, G.M. & McMinn, A. 1993. A Quaternary vegetation history of northeastern Queensland from pollen analysis of ODP site 820. In McKenzie, J.A., Davies, P.J., Palmer-Julson, A. *et al.* *Proceedings of the Ocean Drilling Program. Scientific Results*, 133, 107-114.

Salemme, M., Heusser, C., Roig, C., Coronato, A. & Rebassa, J. 1995. *INQUA XIV International Congress, Berlin, 1995 Abstracts*, 237.

Walker, D. & Singh, G. 1993. Earliest palynological records of human impact on the world's vegetation. In F.M. Chambers (Ed.) *Climate change and human impact on the landscape: studies in palaeoecology and environmental archaeology*. Chapman and Hall, London, 101-108.

Webb, R.E. 1995. ODP site 820 and the initial human colonisation of Sahul. *Quaternary Australasia* 13/1, 13-18.

White, J.P. 1994. Site 820 and the evidence for early occupation in Australia. *Quaternary Australasia* 12/2, 21-23.

**QUATERNARY AUSTRALASIA
PAPERS**

**Paper: Quaternary Australasia
13/2 (1995)**

**LATEX PEELS FOR
INTERPRETING
ARCHAEOLOGICAL SITES TO
THE PUBLIC**

Sarah Colley

Department of Archaeology
Building A14
The University of Sydney
Sydney N.S.W. 2006
Australia

Introduction

Latex peels of sediment and soil sections have been used by archaeologists, pedologists and other geoscientists since the 1960s, mostly for their own purposes to record stratigraphy. They are also very useful for teaching and display purposes¹. In 1993, a series of latex peels of archaeological sections were made by Sarah Colley, John Namuno and Robert Mundol at Robin Torrence's Garua Island archaeological excavations in West New Britain, Papua New Guinea (Torrence, 1995²). This paper describes the materials and techniques for making latex peels of soil and sediment sections.

¹ Editor's note: They are also potential sources of sediment for research; the editor has, for example, witnessed samples for microfossil analysis being taken from a peel collected several decades ago from an archaeological site which was subsequently destroyed.

² Editor's note: See also inside back cover of *Quaternary Australasia* 11/2 (1993).

Materials and equipment

Materials and equipment needed for one peel c. 1 x 2m:

- Trowel, clippers, shovel, etc. (for cleaning section)
- Latex solution, diluted with water to use; c. 2-3 l per peel³
- Pump-action hand-held spray bottle with spare nozzles
- Face mask which provides protection from breathing latex fumes
- Plenty of water
- Bowls or buckets to hold water for cleaning tools
- Small containers to hold diluted latex for painting
- Household decorator's paintbrushes for painting on latex
- Muslin, cheesecloth or similar material (c. 2-3 m per peel)
- Scissors to cut cloth into strips
- Disposable plastic gloves to protect hands from latex
- Tarp or large plastic sheet to protect peel from rain while it dries
- Sharp knife or razor blade to loosen peel before removing it
- Vacuum cleaner (ideally) or small soft paintbrushes to remove loose deposit from peel before mounting it
- Spray glue (e.g. PVA, hair lacquer or similar) to fix surface of peel
- Backing board or soft tarp for storage and transport
- Strong rubber or silicone glue for sticking peel to backing board
- (Ideally) frame and protective UV perspex sheet for mounting peel for display

Making the peel

1. Clean the section so that the layers show clearly. Remove any very large stones. Avoid, or fill in, any holes.
2. Apply the first coat of latex by spraying. Dilute the latex 60% solution (about 2/3 latex, 1/3 water). Try to obtain a thin even coat over the

³ Latex solution is used as carpet glue and can be bought directly from glue manufacturers in various strengths. I have used 60% latex solution in ammonia base (which I obtained from Holdfast Adhesive (Aust) Pty Ltd, 90-92 Bay Street, Botany, N.S.W. 2019, Australia, phone: (02) 316 4102, and Fax: (02) 316 4223). The solution is water soluble until it dries.

whole area. Leave to dry. This takes anything from one hour to several hours, depending on how wet the soil is and the local climate and weather conditions. Wash the latex solution out of the spray nozzle with clean water immediately. Do not let the latex solution dry in the nozzles or you will have to throw them away. Latex solution contains ammonia. Do not breathe in the fumes and consider using a face mask if you are working in a confined space.

3. When the first coat is dry, apply the second coat using a paintbrush. Dilute the latex solution with a little water, but you can paint it on much thicker than the first coat. Leave to dry for at least an hour.
4. When the second coat is dry, apply the third and final coat of latex and the backing cloth. Start at the top of the section and work down. Cut an extra deep strip of cloth the same width as the section. Fold it so that some spare cloth lies over the top edge of the trench to make a handle to hold the peel when you remove it. Do not paint latex on the "handle". Paint latex onto the section and stick overlapping horizontal strips of cloth onto the section. Push the cloth into every hole using the brush. Make sure the whole area is completely covered with latex solution and backing cloth. It is very important to overlap the cloth strips (by at least 5 cm) to provide a strong support for the peel. Apply extra cloth strips in weaker area, around big holes and stones. Apply extra vertical strips down each side and as needed across the peel to provide extra strength.
5. Leave the peel to dry. This may take at least 2-3 days (or longer), depending on the weather. Protect the peel from rain by covering with a tarp or plastic sheet if needed.

Removing the peel

1. Make sure the latex is completely dry before removing the peel.
2. Cut around the edges with a sharp knife or razor blade to loosen the peel away from any latex which has spilled.
3. Start at the top. Hold the cloth "handle" and carefully pull the peel away from the section. Use a sharp knife or a trowel to cut away any roots or latex strings to free the peel. Try to keep the peel as flat as possible to avoid smudging before it is clean. Store flat on a piece of board if possible.
4. Clean off loose soil deposit using a vacuum cleaner if possible, or a small brush. Take care not to smudge the layers.
5. Spray the surface of the peel with a thin coat of PVA glue or hair lacquer to seal it.
6. The peel can be carefully rolled around a soft cloth or tarp for transport, or kept flat on a backing board.

Mounting the peel

1. Stick the peel to a backing board using a strong rubber- or silicone-based glue, such as silicone sealants used for bathrooms.
2. To protect the peel for long-term display, it should ideally be placed inside a frame under a perspex cover which provides protection from UV light.

Acknowledgements

I am grateful to Professor Isabel McBryde for supplying me with information about latex peels.

Reference cited

Torrence, R. 1995. Lukluk bek long taim bepo! *Past* (Newsletter of the Prehistoric Society), 20, 1-2.

COVER ILLUSTRATION

The front cover illustrates a selection of Chenopodiaceae and Casuarinaceae pollen curves, collated by Gay Crowley from Quaternary pollen sequences from southern Australia, as reproduced as represented by the original authors. This collation supports an argument that a relationship exists between rises in the abundance of Chenopodaceae and *Casuarina* and increasing salinization of soils. Soil salinization, it is argued, may have been an important influence on vegetation change in the past, and probably resulted in other vegetational changes and thus must be taken into account in environmental reconstructions. In the diagrams, Crowley identifies five critical phases of salinization, associated with: A, Glacial period aridity; B, High groundwater tables at maximum sea level and/or rainfall; C, Interglacial maximum aridity; D, long-term salinization persisting despite climatic amelioration or watertable fall; and E, European occupation. From: Crowley, G.M. 1994. Quaternary soil salinity events and Australian vegetation history. *Quaternary Science Reviews*, 13, 15-22.